



Kaunas University of Technology
Faculty of Social Sciences, Arts and Humanities

Communicating Biodiversity Loss in News Media in Lithuania

Master's Final Degree Project

Vilius Butkevičius

Project author

Prof. dr. Audronė Telešienė

Supervisor

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Kaunas University of Technology
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Vilius Butkevičius

Projekt author

Prof. dr. Audronė Telešienė

Supervisor

Prof. dr. Aistė Balžekienė

Reviewer

Kaunas, 2026



Kaunas University of Technology
Faculty of Social Sciences, Arts and Humanities
Vilius Butkevičius

Communicating Biodiversity Loss in News Media in Lithuania

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Summary

The topic of biodiversity loss is increasingly becoming an alarming risk. As communicated by European Commission (2024b), “an average of around 25 per cent of species in assessed animal and plant groups are threatened, suggesting that around 1 million species already face extinction”. This problem seems to be affecting many different fields (economical, societal, environmental) and is influenced by a variety of different factors such as “changes in land and sea use, habitat destruction, overexploitation of organisms, climate change, pollution, and invasive species”. The European Union is putting in an effort to mitigate this problem by presenting a new strategy meant to reduce biodiversity loss. This is clearly emphasized in EU documents such as the EU Biodiversity Strategy for 2030 (European Commission, 2024a), the EU Habitats Directive (European Commission, 2024b), the Nature Restoration Law (European Commission, 2024c), and the European Green Deal (European Commission, 2024d). Lithuania, being a part of EU, adapts to its policies to promote environmental restoration. However, the questions such as if the adopted strategies are helping in mitigating biodiversity loss, what is societal concern about these issues, why this topic seemingly gathering such low engagement from the Lithuanian public, how media is reflecting biodiversity loss, are still open and need further exploration. The lack of awareness can be partially attributed to the way that the topic of biodiversity loss/decline is communicated by the Lithuanian news media, which is what this thesis will be exploring. Thus, **the main research question of the thesis** is as follows: How is Lithuanian news media communicating about the topic of biodiversity loss? This master's thesis **aims** to analyse how news media is communicating to the public about the topic of biodiversity loss in Lithuania. The aims are being reached through the several **objectives**: (1) To explore the theoretical frameworks that might be used for analysis of biodiversity loss communication; (2) To create the methodology for biodiversity loss communication in news media empirical analysis; (3) To empirically explore how news media is communicating to the public about the topic of biodiversity loss in Lithuania. **Research methods**: literature review, news media content analysis. **The structure** of the thesis includes 3 major parts. Firstly, the thesis presents the theoretical framework that might be used for analysis of biodiversity loss communication. Secondly, thesis explains methodology for biodiversity loss communication empirical analysis. Finally, it discusses empirical evidence on how news media is communicating to the public about the topic of biodiversity loss in Lithuania. It looks into how the topic of biodiversity is framed and presented to the public, showcases the communication strategies employed by the news media and its correlations to the narratives.

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Santrauka

Biologinės įvairovės nykimo tema yra aktuali globaliu mastu. Kaip praneša Europos Komisija (2024b), „vidutiniškai apie 25 proc. žinomų gyvūnų ir augalų rūšių gresia išnykimas, o tai reiškia, kad maždaug 1 mln. rūšių jau gresia išnykimas“. Atrodo, kad ši problema daro įtaką daugeliui skirtingų sričių (ekonomikos, visuomenės, aplinkosaugos) ir ją lemia daugybė įvairių veiksnių, tokių kaip „žemės ir jūros naudojimo pokyčiai, buveinių naikinimas, pernelyg intensyvus organizmų naudojimas, klimato kaita, tarša ir invazinės rūšys“ (Europos Komisija, 2024b). Europos Sąjunga stengiasi sušvelninti šią problemą, pristatydamą naują strategiją, kuria siekiama sumažinti biologinės įvairovės nykimą. Tai aiškiai pabrėžiama tokiuose ES dokumentuose kaip ES biologinės įvairovės strategija iki 2030 m. (Europos Komisija, 2024a), ES buveinių direktyva (Europos Komisija, 2024b), Gamtos atkūrimo įstatymas (Europos Komisija, 2024c) ir Europos žaliasis kursas (Europos Komisija, 2024d). Lietuva, būdama ES dalimi, prisitaiko prie jos politikos, skatinančios aplinkos atkūrimą. Tačiau klausimai, ar priimtose strategijos padeda mažinti biologinės įvairovės nykimą, koks visuomenės susirūpinimas šiais klausimais, kodėl ši tema sulaukia tokio mažo Lietuvos visuomenės susidomėjimo, kaip žiniasklaida atspindi biologinės įvairovės nykimą, vis dar lieka atviri ir reikalauja tolesnio tyrimo. Nepakankamą informuotumą iš dalies galima paaiškinti tuo, kaip biologinės įvairovės nykimo temą perteikia Lietuvos žiniasklaida, o tai ir bus tiriama šiame darbe. Taigi, **pagrindinis šio darbo mokslinio tyrimo klausimas** yra: Kaip Lietuvos žiniasklaida komunikuoja biologinės įvairovės nykimo temą? **Šio magistro darbo tikslas** - išanalizuoti, kaip naujienų žiniasklaida komunikuoja visuomenei biologinės įvairovės nykimo temą Lietuvoje. Tikslo siekiama keliais **uždaviniais**: (1) Išnagrinėti biologinės įvairovės nykimo komunikaciją teoriniu aspektu; (2) Sukurti biologinės įvairovės nykimo komunikacijos naujienų žiniasklaidoje empirinės analizės metodiką; (3) Empiriškai ištirti, kaip naujienų žiniasklaida komunikuoja visuomenei biologinės įvairovės nykimo temą Lietuvoje. **Tyrimo metodai**: literatūros apžvalga, naujienų žiniasklaidos turinio analizė. **Šio darbo struktūrą** sudaro 3 pagrindinės dalys. Pirmoje dalyje pateikiama teorinių perspektyvų, kurios gali būti naudojamos biologinės įvairovės nykimo komunikacijos tyrimui, analizė. Antroje dalyje, pristatoma biologinės įvairovės nykimo komunikacijos empirinio tyrimo metodika. Trečioje dalyje aptariami empiriniai duomenys apie tai, kaip naujienų žiniasklaida komunikuoja visuomenei biologinės įvairovės nykimo temą Lietuvoje. Šiame tyrime analizuojami Lietuvos naujienų žiniasklaidos straipsniai ir tai, kaip juose pristatoma biologinės įvairovės nykimo tema. Darbe nagrinėjama, kaip ši tema formuluojama ir pristatoma visuomenei, parodomas naujienų žiniasklaidos taikomų komunikacijos strategijos ir jų sąsajos su komunikuojamomis temomis.

Table of contents

List of figures	7
List of tables	8
List of abbreviations and terms.....	9
Introduction	10
1. Theoretical perspectives on biodiversity loss communication in news media	13
1.1. The concepts of biodiversity and biodiversity loss	13
1.2. Theoretical frameworks for analysis of biodiversity communication in news media.....	16
1.2.1. Agenda setting theory.....	18
1.2.2. Framing theory	20
1.2.3. Visual communication theory.....	24
1.3. Biodiversity loss communication in environmental research.....	27
1.4. Theoretical framework for analysis of biodiversity loss communication in news media	29
2. Methodology.....	32
2.1. Quantitative data collection and analysis	33
2.2. Qualitative data collection and analysis	35
3. Findings of the empirical research.....	39
3.1. Top news media sources and trends in biodiversity loss communication.....	39
3.2. Narrative focus in biodiversity loss communication: What should the public think about?....	42
3.3. Sentiment analysis and relation of sentiments with top narratives.....	50
3.4. Framing strategy analysis	51
3.5. Stakeholder analysis	55
3.6. Ecosystem analysis	58
3.7. Types of biodiversity analysis	60
3.8. Visual communication of biodiversity loss	62
3.9. Summary of the empirical research results	64
Conclusions	68
List of references.....	70
List of information sources	75
Appendices	76

List of figures

Fig. 1. Framing strategies (developed by author).....	21
Fig. 2. Theoretical framework for analysis of biodiversity loss communication in news media.....	30
Fig. 3. Steps of empirical research on biodiversity loss communication in news media.....	32
Fig. 4. Descriptive information about the articles	37
Fig. 5. Top News Media Sources	39
Fig. 6. Monthly amount of articles that are related to the topic of biodiversity loss (2020-2022)....	40
Fig. 7. Monthly amount of articles that are related to the topic of biodiversity loss (2023-2025)....	41
Fig. 8. Narrative focus (frequency, number of documents)	43
Fig. 9. Types of solutions related to the issue of biodiversity loss: direct impact (frequency, number of documents)	43
Fig. 10. Types of solutions related to the issue of biodiversity loss: indirect impact (frequency, number of documents)	45
Fig. 11. Types of causes and drivers of biodiversity loss (frequency, number of documents)	48
Fig. 12. Tone of Language (frequency, number of documents).....	50
Fig. 13. Framing strategies of biodiversity loss communication (frequency, number of documents)	52
Fig. 14. Stakeholders, mentioned in the articles (frequency, number of documents)	56
Fig. 15. Ecosystem type (frequency, number of documents).....	59
Fig. 16. Types of biodiversity (frequency, number of documents).....	60
Fig. 17. Example of visuals illustrating topic of humans.....	62
Fig. 18. Example of visuals illustrating topic of management of wolves population	63
Fig. 19. Example of visuals illustrating topic of forest (left) and civilization (right)	64

List of tables

Table 1. Key approaches of biodiversity concept (developed by author).....	14
Table 2. Key approaches of biodiversity loss concept (developed by author)	16
Table 3. Keywords for the <i>Mediaskopas</i> filters	33
Table 4. News media portals that were analysed.....	33
Table 5. The list of code groups, codes and subcodes	35
Table 6. Yearly totals of published articles each year in the period of 2020 - 20225	42
Table 7. Examples of narrative focus on solutions to cope with biodiversity loss as direct impact presented in the analysed documents.....	44
Table 8. Examples of narrative focus on solutions to cope with biodiversity loss, that have indirect impact, presented in the analysed documents.....	46
Table 9. Examples of narrative focus on causes and drivers of biodiversity loss, presented in the analysed documents.....	48
Table 10. Intersection of codes in a segment: types of causes and drivers and sentiments.....	51
Table 11. Intersection of codes in a segment: framing strategy and narrative focus.....	53
Table 12. Intersection of codes in a segment: framing strategy and causes/drivers	54
Table 13. Intersection of codes in a segment: framing strategy and solutions (direct impact).....	55
Table 14. Intersection of codes in a segment: framing strategy and solutions (indirect impact)	55
Table 15. Intersection of codes in a segment: framing strategy and stakeholders.....	57
Table 16. Intersection of codes in a segment: narrative focus and stakeholders	58
Table 17. Intersection of codes in a segment: framing strategy and ecosystem type	59
Table 18. Intersection of codes in a segment: narrative focus and ecosystem type.....	60
Table 19. Intersection of codes in a segment: framing strategy and biodiversity type.....	61
Table 20. Intersection of codes in a segment: narrative focus and biodiversity type	61
Table 21. Representation of the objects in visualization of the articles.....	62

List of abbreviations and terms

Abbreviations:

EU – European Union

NGO – non-governmental organization

Terms:

Biodiversity – varieties of life forms on Earth (Drury, Fuller & Keijzer, 2022). The biodiversity is measured by 3 characteristics: richness, evenness and heterogeneity (Cardinale, et al., 2012).

Biodiversity loss – the decrease in variability of life on Earth (wild and cultivated) (Roe, Seddon, & Elliott, 2019)

Communication - the flow of a message from source to destination (Foulger, 2004).

News media – channels transmitting news to society (adopted by author from Dempster, Sutherland, & Keogh, 2022).

News media knowledge – factual information about news that people have stored in their long-term memory (Schulz, Fletcher & Nielsen, 2022)

Introduction

Significance of the topic. The topic of biodiversity loss is increasingly becoming an alarming risk. As communicated by European Commission (2024b), “an average of around 25 per cent of species in assessed animal and plant groups are threatened, suggesting that around 1 million species already face extinction”. This problem seems to be affecting many different fields (economical, societal, environmental) and is influenced by a variety of different factors such as “changes in land and sea use, habitat destruction, overexploitation of organisms, climate change, pollution, and invasive species” (European Commission, 2024b). The European Union is putting in effort to mitigate this problem by presenting a new strategy meant to reduce biodiversity loss. This is clearly emphasized in EU documents such as the EU Biodiversity Strategy for 2030 (European Commission, 2024a), the EU Habitats Directive (European Commission, 2024b), the Nature Restoration Law (European Commission, 2024c), and the European Green Deal (European Commission, 2024d). Lithuania, being a part of EU, adapts to its policies to promote environmental restoration. However, the questions such as if the adopted strategies are helping in mitigating biodiversity loss, what is societal concern about these issues, why this topic seemingly gathering such low engagement from the Lithuanian public, how media is reflecting biodiversity loss, are still open and need further exploration. The lack of awareness can be partially attributed to the way that the topic of biodiversity loss/decline is communicated by the Lithuanian news media, which is what this thesis will be exploring.

News media is crucial in promoting the topic of biodiversity loss to the public as well as framing this topic in such a way that it inspires people to take up action in solving, however there is a variety of issues which prevent or make it much more difficult for the topic of biodiversity to gain the needed notoriety and people’s support. Inadequate framing strategy is one of the reasons damaging the reach and influence of the topic. In communication of biodiversity and its loss, there is “a mismatch in the framing of the sender and receiver, leading to ineffective communication and a perceived conflict between biodiversity messages and those of other sectors” (Wilhelm-Rechman and Cowling 2011). If this problem was addressed and proper framing or even agenda setting strategies were implemented, the topic could receive much more public attention and support. Another example could be not recognizing that the risk of biodiversity loss can have great negative financial consequences such as physical risk factors, that “refer to disruptions to business inputs, operating environments, or consumer demand resulting from biodiversity loss, e.g. declines in pollinators adversely affecting crop yields”, or transition risk factors, that “refer to economic losses stemming from actions taken to mitigate biodiversity loss, including shifts in policy, regulation, technology, trade, or consumer preferences, e.g. the EU’s proposal to remove deforestation-risk commodities from EU supply chains” (European Commission, 2021a). Even though these risks are valid and present a considerable problem that can affect many different fields and individuals alike, it is very rarely mentioned in the media and is even less likely to be indicated as connected to the loss of biodiversity problem. These examples show that there is a gap in understanding how to effectively communicate about the topic of biodiversity decline. Therefore, analysis of how news media communicates about biodiversity loss to the public is needed since if incorrect framing strategy assignments or lack of financial risk reporting among other existing issues related to the topic were analysed and understood, then the proper steps could be taken in addressing biodiversity loss.

Existing research and novelty. The problem of biodiversity loss and its communication is appearing in all the world, including the Europe and Lithuania. Scientific literature analysis shows the interest in exploring this topic from different perspectives and in different countries and regions such as

Guinea-Bissau, West Africa (da Silva et al, 2023), Indonesia and Southeast Asian countries (von Rintelen, Arida, Häuser, 2017) and even in Lithuania (Elbakidze et al, 2016), as well as from cross-national perspective (Habibullah, Din, Tan, et al., 2022), using global data. The analysis shows that this decline is being mainly caused by destruction and fragmentation of natural habitats (Tilman et al. 2001), accelerated by such issues as misuse of agricultural areas where “intensification or abandonment of agricultural land use has led to a severe decline of semi-natural habitats across Europe”, causing either immediate loss of species or time-delayed extinctions, “known as the extinction debt” (Tilman et al, 2001). The rate of extinction might be accelerated also due to other causes such as invasion by alien species, overexploitation, climate change, habitat deterioration and extinction cascades (Diamond 1989; Thomas et al. 2004a; Brook et al. 2008; Dunn et al. 2009). Despite these seemingly important findings and their connectivity to the topic of biodiversity loss, there seems to be a general lack of analysis of engagement from the public and media towards these issues. Investigating biodiversity loss communication in Lithuania could shed more light on this problem and determine is the news media’s framing of the topic to be blamed or are there other unaddressed issues which were not yet perceived. Thus, **the problem of this thesis** is focused on the gap in understanding how biodiversity loss is communicated in Lithuanian news media.

The main research question of the thesis is as follows: How is news media in Lithuania communicating about the topic of biodiversity loss?

Research sub-questions help to answer the main question in exploring the landscape of biodiversity loss communication, also specifically focusing on Lithuania, as a case, through analysis of different angles of biodiversity loss communication, such as the patterns of biodiversity communication in news media in Lithuania, agenda setting strategies, implied by the news media and how they were used in Lithuania and the framing strategies implied to present the topic to the public.

This master’s thesis **aims** to analyse how news media is communicating to the public about the topic of biodiversity loss in Lithuania.

The aim is being reached through the several **objectives**:

1. To explore the theoretical frameworks that might be used for analysis of biodiversity loss communication.
2. To create a methodology for empirical analysis of biodiversity loss communication in news media
3. To empirically explore how news media is communicating to the public about the topic of biodiversity loss in Lithuania.

Research methods used in this thesis mainly focus on literature review and news media content analysis. Seeking to develop a theoretical framework of the research, the literature review was conducted. The literature review included sources that focus on biodiversity definition, biodiversity loss analysis, communication theories, including Agenda setting, Framing and Visual communication theories, and empirical studies about biodiversity loss communication in environmental research landscape. News media content analysis was focused on analysis of news media articles on biodiversity loss communication.

The structure of the thesis includes 3 major parts. Firstly, the thesis presents analysis of the theoretical frameworks that might be used for analysis of biodiversity loss communication. Secondly, thesis explains methodology for biodiversity loss communication empirical analysis. Finally, it discusses empirical evidence on how news media is communicating to the public about the topic of

biodiversity loss in Lithuania. This study analyses Lithuanian news media articles and how the topic of biodiversity loss is presented in them. It investigates how the topic is framed and presented to the public, showcasing different framing strategies employed by the news media. Due to rising risk of biodiversity loss, the role of news media, as a tool that can shape the presentation of the topic affecting how it is perceived by the people and their engagement levels, has become vital. To most effectively use this tool, it is crucial to fully understand its strategy, impact and scope as well as what can be improved in order to procure more of the public's attention, which is what thesis is trying to accomplish.

The thesis is based on analysis of 75 literature and 5 information sources and 1 annex. It has 19 figures and 21 table.

1. Theoretical perspectives on biodiversity loss communication in news media

This part starts with a sub-chapter that presents the description of the object of communication and tries to answer the question of what the object of communication analysis is. The first subchapter discusses two important concepts: the concept of biodiversity and the concept of biodiversity loss. While discussing the concept of biodiversity, the major characteristics on how to measure biodiversity are described, and then the key elements of biodiversity concepts that are relevant in the perspective of its communication are presented. This subchapter also discusses the biodiversity loss that is one of the key concerns in a contemporary society. In this subchapter biodiversity loss and its implications as well as factors, accelerating biodiversity loss, are also presented.

The second subchapter explains the concept of communication and by using extensive literature review, presents the theoretical frameworks for communication analysis. After the screening of literature, two major theoretical approaches have been selected to be used as the theoretical basis of this master thesis, namely, agenda setting theory and framing theory. This analysis includes the discussion on three levels of agenda setting theories, including the perspective of reverse agenda setting, and framing theory, which is presented through explanation of different strategies of framing (motivational, diagnostic, prognostic, thematical and others). Additionally, this sub-chapter also discusses visual communication theory, which is a powerful tool in communicating biodiversity loss.

The third sub-chapter presents literature review on biodiversity loss communication. It explores what are the main trends in analysis of biodiversity communication, the scope of communication, what are media outlets for this communication.

The fourth sub-chapter is merging the main findings from the first sub-chapter (literature review on understanding of biodiversity and biodiversity loss: “what” is communicated), the second subchapter (literature analysis of the theoretical background of media communication: “how is communicated”) and third sub-chapter (literature review of biodiversity loss communication: existing research practices), presenting a theoretical framework for analysis of news media communication of biodiversity loss.

1.1. The concepts of biodiversity and biodiversity loss

Biodiversity concept came into the academic discourse in mid-twentieth century (Diaz and Malhi, 2022). The term “biodiversity” was first used by E. O. Wilson in 1988, and since then this concept continues to be widely used (Colwell, 2009). As emphasized by Diaz and Malhi (2022), biodiversity at that point of time was “frequently used in the sense of species number“ (p. 33). Currently, biodiversity is understood as “varieties of life forms on Earth” (Drury, Fuller, and Keijzer, 2022).

Literature analysis shows that the biodiversity concept is multidimensional. As argued by Diaz and Malhi (2022), there is possible to examine biodiversity from different angles: “within species (genetic diversity within populations, and across populations of the same species and also of varieties of domesticated plants and animals); across species (taxonomic or organismal diversity at the level of species and higher) within a given area; and across different scales, from local patches to landscapes to biomes and the whole Earth” (p. 34). The multidimensionality of the concept brings a wide understanding of what constitutes “biodiversity”.

When describing and explaining biodiversity, many authors emphasize the normative approach, speaking about biodiversity as a value. Diaz and Malhi (2022) found that “biodiversity has multiple values ranging across intrinsic, instrumental, and relational values, which differ strongly among social actors” (p.54). These authors identify two major approaches: biocentric worldview and anthropocentric worldview. Biodiversity is also emphasized when discussing environmental values, emphasizing biodiversity protection and conservation (Chan, Balvanera, Benessaiah, Chapman, Díaz, et al., 2016).

Literature also shows that the concept of biodiversity usually is considered in a broader perspective, including the ecosystem approach. Research studies (Diaz and Malhi, 2022) indicate that when describing biodiversity we should include the ecosystem aspect, especially approaching biodiversity from the perspective of policies and legislation. Thus, in order to understand the biodiversity concept, such elements as socio-cultural environment, legal environment, political environment, technological environment, economic environment are important. These aspects are important for biodiversity communication as well.

When discussing biodiversity topics, authors also focus on the implications. Much literature, when analysing biodiversity, incorporates approaches of how biodiversity is affected by humans. In this aspect authors speak about principles for managing or enhancing biodiversity (Jean-Pierre L. Savard et al., 2000), biodiversity conservation (Nielsen, et al., 2021, European Biodiversity Strategy, n.d), implications on functioning of ecosystems and ecosystems services (Cardinale, et al., 2012). These efforts to preserve biodiversity usually are related to programs, projects and other human actions as well as to development of biodiversity preservation strategies (e.g. Convention on Biological Diversity, “an intergovernmental agreement among 193 countries to support the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits (Cardinale, et al., 2012)).

Summarizing, the definitions of biodiversity include different elements. These elements are important when speaking about biodiversity communication. The review of definitions is presented in Table 1.

Table 1. Key approaches of biodiversity concept (developed by author)

Key approaches	Description	Author(s)
Multidimensionality approach	Definitions include emphasis on different classifications of life forms: variation in genes, species, functional traits.	Colwell, 2009 Drury, Fuller, and Keijzer, 2022
Values/normative approach	Definitions include a normative approach where biodiversity is interpreted in the perspective of biocentric worldviews, that favour intrinsic values of nonhuman nature per se.	Diaz and Malhi, 2022 Chan, et al. 2016 de Lange, et al. 2022
Ecosystem approach	Definition of biodiversity incorporates the ecosystems’ perspective, approaching biodiversity as an element of broader environments: socio-cultural, legal, political, technological, economical and other. Also, this perspective emphasizes the role of different stakeholders that are addressing biodiversity loss.	Diaz and Malhi, 2022 Cardinale, et al., 2012
Implications approach	Incorporates approaches of how biodiversity is affected by humans. Factors influencing biodiversity loss are discussed. Also, the biodiversity loss prevention programs and projects are discussed.	Cardinale, et al., 2012 Cardinale. 2012 Nielsen., et al., 2021 Jean-Pierre, Savard 2000

As emphasized by Cardinale, et al. (2012), in measuring biodiversity the focus is on 3 major characteristics (p. 60):

- richness. This measure presents “the number of unique life forms” (p.60);
- evenness. Evenness comes as a measure of “the equitability among life forms” (p.60);
- heterogeneity. This aspect is measured by “the dissimilarity among life forms” (p.60).

All three biodiversity characteristics are related to biodiversity loss as consequences. As argued by Cardinale, et al. (2012), biodiversity loss affects functioning of ecosystems and ecosystem services that they provide to humanity. Loss in richness of biodiversity might be measured in decreased numbers of different and unique life forms. This is related to the extinction of different species and has a direct impact on the functioning of the ecosystems. Evenness is related to the spread of different life forms across geographical localities. In this aspect, the loss in evenness of biodiversity impacts services of ecosystems that they provide to humanity. Finally, heterogeneity is showing how the life forms differ among themselves. The loss of heterogeneity of biodiversity might impact both functioning of ecosystems and ecosystem services.

When speaking about biodiversity loss, biodiversity is often discussed in a perspective of nature – human relation. Cardinale, et al. (2012) developed 6 consensus statements that shows the implications of biodiversity loss for functioning ecosystems and ecosystem services:

- Statement #1 says that “loss reduces the efficiency by which ecological communities capture biologically essential resources, produce biomass, decompose and recycle biologically essential nutrients” (p.60).
- Statement #2 shows that biodiversity loss decreases “the stability of ecosystem functions through time” (p.60).
- Statement #3 states that “the impact of biodiversity on any single ecosystem process is nonlinear and saturating, such that change accelerates as biodiversity loss increases” (p.61).
- Statement #4 is about the negative impact of biodiversity loss on productivity.
- Statement #5 states that “loss of diversity across trophic levels has the potential to influence ecosystem functions even more strongly than diversity loss within trophic levels” (p.61).
- Statement #6 is that “functional traits of organisms have large impacts on the magnitude of ecosystem functions, which give rise to a wide range of plausible impacts of extinction on ecosystem function” (p.61).

These statements indicate the impact of biodiversity loss on ecosystems and serve as a good example to showcase the importance of this topic to the sustainability of the planet. In this respect, biodiversity loss is called as “biodiversity crises” (de Lange, et al. 2022). As argued by Cardinale (2012), historically biodiversity loss was not acknowledged, biodiversity was treated as “as if it were a simple by-product of the physical and chemical variation that generates biological diversity and allows it to persist” (p.552). The situation has changed just in 1990s, “when scientists began to manipulate biodiversity in controlled environments and found that it can act as an independent variable that directly controls ecosystem-level functions, such as nutrient cycling and biomass production” (p.552). Since then, much more attention is paid to present biodiversity loss.

Biodiversity loss is caused by different issues such as deforestation, selective logging, hunting and trade, mining, mineral extraction, reservoir construction, wetland drainage, fires, pollution, invasive alien species, diseases, climate change, and many more (Hughes, 2017). As argued by Hughes (2017), it requires changing human behaviour to address these causes. The strategies to cope with biodiversity

loss include different nature-related programmes and projects, conservation efforts, restoration of habitats, and education on sustainable practices (Hughes, 2017).

Thus, summarizing the concept of biodiversity loss, several key elements are important: causes of biodiversity loss, consequences of biodiversity loss and strategies to cope with biodiversity loss (conservation, restoration, programmes, etc.). The summary is presented in Table 2.

Table 2. Key approaches of biodiversity loss concept (developed by author)

Key approaches	Description	Author(s)
Causes of biodiversity loss	Includes deforestation, selective logging, hunting and trade, mining, mineral extraction, reservoir construction, wetland drainage, fires, pollution, invasive alien species, diseases, climate change, and many more	Hughes, 2017
Consequences of biodiversity loss	Biodiversity loss affects functioning of ecosystems and ecosystem services that they provide to humanity, including that biodiversity loss reduces the efficiency, there is a negative impact of biodiversity loss on productivity, it decreases the stability of ecosystem functions, etc.	Hughes, 2017 Cardinale, et al., 2012 Cardinale, 2012 Nielsen, et al., 2021 Jean-Pierre, Savard et al, 2000
Strategies to cope with biodiversity loss	Includes different nature-related programmes and projects, conservation efforts, restoration of habitats, and education on sustainable practices	Hughes, 2017

These key approaches of biodiversity loss might be used to understand patterns of communication and will serve as guiding elements to understand the topics of biodiversity loss communication via news media.

1.2. Theoretical frameworks for analysis of biodiversity communication in news media

Communication is usually understood as a flow of message or other piece of information from source to destination (Foulger, 2004). The basic aim of communication is to send the message from sender to receiver in the most effective way. The effective communication strategies are very often used in management studies, especially in advertising and marketing (Van Den Putte, Honda, 2005). However, the effectiveness of communication is also a major focus in communication studies as well.

Literature review shows that there are different typologies of communication strategies. Van Den Putte and Honda (2005) did an overview of different strategies of successful communication and how these different models predict human behaviour. They argue that “a vital question is the appropriateness of the choice of strategy in particular situations” (p.2400). Based on the theory of planned behaviour (Ajzen, 1991; Armitage, Conner, 2001), Van Den Putte and Honda (2005) presented an integrated framework for effective communication (IFEC), including descriptions of 5 effective communication strategies:

- Persuasion communication strategy, which is based on communication of instrumental advantages of the product/idea/topic;
- Social communication strategy, which targets social influence and approval or disapproval of others. For example, “brands are used to communicate the social group to which an individual wishes to belong and whose approval is desired” (Van Den Putte, Honda, 2005, p. 2401). The objective of this strategy is related to group goals, identity, norms.

- Self-efficacy communication strategy, which targets self-efficacy and behaviour control. This strategy enhances feelings of competence.
- Relationship communication strategy, which pursues the expression of identity, norms, values. The objective of this strategy is related to personal goals, identity, norms.
- Emotional communication strategy, which is aimed at the positive emotions people experience when the objective of this strategy is related to emotions and affective consequences. This latter strategy is very much related to emotional framework strategies, that are discussed later in this thesis.

Thus, such factors as selection of target audience, preparing the strategy of communication, selecting the scope of communication become important aspects of the communication process.

When describing the communication process, the usual scheme is explained by the idea of information flow from sender to receiver. This basic model of communication is enhanced by including other elements of the communication process. Communication process is not happening in vacuum. Just one type of communication is in person communication. However, a major part of communication is happening using mediators. Mediators can include different technologies, ranging from simple telephone connection to sophisticated social media Apps. Also, communication has different types of communication: person to person, person to public, media communication, etc., but in this study the focus is in on media communication.

Media communication has its specifics. There are explicit differences considering communication in a scientific article, in person non-formal chat, social media blog or news media report. Literature discusses different types and tools of media communication. It is widely recognized by the media that “media both shape and reflect public opinion” (Dempster, Sutherland, Keogh, 2022). Media coverage of different issues incorporates perspectives of different stakeholders, including government, businesses, civil society organizations, academia, however, all these stakeholders might have diverse needs and interests to communicate some particular topic (Dempster, Sutherland, Keogh, 2022). Dempster, Sutherland, Keogh, (2022) argue that “a subtle shift occurs” when information is communicated via mainstream news media, especially of the topic that present scientific information (such as topics of biodiversity loss).

News media communication is a specific type of media communication. As Baron (2005) argues, “the news media can conduct investigative journalism to obtain its own information and based on that information and the information it has received from its sources, provides a news report to the public” (p.336). This type of media is related to journalism, presenting news for society.

News media has several types. Usually, society gets news via conventional news media channels. But besides conventional media, there are also alternative news media channels (Holt, Ustad Figenschou, Frischlich, 2019).

News media also might be mediated by information and communication technologies such as the Internet. News media can be part of new media communication, presented via Web content (Herring, 2004). This type is similar to social media type, as it is much more interactive compared to regular channels of news media such television or radio. Thus, news media communication presents news to society, including news about environmental issues, in the highly “hybrid and polarized media environment” (Holt, Ustad Figenschou, Frischlich, 2019) and opens much more opportunities for expressing feedback on the content.

1.2.1. Agenda setting theory

McCombs and Shaw (1972) have introduced the idea that media can set an agenda for the public. As the authors discovered, media is not able to tell people what to think; however, it can be used to tell people what to think about. In other words, by selecting specific topics and promoting them at a higher frequency than other/opposing topics, media can be used, to a point, influence what topics the public is thinking about the most.

With the recent rise of the loss in biodiversity issue agenda setting with the addition of visual communication have the potential in becoming major tools to combat this issue. Issues related to environmental problems develop much slower than other (for example social or economic) issues. As a consequence, environmental issues usually lack a sense of imminent danger/threat which hinders them in receiving constant media attention. Due to these circumstances agenda setting theories which can help attract public's attention, together with visual elements that can be easily understood and influence individuals rationally as well as emotionally can be used as effective tools when combating many various environmental issues (Brown, Deegan, 1998). Ever since its foundation, agenda setting theory has evolved and been refined into various elements and theories such as first, second and third level agenda setting and reverse agenda setting amongst others.

First level agenda setting

According to agenda setting theory, media can influence public perception by deciding which issues receive the biggest amount of attention, also known as first level agenda setting and how these problems are presented to the public which is second level agenda setting. Generally, first level agenda setting theory refers to the control of media appearance frequency for specific topics (Kim et al., 2017), second level agenda setting refers to perspectives or viewpoints emphasized in the media (Kim et al., 2017). First level agenda setting theory is mainly focused on the frequency of media coverage for specific topics. This theory suggests that there is a direct correlation between the frequency of the topic presented by the media and its importance to the public (Kim et al., 2017). The applicability of first level agenda setting was demonstrated in the US. Presidential election 1972, in this case, by “comparing the rank-ordered issues on the media agenda with the key issues of the day on the agenda of undecided voters, McCombs and Shaw found that the salience of the news agenda was highly correlated to that of the voters, thus providing evidence of agenda setting (i.e., first-level agenda setting)” (Kim et al., 2017, p. 6).

When referring to environmental issues, first-level agenda setting is a crucial tool that can be used to focus the public's attention on the arising problems. The more coverage the topic of biodiversity loss topic receives from the public, the more likely it is to be seen as an urgent/important issue by the public. On the other hand, if this topic gets minimum media exposure it might be perceived by the public as a low-priority issue (Kim et al., 2017).

Literature suggests several factors that can be used while applying first level agenda setting theory. Firstly, understanding that news media organizations prioritize covering economic and political topics, thus environmental topics might have a harder time getting media traction (Kim et al., 2017). Secondly, it is important to cover dramatic events, such as forest fires or species extinction threats, when talking about biodiversity loss issues since dramatic events tend to be more memorable to the audience and more covered by news media (Brown, Deegan, 1998). Lastly, engaging in and understanding social media trends can help increase the public's perception and engagement with the

topic. Creating social media platforms/channels can also help not only spread awareness but also in collecting the support of the people.

Second level agenda setting

Often compared to the framing theory, second level agenda setting influences how the public thinks about specific issues. Kim et al. (2017) emphasize the importance of the works of Shaw and McCombs (1977), who “introduced the concept of attribute agenda. They theorized that not only the media agenda but also object attributes have an agenda-setting effect, illustrating the influence of the attribute agenda in the news on the public’s attribute agenda (i.e., second-level agenda setting)” (Kim et al., 2017, p. 6). In simple terms this theory highlights particular parts of the issue to influence the public’s perceptions of it.

According to the second level agenda setting the loss of biodiversity topic can be presented in multiple different ways. It can be framed in a scientific way, focusing on the endangered species lists or habitat changes. It can be framed in a humanistic way, focusing on environmental decline and how it affects farmers. It can be framed in an economic way, focusing on possible agricultural losses and rising food prices (Brown, Deegan, 1998). With the help of the second level agenda setting theory environmental conservation topics can be tailored to influence the way that the public thinks and feels about these topics, possibly even motivating them to take these problems more seriously in becoming a part of the conservation effort.

Third level agenda setting: network agenda setting

Network agenda setting reaches further than first or second level and is focused on exploring the discourse between topics in both public and media spheres. Network agenda setting theory, unlike others that focus on the frequency or attributes of the topic, instead investigates how topics that are interconnected can be structured as networks and travel from the media to public (Kim et al., 2017).

The work of Guo and McCombs (2011) furthered the development of the third level of agenda setting by introducing a network agenda-setting theory. As Kim et al. (2017) emphasize, that “the central hypothesis for network agenda setting was that “the salience of the interrelationships among constructs or the associative network regarding a certain topic can be transferred from the media agenda to the public agenda” (Guo, McCombs, 2011, p. 9)” (Kim et al., 2017, p. 8). This research suggests that human memory is most likely organized in interconnected networks. Due to this it can be assumed that when the media link up specific topics or issues, in the public’s mind these topics become interconnected which then is reflected in the public discourse.

Network agenda setting has recently gained relevance due to the rise of social media content. Since topics can be shared true multiple social media platforms it can be compared to a network-based system that has media generated content for the public “the concept of network agenda setting further suggests the salience of the networks of objects and attributes of media on the networks of the public” (Kim et al, 2017, p. 9).

Reverse agenda setting

The literature shows that intermedia agenda setting has typically followed a top-to-down model, where big and well-known media companies release content thus setting agenda for smaller media companies (Neuman et al., 2014). For example, national television broadcasting companies release

content that will influence regional television broadcasting. Major news agencies can even influence global news and in doing so create a worldwide media agenda (Neuman et al., 2014).

With the rise of digital media, the agenda setting power dynamic has begun to change. Traditional media channels no longer had the monopoly on media generated influence due to the rise of social media platforms which became sources of media content (Neuman et al., 2014). This phenomenon has introduced the concept of reverse agenda setting, however there is still a lack of evident research as it comes to real world examples. As argued by Neuman et al. (2014), “in language that often proposes to celebrate the new citizen journalists and community agenda-setters, lists of the “exemplary” cases of reverse agenda-setting are less than compelling” (Neuman et al., 2014, p. 196). Even so, the power of public agenda setting should not go unmentioned and could be used to increase people’s attention towards the topic of biodiversity loss.

1.2.2. Framing theory

Framing theory is well known for being very influential in different fields of communication studies as well as media and its related science fields. This is because of “a message design strategy” (Bullock and Shulman, 2021, p. 320). Bullock and Shulman (2021) refer to the work of Cacciato et al. (2016), arguing that “framing refers to the strategic presentation of information in such a way that draws attention toward certain aspects of information while simultaneously drawing attention away from other aspects”, because “individuals’ attitudes about the topic become more aligned with framed information, leading to more message-consistent effects, referred to as a framing effect” (Bullock and Shulman, 2021, p. 320). According to Erving Goffman’s “Framing Theory”, frames themselves can be seen as “schemata of interpretation” which helps the people better comprehend their social environment (Güran, Özarslan, 2022).

The idea of media frames as “central organizing idea or story line that provides meaning to an unfolding strip of events has been introduced by Gamson and Modigliani almost 40 years ago (Güran, Özarslan, 2022). Therefore, frames can be regarded as a descriptive system which shapes the main narratives in the media field. In other words, framing is a process where certain aspects of the chosen topics are strongly highlighted, while other aspects are made incredibly hard to perceive by the public thus influencing their view of reality. For this reason, framing theory is vital in attracting the public’s attention and influencing their perceptions related to important topics such as biodiversity loss or environmental conservation (von Zabern, Tulloch, 2021).

In the current era, with the rise of social media platforms, traditional and social media has begun to combine and evolve, thus influencing change in the framing theory as “the emergence of the Internet and in particular the social media consisted a new revolutionary step for social construction of language, inserting the reader into the interaction loop of media actors, a process that added interpersonal communication features to mass media” (Güran, Özarslan, 2022, p. 452). Due to the appearance of hybrid media, the framing theory has become much more dynamic.

The media is using framing strategies as their main tools in order to influence how the public is reacting to certain chosen topics and issues. These strategies help portray topics in such a way that the media could dictate how they are perceived by the public, for example making some issues seem urgent, while at the same time making others seem like a distant future threat. The literature presents five framing strategies that could be applied to environmental journalism and biodiversity loss topics.

These strategies are motivational framing strategy, diagnostic framing strategy, prognostic framing strategy, episodic/thematic framing strategies, gain/loss framing strategies.

It is important to mention that the three first below-mentioned strategies (motivational framing strategy, diagnostic framing strategy, prognostic framing strategy) can also be positioned under the wider term of emotional framing. Emotions are a very powerful tool in communication theories as they can be used for a variety of reasons and adapted to many different scenarios, which is why it is important to understand how these framing strategies work. Saxonberg and Pažma (2025) argues that “we might accept the common division of framing into diagnostic, prognostic, and motivational, but since frames require emotional appeals to gain resonance, then to understand why each of these frames matters for social movements, we need to know what types of emotions they use” (Saxonberg. Pažma, 2025, p. 2). By understanding the situation, a chosen topic can be framed in such a way that it would receive strong emotional reactions from the public. These emotional responses can generate immediate action and generate engagement from the audience that can be, depending on the strategy used and its application, either short-term or long-term. Due to these factors the literature shows that emotional framing strategies are commonly used for social and environmental movements.

Below each of these emotional framing strategies, alongside other framing strategies, are summarized in Figure 1 and described in greater detail below.

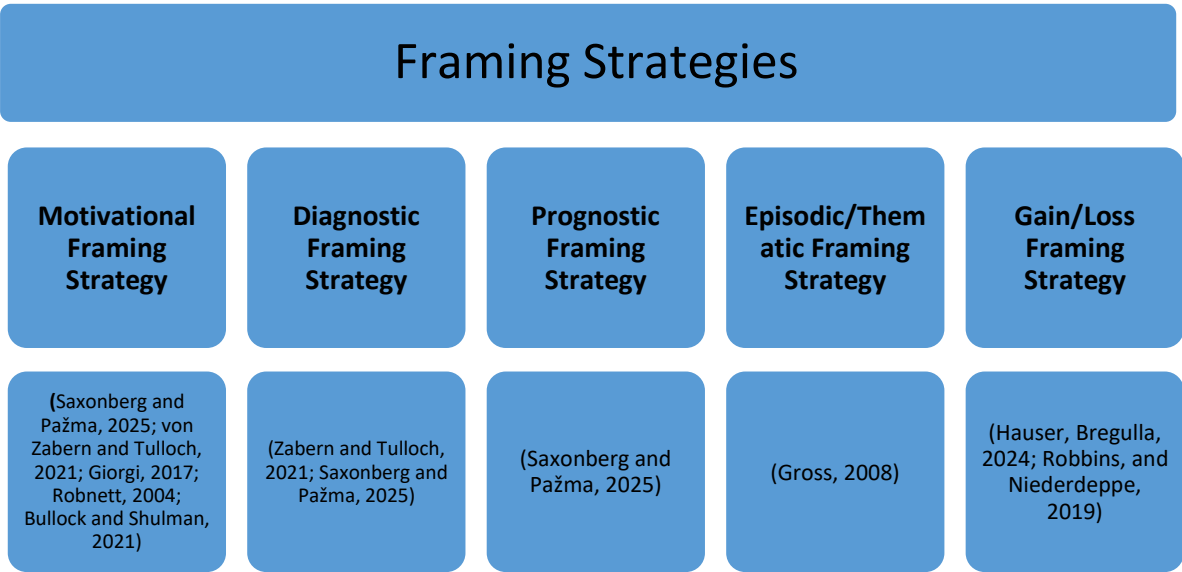


Fig. 1. Framing strategies (developed by author)

Motivational framing tries to rise and appeal to the emotional side of the public, which encourages them to take up action by making them feel as if the presented topic is urgent or important than the other topics. As confirmed by literature (Saxonberg, Pažma, 2025; Giorgi, 2017; Robnett, 2004) the “emotional resonance” is needed for frames to work, because if the framed topic fails in to establish emotional connection to the public it will have a harder time for the audience to mobilize behind it.

Some of the most popular emotional framing strategies are fear-based framing and hope-based framing:

- Fear-based framing presents the topic in such a way, to create a feeling of imminent doom if the public does not take up action. The literature shows that fear-based motivational framing strategy is often used in political and environmental campaigns, however the success rate of

this strategy varies (Bullock and Shulman, 2021; von Zabern and Tulloch, 2021). Fear based framing strategy is most effective in short-term call to action, but the literature indicates that overusing this strategy can cause the audience to lose their motivation or present the risk as too big to overcome (Saxonberg, Pažma, 2025).

- Hope-based framing strategy presents the topic in such a way that the public would feel motivated to rise in action. This is done by presenting positive actions that can be taken regarding the topic and by indicating that with constant action a positive outcome can be achieved. The literature shows that this framing strategy has a higher success rate in gathering long term engagement from the public towards the topic. The main point of this strategy is making the public feel that their actions are important and if they act, they can reach a positive outcome (Saxonberg, Pažma, 2025).

The second strategy might be called the **Diagnostic Framing Strategy**. The diagnostic framing strategy indicates that when it comes to the chosen topic or issue it is best to first identify the problem and secondly letting the audience themselves or directing them to blame the specific object that is causing it “social movement entrepreneurs need to explain to the public what the problem is (i.e. the diagnostic frame). After all, if there is no problem, there is no reason to act. This is similar to the “injustice frame” that Gamson (1992) describes. This frame requires movement activists to assign the blame to somebody” (Saxonberg, Pažma, 2025, p. 4). Literature seems to indicate that diagnostic frames are good in collecting strong emotions such as a feeling of injustice or outrage and then directing them toward the specific topic or issue (Saxonberg, Pažma, 2025).

One of the main aspects of diagnostic theory is assigning the blame to a specific object. The way that this theory shapes topics in the media, it can make topics seem either systematic or singular (Saxonberg, Pažma, 2025). In relation to this theory, it is very important that the blame is assigned to the object which is truly to be blamed otherwise the wrong object might receive the blame and cause negative actions which can reverse the feelings of moral justice held by the public.

The literature also shows that theory has underlying intentions. This framing strategy is also used by radical organizations, which use the effects of diagnostic framing to encourage the public in performing negative actions. Therefore when using this strategy, it is important to not only defy the problem, but to overlook the intentions behind its use and to what object is the blame being directed (Zabern, Tulloch, 2021).

The third strategy found in the literature analysis is **Prognostic Framing Strategy**. Prognostic framing theory presents the topic to the public by finding the problem and suggesting the optimal solution in order to solve it. The main difference between this theory and diagnostic framing theory is that while diagnostic framing defines the problem and directs the blame, prognostic theory defines the problem and presents possible solutions to the public (Saxonberg, Pažma, 2025). This strategy is often used in different social movements since it can present the topic or issue in such a way so that the public would see it either as something that is impossible to solve or in such a way that it would seem easily solvable (Saxonberg, Pažma, 2025). When applying prognostic strategy, it is important to indicate possible problems that are associated to the chosen topic, not only solutions. If the problems related to the topic are not addressed it can later on reduce the public's motivation and willingness to take action (Saxonberg, Pažma, 2025).

Another strategy that is related to identification of themes and is called **Episodic/Thematic framing strategy**. Episodic/thematic framing strategy represents two ways that the chosen topic can be presented to the public. Thematic frames usually present the topic/problem as a part of a wider subject or topic that may be interconnected with other similar events, while episodic frames usually focus on a specific situation or problem “Episodic frames present an issue by offering a specific example, case study, or event oriented report (e.g., covering unemployment by presenting a story on the plight of a particular unemployed person). Thematic frames, on the other hand, place issues into a broader context (e.g., covering unemployment by reporting on the latest unemployment figures and offering commentary by economists or public officials on the impact of the economy on unemployment)” (Gross, 2008, p.169).

Episodic framing strategy tries to engage the public by appealing to their emotions, this is why the strategy focuses on specific, easy to understand and comprehensible events as well as individuals effected by them. If the public fully understands and preferably feels related to the chosen topic or issue, they will be more inclined to solve it. This framing strategy is designed to make the public feel emotional toward the topic, similarly to motivational framing, however in this context the preferred emotions are empathy and sympathy (Gross, 2008).

Thematic framing strategy presents the topic as a part of a bigger structure. Thematic framing, unlike episodic, presents the public with a wide variety of information spanning from scientifically supported evidence to the historical progression of the issue. This is done in order for the public to see the connections between similar instances and to motivate them to take up action against the root cause of the problem “in the face of thematic frames, they offered more societal attribution. For example, people who attribute causal responsibility for poverty to societal factors were particularly likely to support social welfare spending increases” (Gross, 2008).

Both framing strategies use the public’s emotions to achieve the wanted outcome, however their use also varies between the two. Thematic frames are trying to encourage their audience to perceive the topic in a calm, analytical and logical manner, to take time and reflect on what action needs to be taken, while episodic frames tend to provoke immediate and strong emotions, since due to the nature of this strategy, the public is presented with a concise and specific topic, allowing them to harbour strong emotions with a lesser need for reflection. The literature suggests that thematic framing strategy is more effective in generating long-lasting solutions as it encourages the public to take up action collectively and strive for changes to the general policies, that would get rid of the main root of the issue instead of solving one specific problem. Episodic frames on the other hand, are more applicable to situations that demand immediate responses from the public, as this framing strategy makes issues more understandable and compelling to the audience (Gross, 2008).

Finally, one more framing strategy is found in the literature is **Gain/Loss framing strategy**. Gain/Loss framing strategy is used to present the message to the public in such a way that they would seemingly either experience a loss which they would be motivated to avoid or the public would be presented with the possible gains if the relative topic/issue were to be solved, which would motivate them to reach for this positive outcome (Robbins, and Niederdeppe, 2019). These authors claim that “under conditions of uncertainty, individuals are more likely to take a risk when information is framed in terms of losses, but more likely to be risk averse when outcomes are known and information is framed in a manner to emphasize potential gains” (p.87). However, the literature also suggests that

when it comes to environmental topics/issues loss framing strategy seems to be more effective, when compared to gain framing strategy (Hauser, Bregulla, 2024).

Loss framing strategy presents the topic in such a way that the public would see the possible negative consequences if no action is taken. Loss framing strategy is most commonly used when the present situation needs the public to take immediate action in addressing it (Hauser, Bregulla, 2024). For example, when discussing environmental issues or topics, the literature shows that presenting the negative aspects of the topic and how it can have a negative impact on the audience, would gather much more attention and support than presenting what could be gained if the problem is solved. Therefore, it can be argued that loss framing gathers more attention and influences individuals to take immediate action (Hauser, Bregulla, 2024).

Gain framing strategy presents the topic in such a way that the public would see what possible positive aspects or “gains” can be achieved by solving the issue. The literature shows that gain framing can be most useful when the public when already feels involved in the topic or when the risks presented by the topic are relatively low (Hauser, Bregulla, 2024).

1.2.3. Visual communication theory

During the current technologically advanced era, many forms of media are seeming to steer toward visual communication and are putting emphasis on visual elements in general. Visual storytelling with the help of social media has become a surprisingly strong tool and is shaping the audience perception of most any given topic. Literature indicates that posts with good visual elements typically gather more audience attention (shares, likes, comments), which in turn give the post topic a better chance affecting the media agenda. The more attention a topic can gather, the better chances are of said topic reaching individuals with the potential to bring change (Neuman et al., 2014).

The literature defines visual communication as the use of various symbols or other visual elements to transmit information for the public “visual communication can be used for dissemination of information and ideas using symbols, imagery, signs, graphic designs, films, typography etc.” (Kujur, Singh, 2020, p.38). Visual communication applies distinct visual techniques and media formats to shape audience interpretation, complementing rather than replacing verbal framing by extending framing theory into non-verbal and visually mediated communication environments (Ahn, et al., 2015).

The literature also shows that can be seen as one of the main components of strategic communication, because visuals are used to create and transfer messages and meaning (Göransson, Fagerholm, 2018). Göransson and Fagerholm (2018) argue that three thirds of the information that reaches brain is visual. In regard to the historical evolution of visual communication the literature proposes that meaning to visual communication and its evolution is linked to the different culture and their assigned meaning to the visual elements, such as, for example assigning meaning or emotions to certain colours (Aiello, Van Leeuwen, 2022).

With the rising popularity of social media, visual elements have started to play a big role in shaping public perception of certain topics or issues. Agenda theory shows how media can influence public perception by controlling the frequency and certain framing of their reports. However visual elements can be used to intensify this effect even further, generating emotional and cognitive associations which can happen between singular topics or even in topic networks (Kim et al., 2017).

An important aspect of visual communication is how it might be framed when presented to the public, otherwise known as visual framing. For example, visual framing is commonly used to simplify complex messages before sharing them with the public “function of media frames is to reduce the complexity of the world and thereby render it comprehensible and meaningful” (Irom, Borah, Gibbons, 2022, p. 50). This can be applied to both visual elements and texts with the main goal being to present the chosen message or topic in a way that is most importantly engaging and easily understood, so that the majority of the public would be informed and inspired to address the presented topic or in cases where a problem is presented, for instance the biodiversity loss, the people would be motivated to help the cause and take up immediate and informed action in order to solve it (Irom, Borah, Gibbons, 2022). In this way visual framing theory helps to tailor communication strategies for different audiences (Spiegelhalter, et al., 2011).

Visual framing theory offers a framework to understand relation between how the topic is presented to the public by using different images and how the public interprets and responds to that topic (Rodriguez and Dimitrova, 2011). Rodriguez and Dimitrova (2011) explored different visual framing techniques and analytical approaches applied in previous research studies and presented a four-level model for identifying and examining visual frames: first of all, introducing visuals as denotative systems, second, presenting visuals as stylistic and semiotic systems, third, analysing visuals as connotative systems, and finally, considering visuals as ideological representations. Rodriguez and Dimitrova (2011) claim, that this system might be “applied to analysing any type of visual media content or audiences’ perception of that content” (Rodriguez, Dimitrova, 2011, p. 48).

The visual framing theory was used in biodiversity loss analysis quite often. Analysing visual framing in communication of conservation of marine environments, as one of the most significant challenges of biodiversity loss (Fan et al., 2022), Ison, Cvitanovic, Pecl, Hobday and van Putten focussed on flatback turtles case study. The authors studied whether images of conservation actions that appear in social media affect participants emotions, self-efficacy, and intentions to start pro-conservation actions (Ison et al., 2024). They found that visual framing significantly influenced viewers’ emotional responses and intentions to engage in pro-conservation behaviours, highlighting the importance of carefully designed visual communication in biodiversity and marine conservation campaigns. They found that images of animals that were often used on social media together with landscapes and conservation actions, encouraged higher engagement. Considering social media types, images on Twitter and Instagram were more successful in generated higher user engagement compared to the images on Facebook. The authors also found interesting correlation between type of images and self-efficacy. Data showed that images of conservation actions increased self-efficacy; however, images of conservation threats reduced self-efficacy. And overall, the feelings of self-efficacy directly affected potential behaviour, increasing intentions to support conservation actions (Ison et al., 2024).

Several studies also found that two frames such as “solutions” and “threats” have most powerful effect on public perceptions of climate change and pro-environmental behaviour. Dickinson, Crain, Yalowitz, and Cherry (2013) analysed how different positive and negative framing strategies influence citizen scientists’ intentions to take action on climate change. Their findings showed that messages emphasizing threats to humans were less effective in motivating personal action, but framing climate change as a threat to birds significantly increased participants’ willingness to engage. Additionally, they found that highlighting the positive collective impact of small behavioural changes encouraged stronger intentions to act on climate-related issues (Dickinson, Crain, Yalowitz, Cherry,

2013, p.145). Salazar, Neves, Alves, Silva and Veríssimo (2021) analysed how different images influence donation behaviours. Their study found that different visual framing strategies on conservation fundraising posters did not significantly influence donation amounts, suggesting that image type alone may have limited impact in passive fundraising contexts such as donation boxes. The authors emphasize the need for further research examining how alternative visual frames and different fundraising environments may affect philanthropic behaviour toward biodiversity conservation (Salazar, et al., 2021).

The literature also suggests that there is a correlation between the levels of complexity presented in visual elements and the way that it will be perceived by the public. Simplistic and coherent visuals seem to be effective in increasing the retention of presented information. Due to the simple and direct approach individuals can better comprehend the given visual information and more easily recall it (Irom, Borah, and Gibbons, 2022).

The literature also suggests that moving or interactable forms of visual information, such as for example interactive templates or animated live /animated videos are a good tool which can increase the publics engagement (Irom, Borah, and Gibbons, 2022). Techniques such as these could be adapted by the Lithuanian news media corporations to increase the engagement, interest and spread of the loss of biodiversity topic.

The emergence of social media platforms and online journalism visual elements have gained much more notoriety and power. Since most new online forms of media are heavily based on visual representation, it can be argued that visual communication strategies and their applications have a direct impact on the spread, impact and engagement of the public, when presenting the chosen topic. The right adaptation of visuals, which are in coherence to the topic, which is presents can improve gather much more likes, thus deeming this topic important in the eyes of the public and increasing its engagement as well as gathering more shares which impacts the spread/notoriety of the topic, attracting new individuals to join its cause (Irom, Borah, Gibbons, 2022).

Regarding the visual tools of communication, photos are the most often used tool to communicate, especially in online communication (Bakhshi, Shamma, Gilbert, 2014). Bakhshi, Shamma, and Gilbert (2014) examined how the presence of human faces, as well as their age and gender, influence user engagement with photographs on Instagram, using a dataset of one million images and measuring engagement through likes and comments. They found that photographs containing human faces generated higher levels of user engagement on Instagram, reflected in increased likes and comments, while the number of faces and their demographic characteristics did not significantly influence engagement.

However, visual communication is not focussed just on using photos, but also involve other means, tools and technologies. For example, the study by Nelson, Anggraini, and Schlüter (2020), demonstrated that immersive virtual reality experiences, particularly when combined with negatively framed environmental messages, can effectively increase emotional engagement, awareness of environmental threats, and pro-environmental behaviours such as charitable donations to marine conservation initiatives (Nelson, Anggraini, Schlüter, 2020). Another study focussed on the role of virtual environments, where users experience simulations that feel like the real world experience, studied how positively and negatively framed experiences presented through virtual environments can influence pro-environmental behaviour, while also examining the roles of response efficacy,

interactivity, and the long-term impact of these framed virtual experiences over time (Ahn, et al., 2015). This study found that there is a positive impact of virtual experiences for pro-environmental behaviours, as high engagement in virtual experiences promoted environmental behaviour (i.e. 25% participants of the experiment reduced paper consumption compared to a control group). Thus, visual communication involves different methods, tools and technologies to compliment the text-based, semantic communication.

1.3. Biodiversity loss communication in environmental research

Biodiversity loss communication has received relevant attention in environmental research. Usually, biodiversity loss is presented within a broader environmental scope, as one of the relevant issues in environmental communication research. The broad topics such as agriculture, overexploitation, innovations, urbanization, and pollution (especially plastic pollution) are accompanying biodiversity loss topic as they remain “the major threats to biodiversity in the Anthropocene” (Barrios-O'Neill, 2021, p. 307).

As argued by Doley and Barman (2023), it is very important to communicate about biodiversity loss to assure sustainable management of natural resources. Doley and Barman (2023) indicated 2 major arguments why this communication is important:

- *To promote public participation in conservation.* Doley and Barman (2023) argue that effective biodiversity conservation depends heavily on public support, community participation, and cooperation between governments, local communities, and other stakeholders. They highlight that involving local and Indigenous communities in natural resource management, participatory conservation initiatives, and biodiversity governance can improve both conservation outcomes and the long-term sustainability of environmental programs. According to these authors, communication plays a central role in this process by increasing public awareness, encouraging engagement in conservation activities, reducing wildlife-related conflicts, and promoting socially accepted and sustainable wildlife management practices (Doley, Barman, 2023, p. 324).
- *To bridge the biodiversity and biodiversity conservation knowledge gap among the general public.* According to Doley and Barman (2023), increasing urbanization and declining interaction with nature contribute to reduced ecological knowledge and biodiversity awareness, highlighting the need for stronger public engagement and more effective biodiversity communication strategies. These authors emphasize that carefully framed communication, adapted to target audiences and using appropriate language, narratives, and message techniques, can improve public understanding, influence attitudes and behaviours, and encourage greater participation in biodiversity conservation efforts (Doley, Barman, 2023, p. 325).

One of the major challenges in environmental communication research is the knowledge-to-action gap, referring to the disconnect between growing public awareness of environmental issues and the limited translation of this awareness into actual pro-environmental behaviour (Ahn, et al., 2015). Ahn, Fox, Dale, and Avant (2015) analysed the specifics of environmental communication and its emphasis on the impact of perceptions and behaviours. The authors argue that while traditional framing research primarily examines how framed news content shapes perceptions and opinions, framing in health and environmental communication is more strongly oriented toward promoting behavioural change and

encouraging action (Ahn, et al., 2015, p. 842). In this context, gain and loss framing represents an important approach for influencing environmental behaviours through differently framed messages.

Public visibility of the topic is one of the reasons to focus attention of policy makers and public in general and foster actions and facilitates advocacy of the biodiversity loss questions. For example, Brazil in 2018 has expanded the scale of its marine protected areas or (MPA) and created 2 new large scale marine protected areas (LSMPA) “Archipelago de Trindade e Martim Vaz, containing the Natural Monument of Ilhas Trindade e Martim Vaz e Monte Columbia” and “Archipelago de São Pedro e São Paulo, containing the Natural Monument of Archipelago de São Pedro e São Paulo” (Goncalves and M. De Santo, 2022, p. 209). The creation of these LSMPAs has been influenced by several different reasons, of which the main are political/populistic motivations, upkeeping environmental promises and lastly media attention towards this topic. Researchers have indicated that biodiversity preservation was not the only reason for the area’s appearance. The other reasons in this case were global pressure and high public visibility of this topic. In this specific instance the media and assumably visual elements presented in it had a major impact in gathering awareness and influencing the people’s perceptions which in turn has influenced individuals with the power to change/renew current policies (Goncalves & M. De Santo, 2022).

Many research studies focus on the use of social media to communicate biodiversity loss as well as other environmental issues. As emphasized by Bergman et al. (2022), social media has enormous potential “to widely spread conservation messaging and be a powerful tool to mobilize social change for conserving biodiversity” (Bergman, et al., 2022, p. 360). Bergman et al. (2022) identified both positive and negative impacts of social media on wildlife conservation. The study showed that many social media activities revealed no measurable conservation impact, but there were cases where social media communication produced significant conservation outcomes. These authors found that social media can support wildlife conservation by encouraging pro-conservation behaviours, increasing conservation funding, and promoting policy change; however, it can also generate negative consequences, including species exploitation, illegal wildlife trade, unsustainable tourism in protected areas, and the spread of misinformation that reinforces anti-conservation behaviours (Bergman, et al., 2022, p. 360). Especially dangerous is geotagging. The study found that geotagging wildlife photos on social media can facilitate wildlife exploitation and poaching by revealing animal locations. Although social media platforms and NGOs have introduced initiatives to reduce online wildlife trafficking, illegal trade remains widespread and difficult to control due to ambiguous language and challenges in connecting online content with actual illegal activities (Bergman, et al., 2022).

The research covers different platforms of social media, including Facebook, Twitter and others. Barrios-O'Neill (2021) investigated how non-governmental organizations use Twitter to promote environmental advocacy. The author analysed content from 10 Twitter accounts of 9 NGOs and found that a substantial proportion of tweets published by environmental NGOs addressed at least one recognized threat to biodiversity. Climate change emerged as the most frequently communicated issue, followed by overexploitation and plastic pollution as the second and third most prominent biodiversity threats discussed in the posts (Barrios-O'Neill, 2021). The role of Twitter in communicating scientific findings in ecology and evolution topics were also analysed by Darling et al. (2013). These authors found that active engagement of scientist in social media discussions are very important. Daume (2016) investigated the strengths and limitations of using Twitter data for ecological monitoring, demonstrating how social media mining can support the detection and analysis

of invasive alien species through the examination of observational and descriptive online content related to forest ecosystem threats. The author assessed these strengths and weaknesses of using Twitter for ecological monitoring by analysing 2,842 tweets collected over nearly three years. Using examples of the Oak Processionary Moth, Emerald Ash Borer, and Eastern Grey Squirrel, this research demonstrated how social media data can provide both observational and descriptive information. The findings demonstrate that Twitter can serve as a valuable source of biodiversity-related information by providing both observational data and insights into public communication and perceptions regarding invasive alien species and their management, highlighting the broad potential of social media mining for ecological monitoring and environmental research, while emphasizing that such approaches should follow rigorous monitoring practices and be guided by clearly defined ecological questions and contextual understanding (Daume, 2016, p. 70). But as argued by Daume (2016), Twitter is not the only relevant social media to communicate environmental topics, as “other social media (i.e. blogs, Wikis or content communities such as YouTube or Flickr) may prove valuable sources of ecological information as well” (Daume, 2016, p. 70).

One more important issue in biodiversity loss communication is misinformation. As argued by Bergman et al. (2022), digital misinformation spread through social media represents a significant societal risk because false or misleading information can rapidly gain acceptance and become difficult to correct. Their study defined misinformation as inaccurate or misleading content shared online regardless of whether there is an intentional aim to deceive (Bergman, et al., 2022). Their study also showed that misleading or incomplete wildlife representations on social media can undermine conservation efforts, particularly when threatened species are portrayed in close interaction with humans, as such images may reduce public perception of species vulnerability and increase their attractiveness as pets. They provide an example of chimpanzees: “even though chimpanzees (*Pan troglodytes*) are Endangered, survey data revealed that the public is less likely to think chimpanzee populations are threatened when mis portrayed in images: the presence of a human in a photograph with a chimpanzee resulted in people considering wild chimpanzee populations to be stable and healthy (compared to the same image without a human)” (Bergman, et al., 2022, p. 376). Another example was about wild cat species such as lions and cheetahs. These animals are frequently misrepresented on social media through images showing close interactions with humans. Research indicates that such portrayals increase public interest in interacting with these animals and significantly strengthen perceptions that wild cats are appropriate attractions for wildlife tourism (Bergman, et al., 2022, p. 376).

The research done by Bergman et al. (2022) also revealed actors that usually are present in communicating wildlife conservation on social media, including social media administrators, general public, i.e. social media users, NGOs, and governing agencies. The scientists were missing in this communication, or their part was very little. However, as other studies show, an active engagement of scientists in online discussions and social media platforms can broaden the visibility and societal impact of research findings while also contributing to public awareness and education on conservation-related issues (Darling et al., 2013).

1.4. Theoretical framework for analysis of biodiversity loss communication in news media

In accordance with the data collected during literature review, a theoretical framework for analysis of biodiversity loss communication in news media was developed. This framework consists of 3 stages indicating “Theoretical approach” in stage 1, raising “Main questions” in stage 2 and

identifying “Strategies” in stage 3 (see Figure 2). Three theoretical approaches that were chosen for this framework analysis in order to better understand communication about the topic of biodiversity loss are: “Agenda setting theory”, “Framing theory” and “Visual communication theory”.

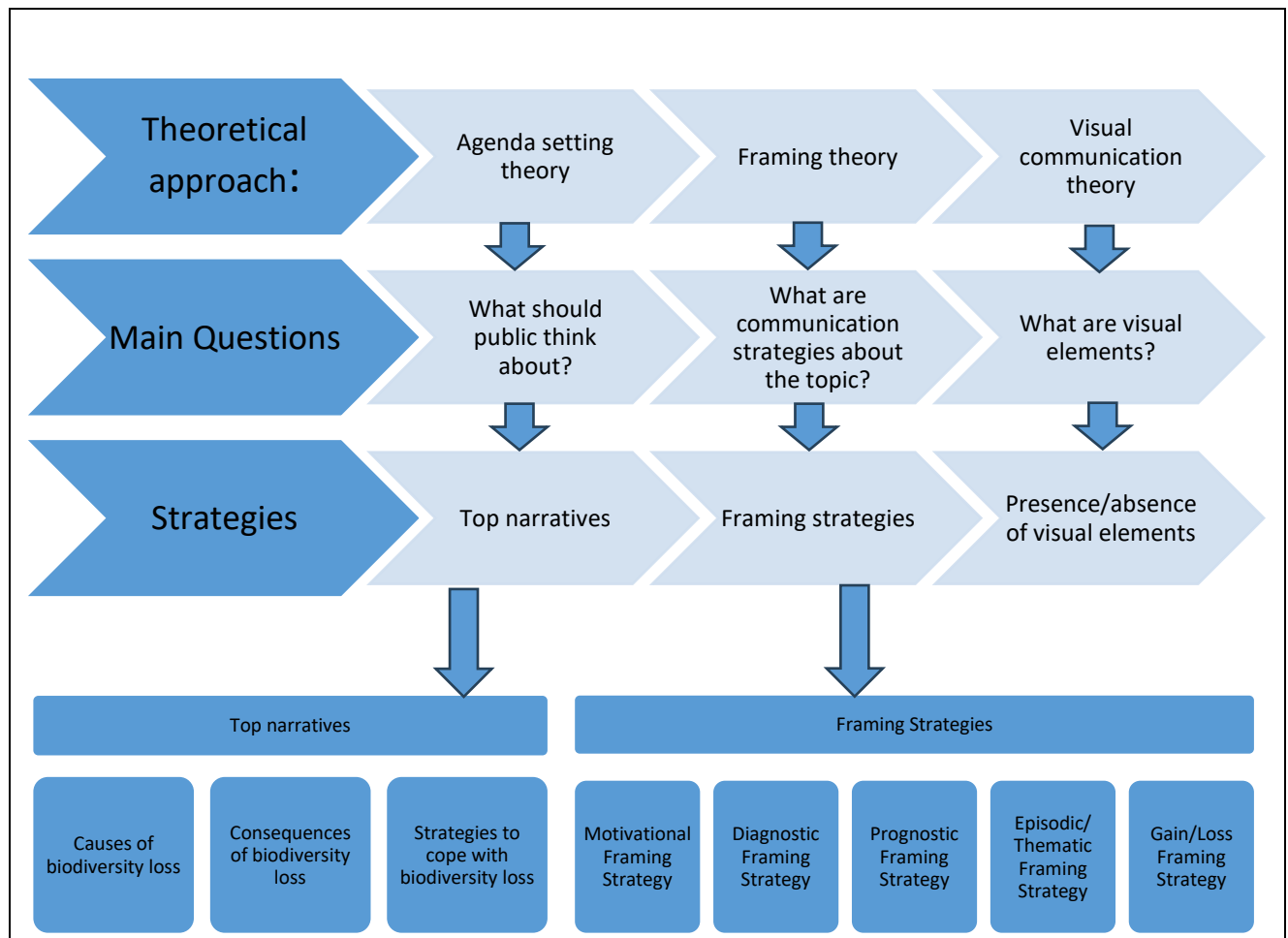


Fig. 2. Theoretical framework for analysis of biodiversity loss communication in news media

Agenda setting theory seeks to indicate what the public is influenced to be thinking about when interacting with the topic of biodiversity loss. In order to analyse this influence “Top narratives” analysis strategy was created. This strategy consists of three main “Top narratives” related to the topic of biodiversity loss: “Causes of biodiversity loss”, “Consequences of biodiversity loss” and “Strategies to cope with biodiversity loss”. These narratives are relevant within the theoretical framework of using agenda-setting theory for empirical research, as they show that media influences public attention by determining which issues receive visibility and emphasis. By analysing these top narratives in news media content, the empirical research will examine how biodiversity loss is prioritized and constructed in Lithuanian news media.

The top narratives identified in this research were distinguished through the analysis of scientific literature on biodiversity communication. As showed before, the literature demonstrated that communication on biodiversity is structured around explaining the drivers of biodiversity loss, highlighting its environmental and societal impacts, and presenting potential responses, solutions, and / or mitigation strategies. Narratives focusing on causes help audiences identify the key drivers of biodiversity loss, such as climate change, pollution, habitat destruction, or overexploitation of resources. Narratives related to consequences emphasize ecological, social, and economic risks

associated with biodiversity loss. Narratives focused on strategies for finding solutions draw attention to conservation actions, policies, public engagement, and behavioural change. All together, these narratives shape how biodiversity issues are framed, interpreted, and prioritized by society. Data collected from these narratives are analysed in order to understand the overarching “Agenda setting” related to the topic of biodiversity loss.

Framing theory analysis was conducted to understand what kind of communication strategies are related to the topic of biodiversity loss. For this analysis, using the information from literature analysis seven framing strategies were developed: “Motivational framing strategy”, “Diagnostic framing strategy”, “Prognostic framing strategy”, “Episodic framing strategy”, “Thematic framing strategy”, “Gain framing strategy” and “Loss framing strategy”. These framing strategies are important because they influence how biodiversity issues are understood. Diagnostic framing focuses on identifying the causes and sources of biodiversity loss, such as climate change, pollution, habitat destruction, or unsustainable human activities. Prognostic framing emphasizes proposed solutions, policy responses, conservation initiatives, or behavioural changes intended to address biodiversity loss. Motivational framing seeks to encourage action and engagement by appealing to responsibility, urgency, moral obligation, or collective action. Episodic framing presents biodiversity-related issues through specific events, individual examples, or concrete cases, often focusing on isolated incidents or emotionally engaging stories. In contrast, thematic framing situates biodiversity loss within broader systemic, political, social, or environmental contexts, emphasizing structural causes and long-term processes. Gain and loss framing strategies were included in the analysis because previous environmental communication research demonstrates their importance in influencing attitudes and behaviours. Gain framing highlights positive outcomes, benefits, and opportunities associated with conservation actions and biodiversity protection, such as ecosystem resilience, human well-being, or sustainable futures. Loss framing, conversely, emphasizes negative consequences, risks, and damages resulting from biodiversity decline or inaction, including species extinction, ecosystem degradation, and societal impacts. Analysis of these framing strategies indicates what communication strategies are most and least related to the topic of biodiversity loss in Lithuanian news media.

Visual communication theory was analysed to understand its connection (if any) to the topic of biodiversity loss. This was analysed by indicating presence of absence of visual elements in analysed articles. This would indicate if visual communication were being used to enhance articles related to the topic of biodiversity loss. Literature emphasized that two frames such as “solutions” and “threats” are very powerful effect on public perceptions and pro-environmental behaviour, thus it is relevant to test if these findings are also echoed in Lithuanian news media’s visual communication.

In summary, the literature review gave insights to develop a theoretical framework for analysis of biodiversity loss in news media. This framework incorporates two theoretical approaches, Agenda setting theory, that helps to answer research question of how news media sets topics that people should think about, emphasizing top narratives of causes, consequences and solutions to cope with biodiversity loss, and the Framing theory, that helps to understand what are the communication strategies of how biodiversity loss is communicated to the public. Additionally, this theoretical framework incorporates insights from visual communication theories, that help to investigate visualization of the biodiversity loss topic and how visual means of communication compliment the text-based, semantic communication.

2. Methodology

To understand how Lithuanian news media is communicating about the topic of biodiversity loss, a mixed research methodology (qualitative and quantitative) was chosen. This was done to carry out in depth research in the quantitative area where analysis focuses on the statistical information regarding the trends and popularity of the topic over time, news media channels that have reported on the topic and the trends that they present as well as evaluating agenda setting strategies that they might have been using as well as the qualitative area where the analysis will be investigating the content which is presented in the “top narratives” category, seeing what trends are being reported, what sentiments are the articles propagating and getting a deeper understanding of how the topic of biodiversity loss is being shaped by different news media outlets, what kind of framing strategies are being used if any.

This approach was taken to gain understanding about the specificities of the communication process which is used to propagate the topic to fully map out this process and see its strengths as well as its weaknesses. Literature analysis has already expressed the importance of biodiversity and its integral part in our ecological functionality and has indicated biodiversity loss as relative and, understanding the full communication process can not only further the knowledge in the field of public communication, but by indicating and analysing its weaknesses it can also help adapt and streamline the entire process in order to achieve greater conservational efforts.

The research was carried out by:

- Firstly, using the website *Mediaskopas.lt* to construct a database of Lithuanian news media outlets and news articles that are in some way referencing the topic of biodiversity loss. This website was also be used for collecting and analysing the majority of the quantitative data.
- Secondly, articles related to top narratives from the topic of biodiversity loss were collected and then analysed using the MAXQDA program. Written articles will be coded in order to understand what framing strategies were used in their construction and to collect data needed for the qualitative research.
- Thirdly the collected qualitative and quantitative data were be used to formulate the findings for this master’s thesis and, if needed, propose recommendations for further research and improvements for the communication processes used by the media organizations.

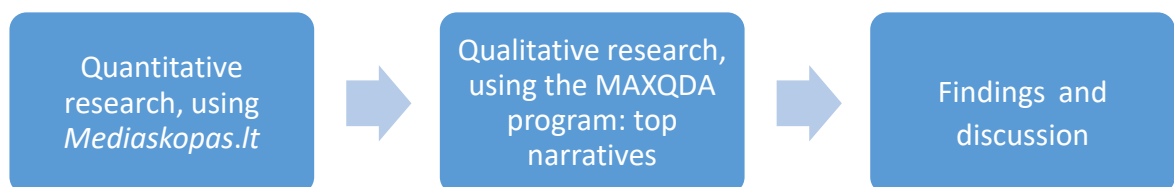


Fig. 3. Steps of empirical research on biodiversity loss communication in news media

By completing all three of these steps this master thesis investigates how Lithuanian news outlets are communicating about the topic of biodiversity loss, what framing or agenda setting techniques were used and how the current form of communication is impacting the public's outlook of this topic.

2.1. Quantitative data collection and analysis

Mediaskopas is a part of the Baltic Media monitoring Group. According to their website they are “Baltics leading media monitoring, analysis and consultancy provider, that serves most of the Baltic public sector organisations as well as various private companies. We use the best technological possibilities available and combine it with human intelligence”. This platform is “a leading media monitoring, analysis and communication consultancy provider in Estonia, Latvia and Lithuania, established in 1997” and as it is stated on the company’s website their vision is to “transform a world of data into a world of intelligence”. This research would not be possible without the collaboration with the *Mediaskopas* team and provided statistical support.

After communicating with *Mediaskopas* representatives they have agreed to provide access to their platform and even helped to generate a database of articles and news reports specially tailored to the research purposes for this thesis. The articles were chosen by indicating the main keywords and presenting them to the *Mediaskopas* team where they have created a filter named “communication about biodiversity loss” (in Lithuanian, “komunikacija apie biologinės įvairovės nykimą”), which included all of the earlier indicated keywords. In the table below filter titles and the main keywords are showcased in both Lithuanian and English languages (Table 3).

Table 3. Keywords for the *Mediaskopas* filters

Language	Title of the filter
English	communication about biodiversity loss
Lithuanian	komunikacija apie biologinės įvairovės nykimą

Having access to these articles has been an integral part of this research. Besides generating the main database of news articles, *Mediaskopas* (station.lt) platform was also integral in collecting other important quantitative data. For example, the platform was used to indicate trends in the topic’s popularity over time and analyse the top news outlets that are communicating about the topic of biodiversity loss. It was also used for the analytical overview section, where the platform offers the possibility to generate different graphs with, for example, general and monthly topics mentioning dynamics among other useful data visualization options.

The news media portals that were analysed are presented in Table 4.

Table 4. News media portals that were analysed

News media portal	Description
delfi.lt	This is one of the biggest Lithuanian news portals, established in the year 2000 and attracting large numbers of daily readers. This platform reports on Lithuanian and worldwide news and encompasses a large variety of topics spanning from politics to sports news.
Ukininkopatarejas.lt	This news platform was started in 2014 and is produced by the ministry of agriculture. Most of the topics presented in this website therefore are also mainly related to agricultural aspects with a big emphasis on producing articles that are relatable to farmers
Lrt.lt	This platform which was created in 2000 is a part of Lithuanian national radio and television. Though in 2000 this platform was released as an official company’s website, in 2006 it was remodelled to be a news portal and in 2007 it was updated once more to become a news archive as well as contain audio/visual news reports. Due to it being a national broadcaster this news agency reports on a wide variety of topics

Sc.bns.lt	This platform is a “press centre”, where companies can present official reports and statements to the press as well as invitations to press conferences.
Agrobite.lt	This platform is made to present all relative agricultural information to farmers, which make up most of its readers. This website, accompanied by its Facebook group, offers many different articles on agricultural politics, agricultural technologies and many other similar topics.
Lrytas.lt	This website is one of the biggest news publishers in Lithuania. The platform started in 2006 and is a part of Estonian news agency group “Ekspress Grupp”. This news portal covers a wide variety of fields and topics.
15min.lt	This news agency is also widely known in Lithuania. This news platform covers recent news in Lithuania. It presents both countrywide news and news from specific cities or living areas.
Tv3.lt	This platform is a part of a bigger TV3 group. In the platform there can be found many forms of media including auditory and visual. The platform usually presents a wide array of topics from politics to agriculture. The group also possesses a commercial channel where they showcase many different types of media, however the company itself is mainly creating media that is related to journalism. The channel itself was created in 1997
Bns.lt	The title for this platform stands for Baltic news service and was started in 1990. This platform publishes articles that are meant for individuals living in the Baltic region, it mainly covers political, economic and societal news.
Kauno.diena.lt	This website is a Lithuania news sharing platform that was started in 1945. As a nod to the title the website is best known for its articles about the main events happening in the Lithuanian city of Kaunas, however nationwide news topics can also be found reported on the platform.
Diena.lt	This platform was created in 2007 and is a news portal where many different topics are being covered. The platform reports on news at a regional and country levels, mainly reporting on politics, economics, societal life and culture.
Etaplius.lt	This platform is mainly used to share regional news in Lithuania. This News agency was created in 2004, the website seems to be publishing articles that lean more towards everyday life occurrences, rather than country wide topics or problems.
Alkas.lt	This platform specializes in Lithuanian cultural and life related news. As stated by the website itself it offers the readers news that showcases a true Baltic or Lithuanian cultural perspective.
ELTA	This Lithuanian news agency started in 1920. It is a long-living news agency providing a wide variety of topics.
Klaipeda.diena.lt	This website was created in 1945 and is oriented towards the individuals living in the Lithuanian city Klaipėda. This internet platform does report on big national or international topics, however the focus of the published articles remains on topics closely related to the city.
Ūkininko patarėjas	This is another platform which mainly publishes information related to agriculture. Since 1989 this newspaper, which nowadays has a digital form, was released by the Lithuanian ministry of agriculture and is mainly focused on publishing articles that interest farmers.
Am.lrv.lt	This platform belongs to the Lithuanian ministry of environment, which was started in 1996. The platform shares news and articles related to the topic of “environment” and its various aspects.
Ve.lt	This is a Lithuanian news platform started in 1990. It showcases a large variety of different news stories, with a focus on stories that are related to Lithuanian news discourse.
Alfa.lt	This is a Lithuanian news media platform, existing since 2006. The platform encompasses a large variety of different topics and covers worldwide as well as regional news stories.
Valstietis.lt	This platform is a part of a newspaper company that was started in 1940. The platform is oriented towards farmers having a focus on articles related to agricultural activities, however it also reports on other relative Lithuanian news stories.

Lastly, this platform was used to collect the articles for the qualitative analysis part. After deciding the period of time for this analysis, the most popular articles were selected for the construction of the

qualitative data sample. This can be done since the *Mediaskopas.lt* platform suggests different filter application possibilities. Since the qualitative analysis will be analysing the most popular articles, they will be collected from the website's "top narratives" section. The "top narratives" section presents the top 20 stories in a chosen time period that have gathered the largest number of mentions, making them the most relevant, influential and notable stories under the specified filter option. These stories were then entered in the websites search tab and an article, whose title matches the narrative most closely would be chosen for the analysis. Thus, each year is represented by 20 top narratives that were related to the topic of biodiversity loss and had matching articles. The final data sample for the qualitative analysis consists of 60 articles, 20 articles per each year of the analysis period (2023-2025).

2.2. Qualitative data collection and analysis

After the quantitative analysis is completed, the qualitative research process started. The qualitative analysis was performed on the previously mentioned top narratives. The platform which has been chosen to conduct this research is MAXQDA. This software is the most often used qualitative data analysis software with the best AI integration, and it is used to simplify and enhance data analysis through automated transcription, advanced analytical tools, user-friendly functionality, and intelligent AI integration. Due to the large variety of different tools and well-made interfaces this program was chosen to conduct the content analysis for this research.

The first step in this analysis was the creation of specific codes that would be used to analyse the gathered content. These codes include different areas of interest, such as the sentiment felt in the article, the location of the object or topic discussed in the article or even different framing strategies that might be used in the creation of the article with the intent to steer the readers towards a certain direction. Later on, coded articles will be used in further qualitative analysis processes. Presented in the table below are codes that will be used in the analysis, category showcases different code groups, code section entails the main codes for the research and lastly additional codes present subcodes which are used to further specify content analysis (see Table 5).

Table 5. The list of code groups, codes and subcodes

Code group	Code	Subcode
Descriptive	News outlet	Delfi.lt; Sc.bns.lt; 15min.lt; Lrytas.lt; Ukininkopatarejas.lt; Lrt.lt; Tv3.lt; Agrobite.lt; Etaplus.lt; Alfa.lt; Klaipeda.diena.lt; Diena.lt; Ukininkopatarejas; Kauno.diena.lt; Am.lrv.lt; Ve.lt; Elta.lt; BNSAlkas.lt; Jp.lt; Madeinvilnius.lt
	Article title Image	
Tone of language	Neutral Positive Negative	
Framing strategy	Thematic frame Prognostic frame Motivational frame Loss frame	

	Gain frame Episodic frame Diagnostic frame	
Stakeholders mentioned in the article	Other Foresters Hunters Farmers News agencies Scientific community NGOs Consumers and the general public Citizens Experts and specialists Businesses and industries Politicians and official representatives	
Ecosystem type	Freshwater ecosystems Marine ecosystems Land based ecosystems	
Type of biodiversity	Microorganisms Fungi Plants Animals	
Types of causes and drivers	Other Urbanization Poor Policies Pollution Invasive species Industrial development Illegal hunting Habitat loss Deforestation Climate change	
Types of solutions	Direct impact	Conservation and protection; Restoration and rehabilitation
	Indirect impact	Technology; Innovation; Research; Voluntary; Economic-financial; Informational-educational; Regulatory-administrative
Narrative focus	Solutions to biodiversity loss Consequences of biodiversity loss Causes and drivers of biodiversity loss	

After the coding phase has ended all of the codes were used for further qualitative analysis. Using the MAXQDA program and its data analysis and visualization functions. This process compared the coded parts and the amount of the codes in the articles with the goal of gaining a deeper qualitative perspective on the topic of biodiversity loss and how it is reflected in the “top narratives” from different news media outlets.

Descriptive overview of code groups

This code group was used to gather the basic information about the analysed articles (see Figure 4). The information in the bar chart below showcases in what percentage of the documents does a selected code appear. Descriptive information includes the articles title, usage of visual elements and if the coded document belongs to one of the top news outlets, which were presented in *station.lt* analysis.

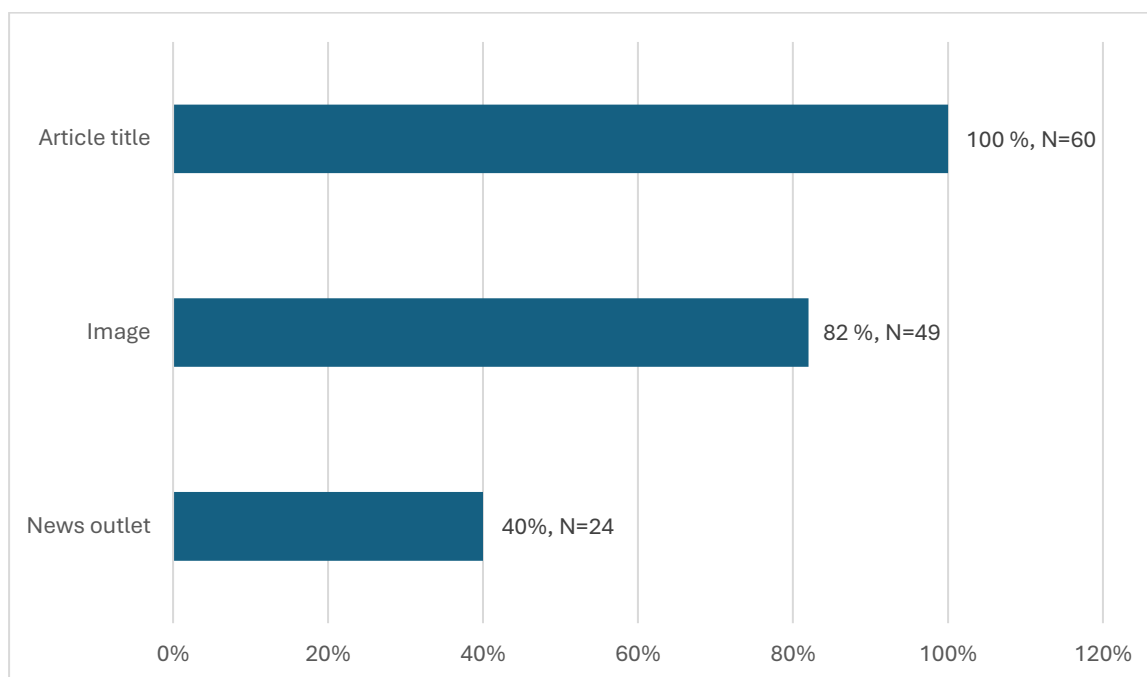


Fig. 4. Descriptive information about the articles

What we can see from this analysis is that visual elements were used in the majority of analysed documents (49 (or 82%) of documents had visual elements) indicating that Lithuanian news agencies use visual communication elements quite extensively to enhance their news articles.

News outlet analysis indicated that 40% of articles (24 articles out of 60 that were analysed), were published by the “top news outlets” group of news agencies indicated in *station.lt* analysis. The major news outlets that published these articles include: “Lrytas.lt”, “Jp.lt”, “Elta.lt”, “Ukinikopatarejas.lt”, “Delfi.lt”, “Alkas.lt”, “Diena.lt”, “Arrobite.lt”, “Lrt.lt” and “15min.lt”. This could likely be related to the way that the sample documents were gathered. As previously stated, these documents were collected using the top narratives section of each year as a guide, however narratives section indicates the most widespread topics of each year and not precise names of a singular article, meaning that multiple news outlets could have written articles on the same topic. The data sample for this work was created from 60 top narrative topics.

Ethics of the empirical research

The empirical research, presented in this Master thesis, is compliant with general principles of research ethics. This research did not involve any significant ethical risks. The empirical research was based just on the analysis of openly available news media content. All articles that were used for analysis were collected through the media monitoring platform *Mediaskopas.lt*. empirical research

did not include any interaction with human participants, thus, no personal or sensitive information was collected.

Limitations of this study.

The empirical study has several limitations. First of all, the scope of empirical research was limited to news media articles, that were available online and were collected through the *Mediaskopas.lt*. In this way, it might not fully reflect the trends of all news media.

Second, the qualitative analysis also has some limitations. Qualitative analysis was conducted just with top narratives, selected by *Mediaskopas.lt*. This selection might not fully reflect the all communication on news media. Also, top narratives were analysed in the period of 2023-2025. Thus, result interpretation is possible just for that particular period of time. In order to have a more explicit picture of the results, future research might include longer period of analysis.

Third, the coding and interpretation of visual communication is subjective, especially talking about classification of images. The current interpretation reflects the opinion of the author of these thesis and may not fully reflect the possible interpretations made by other researchers.

3. Findings of the empirical research

This part discusses the quantitative and qualitative findings on how news media in Lithuania is communicating the topic of biodiversity loss. The main goal of empirical research is to understand how Lithuanian news agencies/outlets are communicating about the biodiversity loss, which has recently been rising in popularity due to the damage which it can inflict to the planet's ecosystems. By completing both stages of research this thesis presents its statistical and content-oriented findings that portray the communication process between the news agencies and the public, indicate if any level agenda setting strategies were used in order to promote or suppress the research topic, see what kind (if any) framing strategies were used and see if there was any visual communication used.

3.1. Top news media sources and trends in biodiversity loss communication

To begin the analysis will focus on the qualitative data and how it relates to the investigation of the biodiversity loss topic. As mentioned before, *Mediaskopas.lt* platform grants this research a specific perspective since it can provide descriptive statistical information related to it. This analysis will entail the agenda setting strategy analysis, statistical information on the news media outlets and their involvement, information about the increases and decreases in the topic popularity over different chosen time periods and all other relative statistical data that can offer deeper insights into the communication processes for the topic of biodiversity loss.

In the Figure 5 represented below we can see the top news media outlets which have reported on the topic of biodiversity loss. As we can see represented in the statistical data analysis “delfi.lt”, “Ukininkopatarejas.lt” and “Lrt.lt” are seemingly news media outlets which are most actively reporting on biodiversity loss with indicators showing from 1047 to 888 articles published relating to the topic. News agencies such as “Sc.bns.lt”, “Agrobite.lt”, “15min.lt”, “Lrytas.lt” and “Tv3.lt” are also shown to have a relatively high number of articles published. These agencies are approximately publishing from 818 to 650 related articles. These news articles are shown to have a larger number of published articles that include the topic of biodiversity loss.

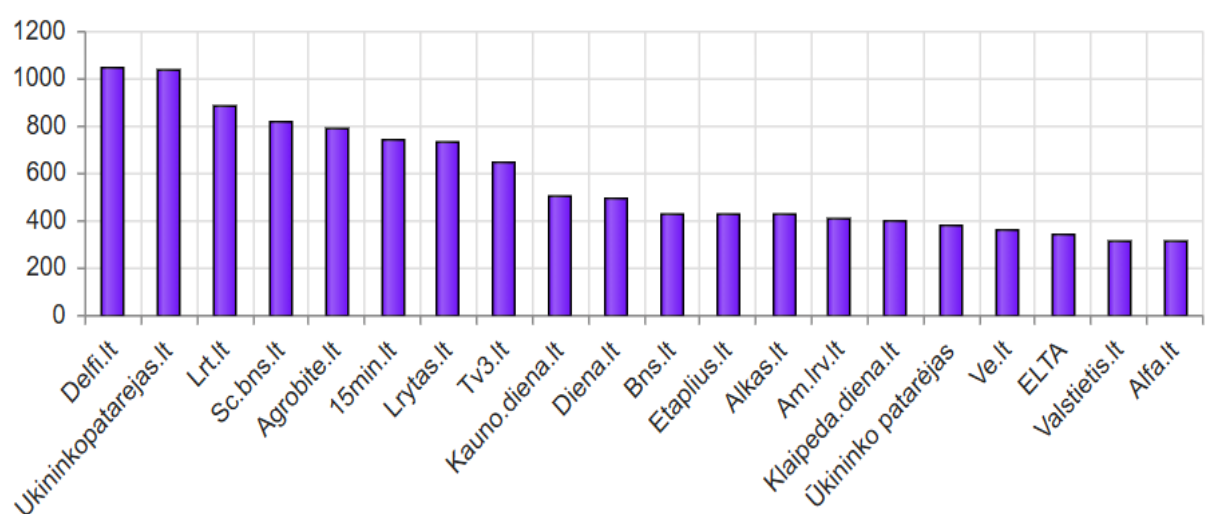


Fig. 5. Top News Media Sources

On the other side we can see news outlets that are publishing less articles related to this master's topic, however they still report on the topic of biodiversity loss, just less often than before mentioned news agencies. News agencies such as "Kauno.diena.lt", "Diena.lt", "Bns.lt", "Etaplius.lt" and "Alkas.lt" have approximately from 508 to 427 articles that reference the issue of biodiversity loss. The last bundle of news media outlets such as "Am.lrv.lt", "Klaipeda.diena.lt", "Ūkininko patarėjas", "Ve.lt", "ELTA", "Valstietis.lt", Alfa.lt" have the least number of articles related to the topic of biodiversity loss, publishing from 412 to 311 articles.

This analysis shows that the topic of biodiversity is quite relative in Lithuanian news agencies. As shown in the graph which showcases before mentioned news outlets, the majority of the most popular news agencies, such as "Lrt.lt", "Tv3.lt", "15min.lt", "delfi.lt", have published articles that reference this topic. This information indicates that the topic of biodiversity loss is present in the Lithuanian media and is not being ignored or silenced.

Statistics of published articles relative to time

In order to better understand its popularity and actuality statistics in Lithuanian news media, presented in the Figure 6 below are statistics which represent monthly amount of articles that are related to the topic of biodiversity loss. Further analysis focused on the increases and decreases of articles related to the topic of biodiversity loss relative to the scale of time. The time period chosen for this analysis starts at 01.01.2020 and ends at 01.12.2025.

Reflecting on the acquired data it can be seen that the topic of biodiversity was not overly popular in the media before the year 2024. As shown in the line chart below, which showcases the number of articles produced per month, during the period, which starts at 01. 01. 2020 and ends at 01. 12. 2022 the topic of biodiversity does appear to be mentioned however it was not overly popular. The highest notable spikes referring to the number of articles produced per month were on 05. 2021 reaching 324 articles, 05. 2022 reaching 301 articles and 07. 2022 reaching 282 articles.

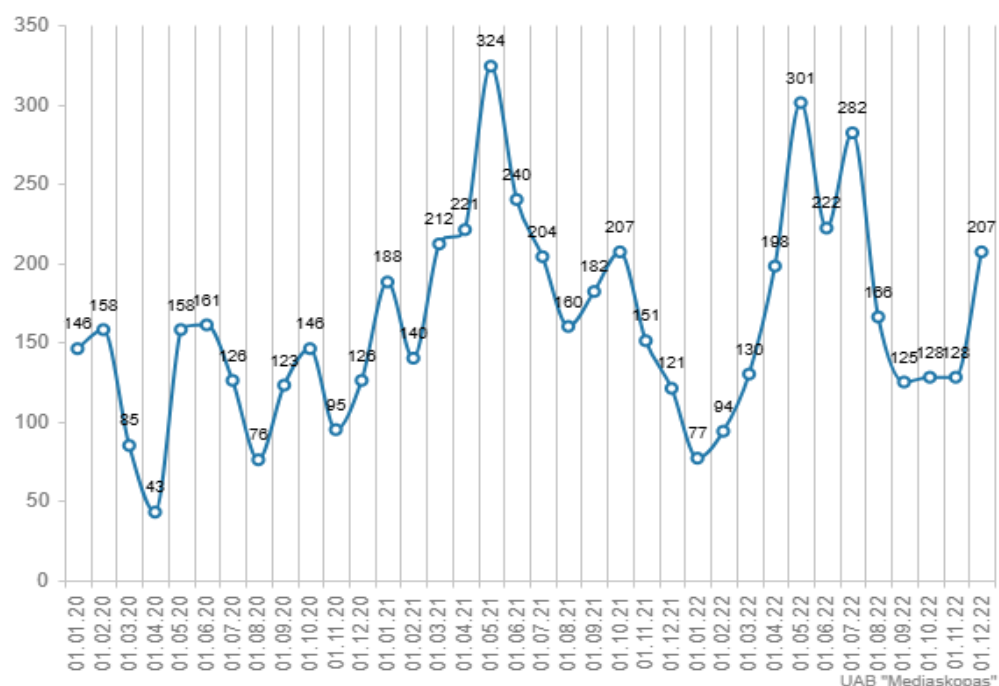


Fig. 6. Monthly amount of articles that are related to the topic of biodiversity loss (2020-2022)

When analysing the time period which starts at 01. 01. 2023 and ends at 01. 12. 2025, as shown in the Figure 7, it was found that the lowest number of articles published was during the first two months of 2023. Since then, there has been a steady increase in the number of published articles until the sixth month, during which 362 articles were published. This was the first peak in the number of articles published that year. After this first highlight till the end of 2023 the monthly total would fluctuate, slightly decreasing over time. The beginning of 2024 saw a massive increase in article monthly production, rising from 245 articles in 12. 2023 up to 1000 articles in 01. 2024. This indicates that at this time the topic of biodiversity has entered the main stage of Lithuanian news media coverage with various news stations deeming it important and relative to the current news sphere. The main peak that was reached in 2024 was during the sixth month, during which a total of 1216 articles were published. This month reached the third number of articles during the second time period, chosen for this quantitative analysis. During 2025 two main popularity spikes can be seen. one on the fourth month generating 1254 articles (which is the largest monthly total during 2023-2025 time period) and one on the seventh month generating 1241 articles. After this period, the number of articles per month once again started decreasing with the last increase happening during the ninth and tenth months of 2025.

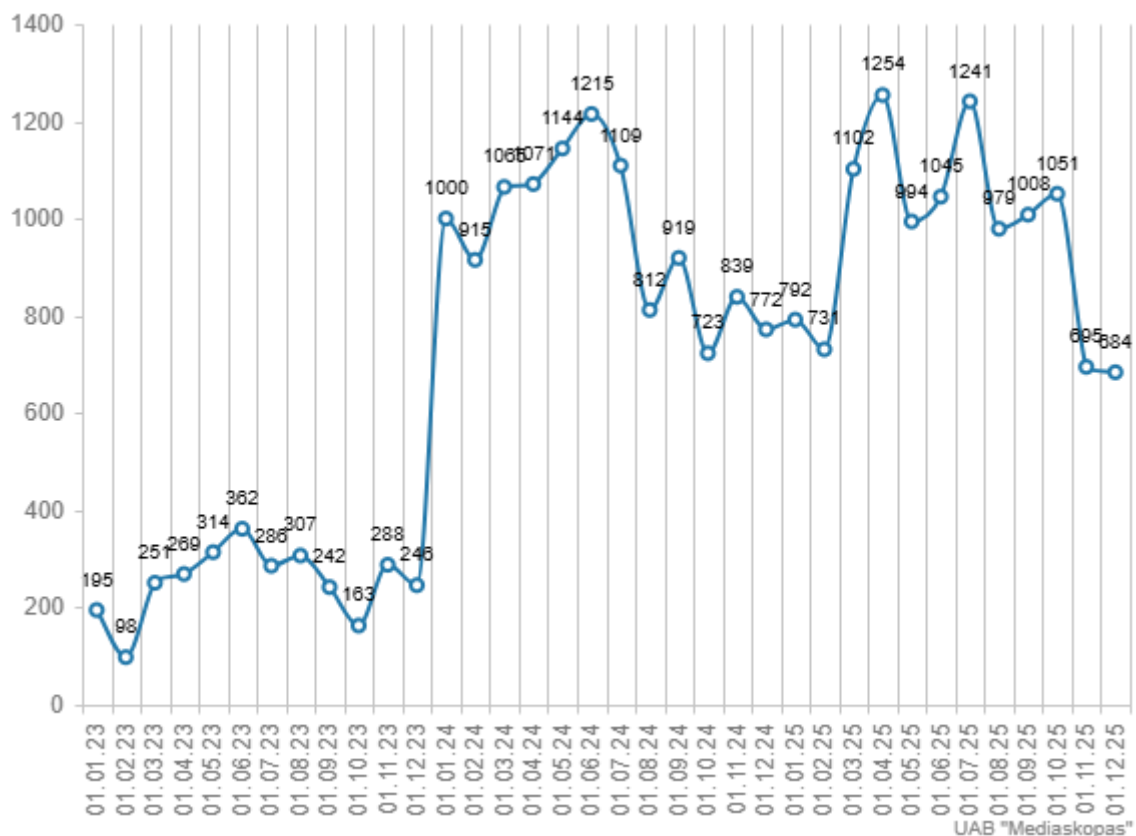


Fig. 7. Monthly amount of articles that are related to the topic of biodiversity loss (2023-2025)

After closely analysing 01. 01. 2020 - 01. 12. 2025 time period, we can concur that the topic of biodiversity was slowly gaining popularity over time, with some slight variations of yearly totals, which will be discussed later on in this thesis. We can also conclude that even if the main popularity of this topic starts in early 2024, it was always present in the news. The topic was rising in popularity more effectively than falling, however it seemingly was a long process, this indicates that the research about biodiversity has been going on for a long time. This data also shows that the problem of

biodiversity loss itself has been progressively worsening. It can be assumed that if the solution to the problem was found or specific actions were taken, we would see larger decreases in the popularity of this topic, than is presented in the current data, however it is important to mention that during the last 2 months of 2025 the number of published articles has dropped below the worst performing month of 2024, which could suggest that some solutions regarding the issue of biodiversity loss were found.

Table 6 indicates the yearly totals of published articles each year. As it shows, from 2020 to 2021 there is a clear increase in the yearly amount of published articles; however, during 2022 the amount started to decrease. It rose once again during 2023. Later in 2024 it had a huge jump in popularity, where it reached the largest yearly number of published articles during the 2020-2025 time period. During 2025 another decrease in the yearly total number of articles was noticed.

Table 6. Yearly totals of published articles each year in the period of 2020 - 2025

Year	Number
2020	1443
2021	2351
2022	2062
2023	3024
2024	11617
2025	11576

This shows that the topic of biodiversity loss is slowly gaining popularity even if some years do show small decreases in yearly totals. According to the seeable pattern it can be assumed that the topic will continue gaining popularity in the foreseeable future. In regard to the upcoming qualitative analysis 2023-2025 time period was chosen due to these years having the largest amounts of yearly published articles.

3.2. Narrative focus in biodiversity loss communication: What should the public think about?

The theoretical framework uses agenda setting theory seeking to answer the research question about the narrative focus: “What should the public think about?”. The literature analysis revealed several sets of top narratives - causes of biodiversity loss, consequences of biodiversity loss, and strategies to cope with biodiversity loss. Thus, following theoretical framework, the empirical analysis is focussed on understanding specifics of communicating causes, consequences and solutions for biodiversity loss.

Figure 8 presents statistical information indicating the popularity of the types of narrative focus related to the topic of biodiversity loss. As we can see from this figure, the narrative on “solutions for biodiversity loss” is the most popular topic, appearing in 40 documents. The narrative “causes and drivers of biodiversity loss” is less popular, appearing in 12 documents. Lastly, we have the narrative “consequences of biodiversity loss”, which appears in 5 documents.

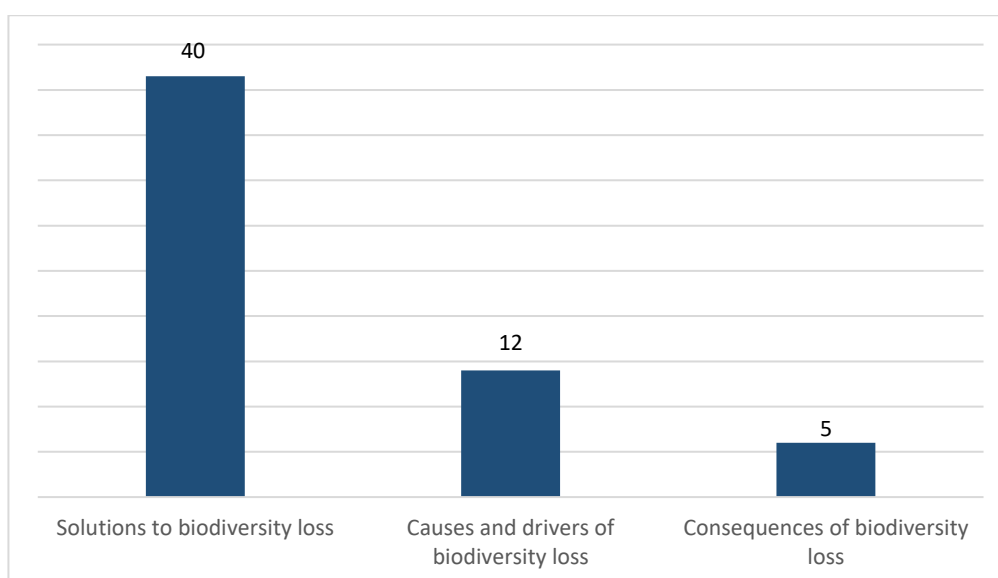


Fig. 8. Narrative focus (frequency, number of documents)

Communication of the solutions to cope with biodiversity loss

Presented in Figure 9 below is statistical information indicating the popularity of the types of solutions related to the issue of biodiversity loss. These solutions were separated into 2 categories, indicating (1) direct and (2) indirect impacts to the related problem.

Regarding the **direct impact** we can see that “conservation and protection types of solutions were the most popular, appearing in 35 documents. “Restoration and rehabilitation” types of direct solutions were less popular, appearing in 7 documents.

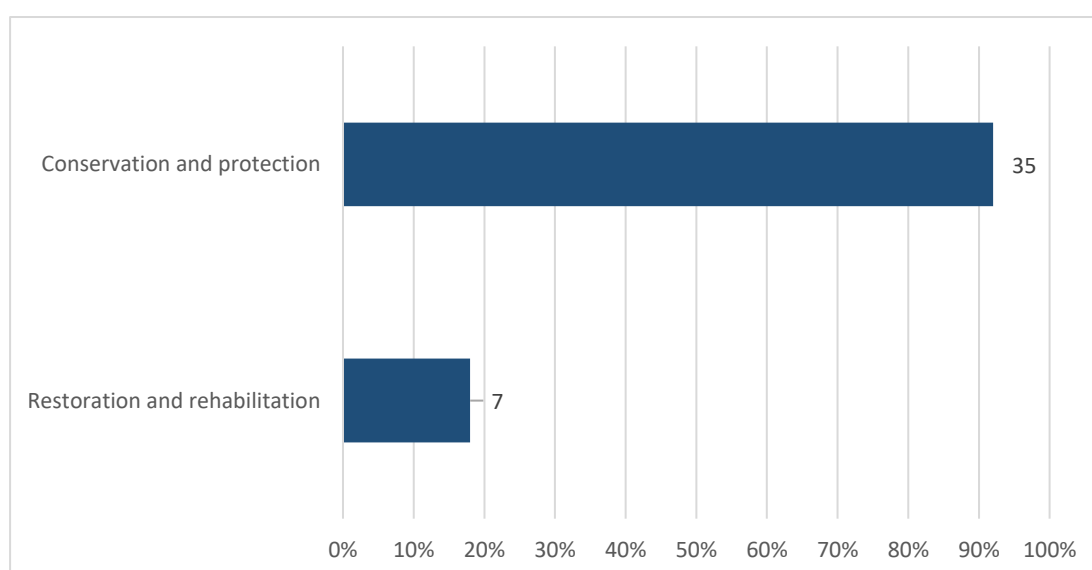


Fig. 9. Types of solutions related to the issue of biodiversity loss: direct impact (frequency, number of documents)

Analysis of communication of the solutions to cope with biodiversity loss as direct impact shows that this topic is focussed mostly on the state’s role and legislation of biodiversity conservation and protection as well as restoration and rehabilitation. preservation and is communicated using 2 types of narrative focus (see Table 7). It might be diversified into two thematic focusses:

- Communication of changes of legal regulations, and
- Communication of existing state actions.

Table 7. Examples of narrative focus on solutions to cope with biodiversity loss as direct impact presented in the analysed documents

Category: Types of solutions	Sub-category: focus of solution	Original excerpts
Conservation and protection	Communication of changes of legal regulations	<i>“The Rules on the Use of Wild Animals have also been amended to stipulate that, in cases where such animals are taken from the wild (from nests or tree hollows), a permit will be required to keep them in captivity. A permit will also be required to import or export such bees into or out of the country”</i> 2024 _ Tamsioji vakarinė medunešė bitė įtraukta į Saugomų gyvūnų, augalų ir grybų rūšių sąrašą - Regionų naujienos <i>“Under its international obligations, Lithuania is required to ensure favorable conditions for the protection of this species; therefore, wolf hunting is restricted not only by setting a permitted hunting season but also by establishing a bag limit”</i> Baigtas vilkų medžioklės sezonas, sumedžioti 326 žvėrys
	Communication of existing state actions	<i>“Please note that broad-clawed crayfish are an endangered species, so catching them is prohibited.”</i> Šilokarčema - Liepos 16 d. prasideda vėžiavimo sezonas aplinkosaugininkai primena svarbiausius reikalavimus, p. 1 <i>“Therefore, to preserve the diversity of our native flora, it is important to prevent invasive species from spreading. For this reason, it is prohibited to grow, propagate, sell, or otherwise use live invasive plants without a permit.”</i> 2023 Lubinas – gražus, bet invazinis augalas - Anyksta.lt <i>“To preserve biodiversity, it would be mandatory in all types of forests to leave not just individual trees during logging, but areas of mature forest that are uncut and undamaged, covering no less than 5 ares and no more than 5 percent of the logging site’s total area.”</i> 2023 Aplinkos ministerija ir Urėdija giriasi, kad miškais rūpinsis dar labiau - Kauniečiams kasdienės naujienos
Restoration and rehabilitation	...assuring animal welfare	<i>“The draft resolution provides that the center will be responsible for the care, rehabilitation, and reintroduction of wild animals.”;</i> <i>“According to the ministry, if more attention were paid to treatment, more animals would survive”</i> 2023 Laukinių gyvūnų priežiūrą ir globą siūloma patikėti prie LSMU steigiamam centrui, p. 3
	... involvement of stakeholders into decision making	<i>“Today, we presented the key provisions of the draft Forestry Law to social partners and everyone concerned with sustainable and responsible forestry,” says Environment Minister Povilas Poderskis.”</i> Premjerui ir socialiniams partneriams pristatytos rengiamo Miškų įstatymo projekto svarbiausios nuostatos - Realu.lt, p. 1
	... nature restoration regulations	<i>“Members of the European Parliament (EP) have decided that by 2030, nature restoration measures must be applied to one-fifth of the EU’s terrestrial and marine ecosystems.”; “The Nature Restoration Rules are an important part of the European Green Deal, based on scientific recommendations for restoring Europe’s ecosystems”</i> 2023 Europarlamentarai sutarė dėl gamtos atkūrimo taisyklių pataisų _ Ūkininko patarėjas, p. 1

Note: translation of original excerpts was made using DeepL.

One of the most important topics, evident in communication of state's actions, is prohibitive measures and rules to protect biodiversity. This explains to public what prohibitions state is creating for biodiversity preservation. This includes prohibition of clear-cutting of forests, prohibition of catching an endangered fish species, such as broad-clawed crayfish, or prohibition to grow, propagate, sell, or otherwise use live invasive plants without a permit.

Regarding the **indirect impact** we can see that “regulatory-administrative types of solutions were the most popular, appearing in 28 documents (see Figure 10). Below them are “economic-financial” types of solutions, appearing in 18 documents. “Research” type of solutions appears in 9 documents. Below them appearing in 4 documents are “informational-educational” type of solutions and lastly, “innovation type of indirect solutions” appeared in 1 document. Indirect solutions such as “technology” and “voluntary” do not appear in any of the coded documents.

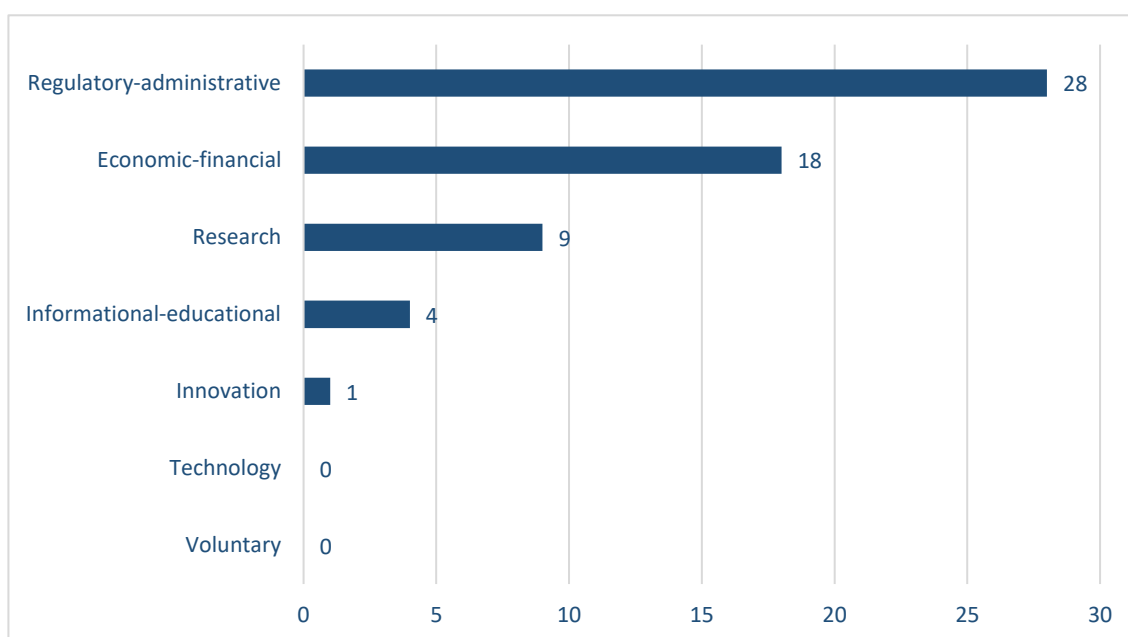


Fig. 10. Types of solutions related to the issue of biodiversity loss: indirect impact (frequency, number of documents)

Communication of regulatory and administrative solutions covers protection of both fauna and flora. There are several thematic lines regarding communication of changes of legal regulation:

- changes in regulations, made to protect fauna. Communication focusses on amendments made for national laws, in some cases aligning national legislation with international laws and regulations. The changes also seek to address animal welfare principles.
- changes in regulations, made to protect flora. Basically, the focus on flora is expressed through the narratives related to forests. The forest related regulation amendments aim to accelerate implementation of protection rules and laws (e.g. Forestry Law).

Another important topic is economic and financial solutions that indirectly address issues of biodiversity loss. State's financial investments for biodiversity preservation includes such actions by the state as purchasing of Natura 2000 sites and signing conservation agreements with private landowners to protect biodiversity, providing support against invasive species, covering damage caused by strictly protected wild animals and those for which hunting is prohibited, and providing support for organic farms in order to promote sustainable development and the efficient use of natural resources such as water, soil, and air, and in this way halting the loss of biodiversity.

Involvement of scientists and other research-based solutions also is important. These actions are relevant in regards of both flora and fauna. Communication of this topic emphasizes taking decisions on hunting quotas based on results and recommendations of scientific studies and working with other stakeholders to preserve a sustainable, genetically healthy wolf population and reduce conflicts between humans and wildlife.

Awareness building and other informational and educational activities, indirectly impacting solutions to biodiversity loss, appear as a topic in news communication as well. Communication of this topic highlights involvement of social partners and everyone concerned with sustainable and responsible forestry in the discussions on amendments of Forestry Law and highlight the informational forums on biodiversity topic. To showcase the actions of Ministry of the Environment, the communication emphasizes organization of forum “Sustainable Urban Ecosystem: For People and Nature” and presenting environmental performance rankings of Lithuanian municipalities.

Innovation as solution, having indirect impact to address biodiversity loss, was focussed on an environmental performance ranking of Lithuanian municipalities. The summary of examples of the narrative focus on solutions to cope biodiversity loss, that have indirect impact, is presented in Table 8 below.

Table 8. Examples of narrative focus on solutions to cope with biodiversity loss, that have indirect impact, presented in the analysed documents

Category: Types of solutions	Sub-category: focus of solution	Original excerpts
Regulatory and administrative	Changes in regulations, made to protect fauna	<i>“...adopted amendments to the Hunting Act, which established a list of prohibited and permitted hunting equipment and tools. According to the drafters of the proposal, restricting the use of night-vision sights would help ensure that animal welfare principles are upheld more effectively...”</i> 2024 _ Seimas iš naujo svarstys Prezidento vetuotas Medžioklės įstatymo pataisas - Vilniečiams.lt, p. 1
	Changes in regulations, made to protect flora	<i>“The latest amendments to the Forestry Act propose a reorganization of the current forest categories”; “We understand the public’s expectations about the future of Lithuania’s forests, which is why we want the drafting of such an important law to be conducted transparently and publicly.</i> Premjerui ir socialiniams partneriams pristatytos rengiamo Miškų įstatymo projekto svarbiausios nuostatos - Realu.lt, p. 1 <i>“By abandoning the 2029 forest group reorganization proposed in the initial draft of the revised Forestry Law and implementing the proposed changes within the framework of the existing group system, it is expected that the resolution of issues in the forestry sector will be accelerated...”</i> Premjerui ir socialiniams partneriams pristatytos rengiamo Miškų įstatymo projekto svarbiausios nuostatos - Realu.lt, p. 1 <i>“This prohibition applies to species listed in the List of Invasive Species in Lithuania or in the Union List of Invasive Alien Species of Union Concern, known as the European Union Invasive Species List.”</i> 2023 Lubinas – gražus, bet invazinis augalas - Anyksta.lt
Research	Research based decision making	<i>“Hunting quotas are set based on data from monitoring the status of the wolf population, as well as the results and recommendations of scientific studies. Their goal is to maintain an appropriate population level of these animals, which are important to forest ecosystems.”</i> Baigtas vilkų medžioklės sezonas, sumedžioti 326 žvėrys

Category: Types of solutions	Sub-category: focus of solution	Original excerpts
Economic financial	- Financial investments and support for biodiversity preservation	<i>"To implement the expansion, the government plans to purchase at least 100 hectares of private and agricultural land within Natura 2000 sites and sign at least 50 conservation agreements with private landowners."</i> 2024 > Leidimus ūkininkauti „Natura 2000“ teritorijose išduos paprasčiau – ką reikia žinoti miškų savininkams - Delfi agro, p. 6 <i>"This will be the first time such support is provided. The procedure for receiving it is set forth in the implementation rules for the measure "Management of the spread of invasive species on the slopes of drainage ditches" under the new Lithuanian Strategic Plan for Agriculture and Rural Development for 2023–2027."</i> Kai kurie ūkininkai galės gauti paramą už invazinių augalų naikinimą - Šilutės naujienos, p. 1 <i>"Starting next year, program funds will be available to cover damage caused by strictly protected wild animals and those for which hunting is prohibited"</i> Nusprendė ūkininkams atlygins meškų, lūšių bei saugomų gyvūnų padarytą žalą <i>"This year, the SP support measures for organic farms - the organic farming schemes "Organic Farming (Fruit, Berries, Vegetables, Medicinal Herbs, and Spices)" and "Conversion to Organic Farming" - have been transferred to the rural development measure "Organic Farming."</i> <i>"Support for organic farms promotes sustainable development and the efficient use of natural resources such as water, soil, and air. It helps to halt the loss of biodiversity and to enhance it."</i> 2024 EKOLOGINIS ŪKININKAVIMAS_ NAUDINGAS ŪKININKUI, VARTOTOJUI IR GAMTAI - Zarasuose.LT - Zarasų krašto naujienos <i>"In some cases, forest owners are encouraged through payments for not harvesting mature stands."</i> <i>"In state-owned forests of Groups IV and III, where forest habitats of EU importance have been inventoried and confirmed, clear-cutting is prohibited by order of the Minister of the Environment, even without compensation from the state budget."</i> 2024 _ Nauji mitai apie Lietuvos miškus – Man.Lt, p. 4
Informational educational	- Awareness building events and work with stakeholders	<i>"On Tuesday, during the forum "Sustainable Urban Ecosystem: For People and Nature," organized by the Ministry of the Environment, the environmental performance rankings of Lithuanian municipalities were announced."</i> Aplinkosaugos reitingo rezultatai pirmoje vietoje – Alytus, didžiausią pažangą pasiekė Raseinių rajono savivaldybė - Regionų n <i>"The Ministry of the Environment will continue to work with stakeholders to preserve a sustainable, genetically healthy wolf population and reduce conflicts between humans and wildlife".</i> Aptarė vilkų populiacijos valdymą ir daromą žalą nuomonių pasigirdo įvairių - Delfi, p. 4
Innovation	New rules and rankings	<i>"The capital is one of the few municipalities to have adopted rules for mowing meadows according to flowering cycles, which help preserve biodiversity and cool the city during heat waves."</i> Aplinkosaugos reitingo rezultatai pirmoje vietoje – Alytus, didžiausią pažangą pasiekė Raseinių rajono savivaldybė - Regionų n <i>"...environmental performance rankings of Lithuanian municipalities"</i> Aplinkosaugos reitingo rezultatai pirmoje vietoje – Alytus, didžiausią pažangą pasiekė Raseinių rajono savivaldybė - Regionų n

Note: translation of original excerpts was made using DeepL.

Communication of the causes and drivers of biodiversity loss

Presented in the Figure 11 is statistical information indicating the popularity of causes and drivers related to the topic of biodiversity loss. The most popular cause seems to be “Invasive species” appearing in 11 documents. Close behind appearing in 6 documents is the cause “poor policies”. Behind it we can see the cause indicated as “other” appearing in 5 documents. “Illegal hunting” appears in 4 and “deforestation” appears in 3 documents. Lastly, the causes “urbanization” and “climate change” appear in one document each. Causes and drivers such as “urbanization”, “pollution”, “industrial development”, “habitat loss” are not present in any of the coded documents.

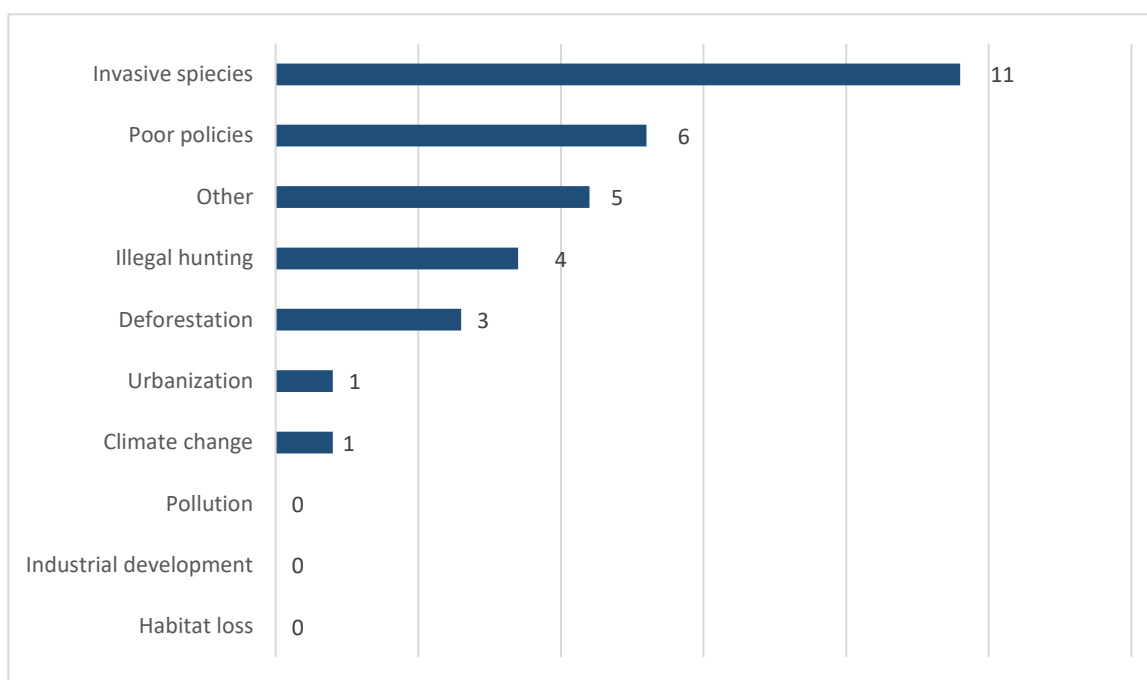


Fig. 11. Types of causes and drivers of biodiversity loss (frequency, number of documents)

The narrative “causes and drivers of biodiversity loss” is communicated mostly with an emphasis on thematic line of invasive species and lack of funding to fight with them, especially Lupins or Sosnovsky's hogweed. Another significant topic is poor policies. The news media emphasize that laws are fully sufficient to protect wild animals, especially those that are injured at accidents. The topic of illegal hunting is mostly related to the regulations of night-vision sights. The examples of the narrative “causes and drivers of biodiversity loss” are presented in Table 9.

Table 9. Examples of narrative focus on causes and drivers of biodiversity loss, presented in the analysed documents

Category: Types of causes	Original excerpts
Invasive species	“Lupins increase nitrogen levels in the soil, causing other plant species to disappear in those areas” 2023 Lubinas – gražus, bet invazinis augalas - Anyksta.lt “Once this invasive plant begins to grow, it is recommended to dig it up, thereby protecting areas that are sensitive in terms of biodiversity”. 2023 Panevėžio rajono savivaldybės biudžete Sosnovskio barščiams naikinti - tik 3 tūkst. eurų, p.2 “Virginijus Šležas, head of the Pajstrio Eldership, admitted that this year they will not receive any funds for the eradication of Sosnovsky's hogweed” 2023 Panevėžio rajono savivaldybės biudžete Sosnovskio barščiams naikinti - tik 3 tūkst. eurų, p.5.

Category: Types of causes	Original excerpts
Poor policies	<i>“Proposal to ban night vision sights rejected In addition, following Thursday’s vote, a proposal by Ieva Pakarklytė, a member of the Seimas Freedom Faction, to include night vision sights and their accessories in the list of prohibited hunting tools and equipment, without any exceptions, as well as to remove night vision sights from the list of permitted hunting tools and equipment. A total of 115 members of the Seimas voted; 42 voted in favor of the proposal, and 40 voted against.”</i> 2023 Iki leidimo naudoti naktinius taikiklius medžioklėje – vienas žingsnis_ gyvūnų apsauga besirūpintieji situacija baisisi -, p. 2 <i>“In the documents accompanying the draft, the Ministry of the Environment states that subordinate agencies receive many reports of injured or distressed wild animals. Most often, assistance is needed for animals involved in car accidents, injured by various structures, power lines, fishing gear, oil spills, and similar incidents.”; “Currently, services related to the care, treatment, or other needs of wild animals are funded through the Environmental Protection Support Program; however, this does not meet the demand, as there is a shortage of providers in the market capable of delivering high-quality services. Due to insufficient assistance for wild animals, fewer are being treated and released back into the wild.”</i> 2023 Laukinių gyvūnų priežiūrą ir globą siūloma patikėti prie LSMU steigiamam centrui, p. 3 <i>“...and the existing legal framework may create conditions conducive to the unjustified depletion of wildlife.”</i> 2024 Seimas iš naujo svarstys Prezidento vetuotas Medžioklės įstatymo pataisas - Vilniečiams.lt, p. 2
Illegal hunting	<i>“Regulations stipulate that night-vision sights should be used only for certain species, but the regulatory authorities claim that effective enforcement of this rule is impossible,”</i> 2023 Iki leidimo naudoti naktinius taikiklius medžioklėje – vienas žingsnis_ gyvūnų apsauga besirūpintieji situacija baisisi -, p. 10
Deforestation	<i>“Through this protest, foresters will demand that the expansion of protected areas not be carried out at the expense of private forest owners, but rather on state-owned land. They will also seek to ensure that the establishment of protected areas is carried out with the consent of private forest owners through signed agreements. They will demand the initiation of restitution of protected areas in private forests, with adequate compensation paid for areas already established without proper notification or consultation with forest owners.”</i> 2024 Miškovežiais riedės į Vilnių – miškų savininkai kitos išeities nebemato - Miskininkas, p. 2
Climate change	<i>“The city’s strategic documents - the 2021-2027 Panevėžys Development Plan, the Waste Prevention and Management Plan, the Renewable Energy Development Action Plan, and the Sustainable Energy and Climate Change Management Action Plan - outline specific measures to help reduce pollution, promote the circular economy, and implement renewable energy solutions.”</i> Aplinkosaugos reitingo rezultatai pirmoje vietoje – Alytus, didžiausią pažangą pasiekė Raseinių rajono savivaldybė - Regionų n
Other	<i>“Pollution of water bodies by conventional pharmaceuticals poses a “significant and growing threat to biodiversity.”</i> Šokiruojantis tyrimas vandenyje esančio kokaino paveiktos lašišos nuplaukė didesnius atstumus, p. 2

Note: translation of original excerpts was made using DeepL.

Communication of the consequences of biodiversity loss

The topic of consequences of biodiversity loss has received the least attention among 3 top narratives. It appeared in 5 documents. The communication of consequences of biodiversity loss is focussed on acknowledging the fact that we witness biodiversity shrinking (“I work in the field of wildlife and biodiversity myself, and we are seeing trends that are certainly not encouraging, biodiversity is declining”, [2023 Iki leidimo naudoti naktinius taikiklius medžioklėje – vienas žingsnis_ gyvūnų apsauga besirūpintieji situacija baisisi -, p. 10](#)) and many natural habitats are in a poor condition

(“About 80 percent of Europe's natural habitats are in poor condition.”, 2023 *Europarlamentarai sutarė dėl gamtos atkūrimo taisyklių pataisų _ Ūkininko patarėjas*, p. 2). Also, the discussion includes subtopics of the wolves population and its genetic diversity (“Lower genetic diversity among wolves has been observed in the Vilnius area”, *Aptarė vilkų populiacijos valdymą ir daromą žalą nuomonių pasigirdo įvairių - Delfi*, p. 2).

3.3. Sentiment analysis and relation of sentiments with top narratives

To better understand the sentiments, held by the news media, related to the topic of biodiversity loss, the “Tone of language” code group was used. As shown in Figure 12 below most of the articles implement a neutral tone of voice, which is present in 54 articles, when discussing the topic of biodiversity loss. This indicates that Lithuanian news media usually portray this topic factually and are not prone to adding many positive or negative sentiments when reporting on it.

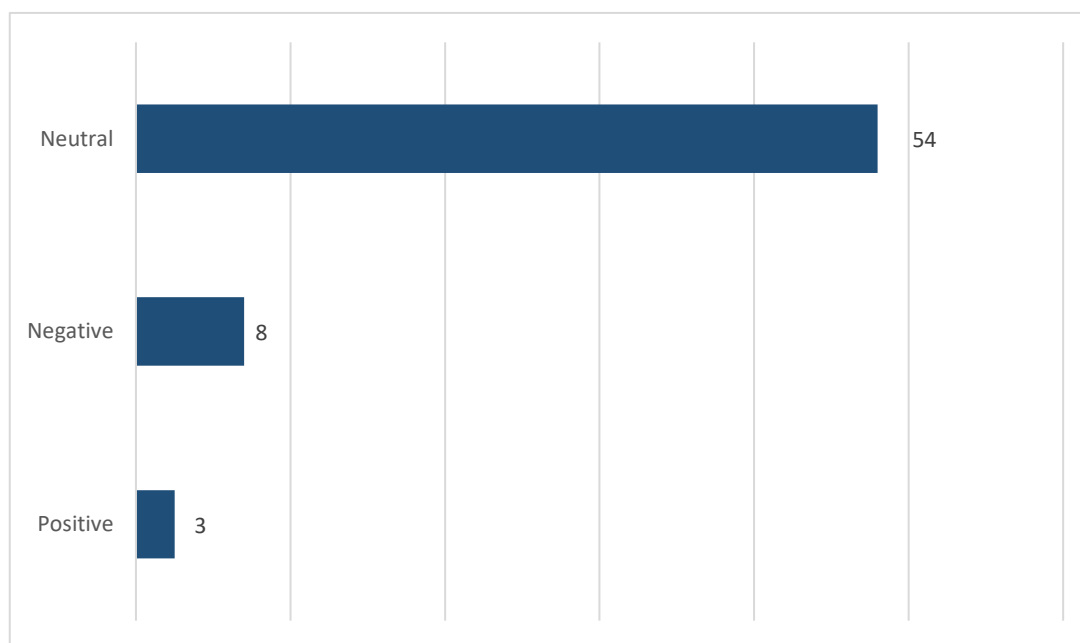


Fig. 12. Tone of Language (frequency, number of documents)

“Negative” sentiments appear but in much smaller quantities. 8 documents are shown to possess some negative sentiments indicating that some articles do use emotions in their stories. This is likely done in order to make the stories more entertaining and engaging. “Positive” sentiment is seen the least, appearing in only 3. This indicates that the main focus of news agencies is reporting factual information and information that can be seen as negative or critical in nature. Writing with positive or motivational aspects is seen to be really used by the news media.

Overall, it seems that negative or positive sentiments were not used often, with the majority of the articles being overall neutral in tone. This could be a type of stylistic choice by the news media, but it can also indicate that in Lithuania this topic does not inspire strong sentiments or emotions. During future research a bigger data sample is recommended as it could portray more accurate results.

After analysing the relations in the documents another analysis was conducted inspecting the relations between codes in the same coded segments. This shows the number of singular coded segments that had both codes indicating an even closer relation (see Table 10).

Table 10. Intersection of codes in a segment: types of causes and drivers and sentiments

Types of causes and drivers	Sentiment			Total
	Neutral sentiment	Positive sentiment	Negative sentiment	
Other	4		2	6
Urbanization	2			2
Poor policies	8		11	19
Pollution				0
Invasive species	28			28
Industrial development				0
Illegal hunting	7		1	8
Habitat loss				0
Deforestation	4			4
Climate change	1			1
Total	54		14	

As shown in Table 10, “neutral” sentiment seems to be most closely related to the “invasive species”, this cause having 28 segment intersections. It is also related to the cause of “poor policies” having 8 segment intersections. “Illegal hunting” cause and “neutral” sentiment intersect in 7 segments. This could be due to the fact that when illegal hunting is being discussed, it is done in an official/regulatory manner. Causes “other” and “deforestation” both have 4 intersections in coded segments. Lastly, “climate change” cause has 1 intersection with the “neutral” sentiment in coded segments.

On the other hand, there are no relations between “positive” sentiment and causes/drivers of biodiversity loss. “Negative” sentiment is most closely related to the “poor policies” cause having 11 segment intersections. This outcome even more strongly suggests that official declarations or decisions made by politicians or official representatives are judged more harshly by the news media. Cause indicated as “other” has 2 intersections with the “negative” sentiment in coded segments. “Illegal hunting” cause has 1 intersection with “negative” sentiment in coded segments.

Thus, even the causes/drivers of biodiversity loss seem to be negative in general, Lithuanian news media most often chooses to present them in a neutral tone.

3.4. Framing strategy analysis

Figure 13 shows the frequencies of different framing strategies used by the Lithuanian news media to communicate about the issue of biodiversity loss.

As we can see “prognostic framing strategy” was the most widely used, appearing in 20 documents. This indicates that when it comes to the issues of biodiversity, Lithuanian news media largely tries to indicate what should be done in relation to the discussed problem. Closely behind prognostic strategy is the “episodic framing strategy”. This means that Lithuanian news media is also likely to focus on specific small cases. “Diagnostic framing strategy” appears in 12 documents. This indicates that new agencies also tend to often describe the issues and responsible parties involved when reporting on the issue of biodiversity loss.

“Thematic framing strategy” and “motivational framing strategy” are used considerably less often, appearing in 5 and 3 documents respectively. This indicates that even if the approach of reporting on

“the bigger picture” or motivating individuals to take up action is used less often it is still present in articles related to the issue of biodiversity loss.

“Gain framing strategy” was used the least, appearing in only one document. This indicates that reporting on what could be gained if action is taken toward a specific problem is not used often by the Lithuanian news outlets. However, different framing strategies are used to communicate every of the three topics. And lastly, “loss framing strategy” was not used at all. This indicates that the narrative of what can be lost if no action is taken is not popular with Lithuanian news agencies when discussing the topic of biodiversity loss.

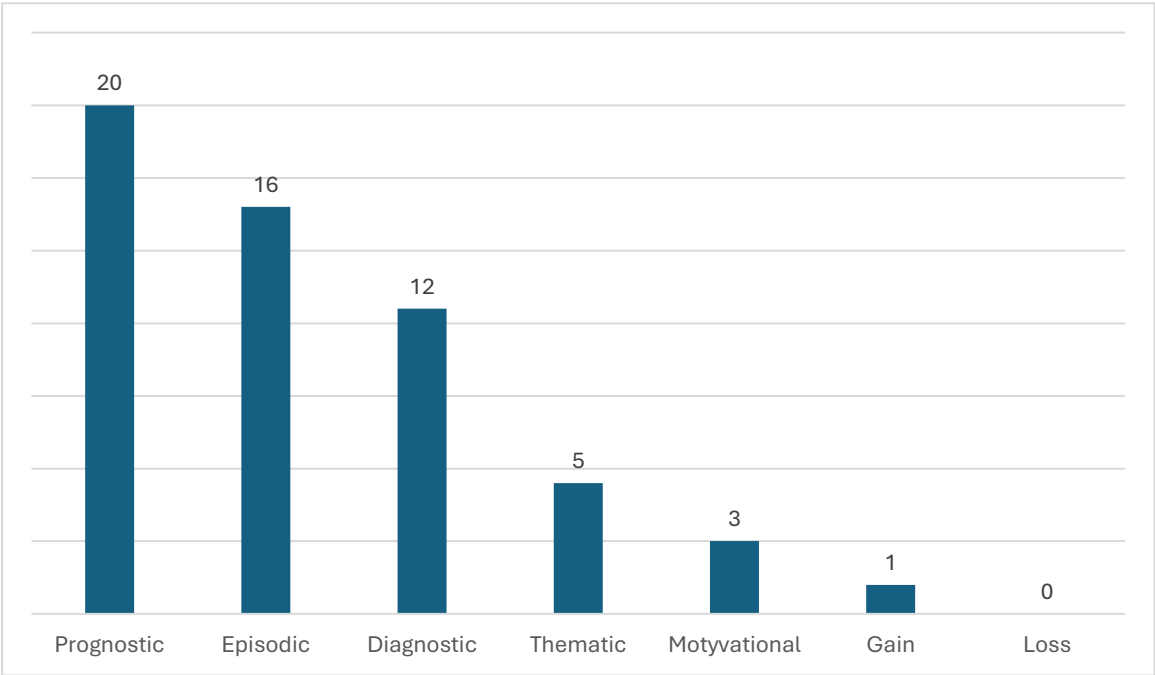


Fig. 13. Framing strategies of biodiversity loss communication (frequency, number of documents)

Relations between framing strategies and narrative focus

Table 11 shows relations between framing strategies and the general narrative focus of the article. This analysis indicates what framing strategies are most commonly used with each of the three main narratives: “solutions to biodiversity loss”, “causes and drivers of biodiversity loss” and “consequences of biodiversity loss”.

Narrative “solutions to biodiversity loss” is most closely related to “prognostic framing strategy” (19 intersections), “diagnostic framing strategy” (16 intersections), “episodic framing strategy” (having 15 intersections) and “thematic framing strategy” (having 12 intersections) in coded segments. Other framing strategies that are related to this narrative are "motivational framing strategy", having 6 intersections in coded segments, and “gain framing strategy”, having 2 intersections in coded segments. Narrative “consequences of biodiversity loss” is related to “diagnostic framing strategy” having 4 intersections in coded segments and “thematic framing strategy” having 2 intersections in coded segments. Narrative “causes of biodiversity loss” seems to be mainly related to the “diagnostic framing strategy” having 12 intersections in coded segments. It is also related to “prognostic” (5 intersections) and “episodic” (2 intersections) framing strategies in coded segments and "motivational framing strategy” having one intersection in coded segments. “Loss framing strategy” has 0 intersections with all types of narrative focus.

Table 11. Intersection of codes in a segment: framing strategy and narrative focus

Framing strategy	Narrative focus			Total
	Solutions to biodiversity loss	Consequences of biodiversity loss	Causes of biodiversity loss	
Thematic framing strategy	12	2		14
Prognostic framing strategy	19		5	24
Motivational framing strategy	6		1	7
Loss framing strategy				0
Gain framing strategy	2			2
Episodic framing strategy	15		2	17
Diagnostic framing strategy	16	4	12	32
Total	70	6	20	

Relations between framing strategies and causes/drivers

In order to better understand these processes further analysis was conducted, investigating code intersections in the same segment. This analysis can display the connections between cause and different framing strategies more accurately and give better conclusions. Collected information is presented in Table 12.

We can see that the largest relation is between the “diagnostic framing strategy” and “invasive species” cause, having 17 intersections (Table 12). This suggests that when the article topic is related to “invasive species”, Lithuanian news media is most likely to choose a narrative which indicates what is the problem and why it emerged, as well as identifying the parties that are related to the issue. “Diagnostic framing strategy” poses another strong relation with “poor strategies”, having 9 intersections in coded segments. Another notable relation to the “diagnostic framing strategy” is with the “illegal hunting” cause, having 7 intersections in coded segments. Lastly, “diagnostic framing strategy” poses 2 intersections with “urbanization” and 1 intersection with cause “deforestation” in the coded segments.

“Prognostic framing strategy” has strong relations with the “poor policies” cause, having 11 intersections in coded segments. This means that when it comes to the topic related to “poor policies” Lithuanian news media most often chooses a narrative which proposes strategies and solutions related to the problem. “Invasive species” cause has 7 intersections with this framing strategy in coded segments. Lastly, there are 2 intersections in coded segments between the “prognostic framing strategy” and the cause “other”.

“Thematic framing strategy” has 3 intersections with the cause “deforestation” and 1 intersection with such causes as “climate change”, “invasive species”, “other” in the coded segments. “Episodic framing strategy” had 2 intersections with the cause “other” and 1 intersection with causes “deforestation”, “invasive species” and “illegal hunting” in the coded segments. “Motivational framing strategy” had 3 intersections with the cause “invasive species” in the coded segments. “Loss framing strategy” together with “gain framing strategy” has no intersections with any type of causes

and drivers. On the other hand, such causes as "pollution", "industrial development" and "habitat loss" had no intersections with any other framing strategies.

Table 12. Intersection of codes in a segment: framing strategy and causes/drivers

Types of causes and drivers	Framing strategy							Total
	Thematic framing strategy	Prognostic framing strategy	Motivational framing strategy	Loss framing strategy	Gain framing strategy	Episodic framing strategy	Diagnostic framing strategy	
Other	1	2				2		5
Urbanization							2	2
Poor policies		11					9	20
Pollution								0
Invasive species	1	7	3			1	17	29
Industrial development								0
Illegal hunting						1	7	8
Habitat loss								0
Deforestation	3					1	1	4
Climate change	1							1
Total	6	20	3	0	0	5	36	

Relations between framing strategies and types of solutions

The relations between framing strategies and types of solutions regarding the problem of biodiversity loss are presented in Table 13 and Table 14. This research is similar to the causes/drivers related analysis, however it investigates what framing strategies are being used in relation to direct and indirect types of solutions for dealing with issues of biodiversity loss.

When analysing solutions with direct impact we can see that "conservation and protection" has three framing strategies that are most often used by the media. The most often used strategies are: "prognostic" and "episodic" framing strategies, having 24 intersections each in coded segments and the "thematic framing strategy", having 18 intersections in coded segments. After the three framing strategies mentioned above, there is "diagnostic framing strategy", which poses 12 intersections in coded segments. This indicates that Lithuanian news media when talking about conservation and protection related to the issue of biodiversity loss most usually creates a narrative which either presents the bigger picture or explains trends that are related to the topic or indicates the problem and parties that are related to it. Other framing strategies are used less often. "Conservation and protection" type of solutions also has 4 intersections with "motivational framing strategy" and 2 intersections with "gain framing strategy" in the coded segments.

"Restoration and rehabilitation" type of solutions has less intersections with framing strategies in general. This type of solution has 5 intersections in coded segments with "thematic framing strategy" and 7 intersections with "prognostic framing strategy". Lastly, "Restoration and rehabilitation" type of solutions has 4 intersections in coded segments with "episodic framing strategy". This means that restoration and rehabilitation type of solution is mostly presented in news media as solution or strategy on how to resolve the issue, including actors of these processes.

Table 13. Intersection of codes in a segment: framing strategy and solutions (direct impact)

Types of solutions (direct impact)	Framing strategy							Total
	Thematic framing strategy	Prognostic framing strategy	Motivational framing strategy	Loss framing strategy	Gain framing strategy	Episodic framing strategy	Diagnostic framing strategy	
Conservation and protection	18	24	4		2	24	12	84
Restoration and rehabilitation	5	7				4		16
Total	13	31	4	0	2	28	12	

Regarding indirect impact “regulatory-administrative” types of solutions seem to be most present in the analysed data sample. This type of solution has the strongest relations to “prognostic framing strategy” (29 intersections). This type of solutions has a strong relation to “diagnostic framing strategy” (20 intersections), “thematic framing strategy” (15 intersections), and “episodic framing strategy” (13 intersections). It is also related to „motivational framing strategy” having 1 intersection in coded segments. “Economic-financial” type of indirect solutions is most closely related to “diagnostic framing strategy” (11 intersections) and “prognostic framing strategy” (11 intersections) in coded segments. Other framing strategies related to this type of solution are “thematic”, “gain”, “episodic” having 2 intersections in coded segments and "motivational" having 1 intersection in coded segments. “Research” type of solutions is most closely related to “diagnostic” framing strategy” having 7 intersections in coded segments. It is also related to “thematic” and “episodic” framing strategies having 4 intersections in coded segments and motivational framing strategy (1 intersection). “Innovation” type of solutions is related to "motivational framing strategy” (2 intersections). “Loss framing strategy” together with "voluntary" and “technology” types of solutions have no intersections with any other framing strategies or types of solutions.

Table 14. Intersection of codes in a segment: framing strategy and solutions (indirect impact)

Types of solutions (indirect impact)	Framing strategy							Total
	Thematic framing strategy	Prognostic framing strategy	Motivational framing strategy	Loss framing strategy	Gain framing strategy	Episodic framing strategy	Diagnostic framing strategy	
Technology								0
Innovation			2					2
Research	4		1			4	7	16
Voluntary								0
Economic-financial	2	11	1		2	2	11	29
Informational-educational	1	2				4		7
Regulatory-administrative	15	29	1			13	20	78
Total	22	42	5	0	2	23	38	

3.5. Stakeholder analysis

The Figure 14 indicates what stakeholders related to the topic of biodiversity loss were mentioned in the analysed articles. As we can see the most common type of stakeholders were “politicians or official representatives”, appearing in 41 documents out of 60. This suggests that a large portion of

the articles have some sort of political aspects. The second most popular type of stakeholders mentioned were “experts and specialists” appearing in 17 articles. Other stakeholders are less often mentioned in the articles. Going in the dissenting order we can see that “other” and “farmers” appearing in 6 articles, “foresters”, “scientific community”, “consumers and the general public” appearing in 5 articles. All three types of stakeholders: “hunters”, “news agencies”, “citizens” and “business and industries” were mentioned in 4 or 3 documents. Lastly stakeholders that were found least often were “NGOs”, mentioned in 1 document.

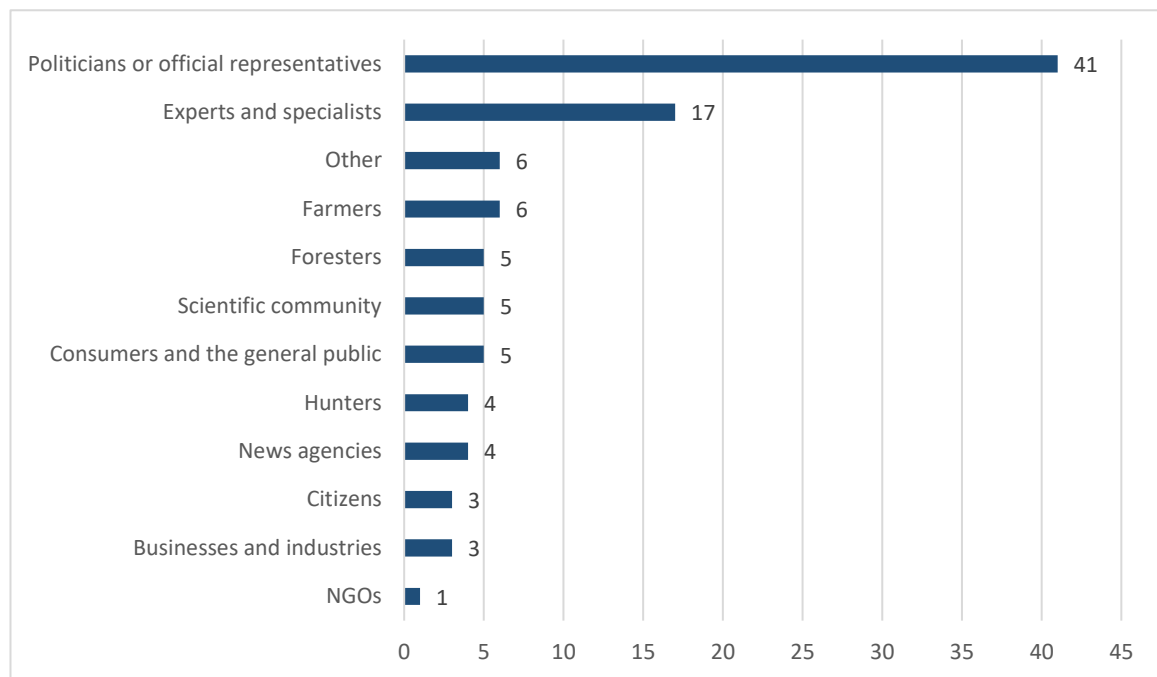


Fig. 14. Stakeholders, mentioned in the articles (frequency, number of documents)

Relations between stakeholders and framing strategies

Table 15 represents the intersections between the stakeholders and framing strategies in coded segments.

“Politicians and official representatives” seem to be most closely related to “diagnostic framing strategy”, having 32 intersections in coded segments. Other relations can be seen between “politicians and official representatives” and “episodic framing strategy” (26 intersections), “prognostic framing strategy” (23 intersections) and “thematic framing strategy”, having 17 intersections in coded segments. Lastly, “motivational” and “gain” framing strategies possess 2 intersections in coded segments related to this stakeholder.

Foresters, farmers and experts /specialists have intersections with 4 types of framing strategies. “Expert and specialists” type of stakeholders possess a strong relation to the “diagnostic framing strategy”, having 13 intersections in coded segments. It also possesses relations to “prognostic” and “episodic” framing strategies, having 7 and 6 intersections in coded segments respectively as well as “gain framing strategy”, having 1 intersection in coded segments. “Foresters” type of stakeholders possesses a relation to the “motivational framing strategy”, having 5 intersections in coded segments. It is also related to “thematic” (4 intersections), “diagnostic” (4 intersections) and “prognostic” (1 intersection) framing strategies. “Farmers” types of stakeholders possess a relation to the “thematic

framing strategy, having 3 intersections in coded segments, “episodic” and “gain framing strategies”, having 2 intersections in coded segments and prognostic framing strategy (1 intersection).

“Hunters” type stakeholders have strong relations to the “diagnostic framing strategy”, possessing 18 intersections in coded segments. It also has a relation to the “episodic framing strategy”, having 1 intersection in coded segments.

Other types of stakeholders have less intersections with framing strategies. “Other” types of stakeholders possess a relation to the “prognostic framing strategy”, having 5 intersections in coded segments. It is also related to “diagnostic” (3 intersections) and “thematic” (1 intersection) framing strategies. “Scientific community” type of stakeholders possesses a relation to the “diagnostic framing strategy” and “episodic framing strategy”, having 4 intersections in coded segments. “Consumers and the general public” types of stakeholders possess a relation to the “prognostic framing strategy, having 5 intersections in coded segments. “News agencies” types of stakeholders possess a relation to the “prognostic framing strategy”, having 2 intersections in coded segments and “diagnostic framing strategy”, having 1 intersection in coded segments. “Citizens” types of stakeholders possess a relation to the “prognostic framing strategy”, having 1 intersection in coded segments and “thematic framing strategy”, also having 1 intersection in coded segments. “NGOs” types of stakeholders possess a relation to the “diagnostic framing strategy”, having just 1 intersection in coded segments. “Business and industries” types of stakeholders possess a relation to the “prognostic” and “episodic framing strategy”, having 2 and 1 intersection in coded segments respectively. And finally, “Loss framing strategy” poses no intersections with any type of stakeholders.

Table 15. Intersection of codes in a segment: framing strategy and stakeholders

Stakeholders mentioned in the article	Framing strategies							Total
	Thematic framing strategy	Prognostic framing strategy	Motivational framing strategy	Loss framing strategy	Gain framing strategy	Episodic framing strategy	Diagnostic framing strategy	
Other	1	5					3	9
Foresters	4	1	5				4	14
Hunters						1	18	19
Farmers	3	1			2	2		8
News agencies		2					1	3
Scientific community		1				4	4	9
NGOs							1	1
Consumers and the general public		5						5
Citizens	1	1						2
Experts and specialists		7			1	6	13	27
Business and industries		2				1		3
Politicians and official representatives	17	23	2		2	26	32	102
Total	26	48	7	0	5	40	76	

Relations between stakeholders and narrative focus

The relations between different types of stakeholders and narrative focus of the article are presented in Table 16.

“Solutions to biodiversity loss” type of narrative focus is related to “politician or official representatives” type of stakeholders, having 8 intersections in coded segments. “Experts and specialists” have 2 intersections. Other types of stakeholders that poses 1 intersection with this narrative are “farmers”, “foresters” and “other”. “Consequences of biodiversity loss” type of narrative focus is related to “scientific community” type of stakeholders, having 1 intersection in coded segments. “Causes of biodiversity loss” type of narrative focus is related to “foresters” and “politicians or official representatives” type of stakeholders, both having 2 intersections in coded segments with this narrative focus

Finally, stakeholders such as “hunters”, “news agencies”, “NGOs”, “consumers and general public”, “citizens”, “business and industries” types of stakeholders possess no intersections with any type of narrative focus.

Table 16. Intersection of codes in a segment: narrative focus and stakeholders

Stakeholders mentioned in the article	Narrative focus			Total
	Solutions to biodiversity loss	Consequences of biodiversity loss	Causes of biodiversity loss	
Other	1			1
Foresters	1		2	3
Hunters				0
Farmers	1			1
News agencies				0
Scientific community		1		1
NGOs				0
Consumers and the general public				0
Citizens				0
Experts and specialists	2			2
Business and industries				0
Politicians and official representatives	8		2	10
Total	13	1	4	

3.6. Ecosystem analysis

The different types of ecosystems that were mentioned in the analysed articles are indicated in Figure 15. This research indicates that the “land based ecosystem” type is seen most commonly in articles published by the Lithuanian news media appearing in 31 documents. This indicates that when Lithuanian news media is discussing the problem of biodiversity loss, they are most commonly reporting on biodiversity that is found in “land based ecosystems”.

“Freshwater ecosystems” appearing in 5 articles and “marine ecosystems” appearing in 1 document are significantly less covered by the news media. This could be in part related to Lithuania historically being an agricultural country, therefore majority of the popular topics are about biodiversity found in “land based ecosystems”

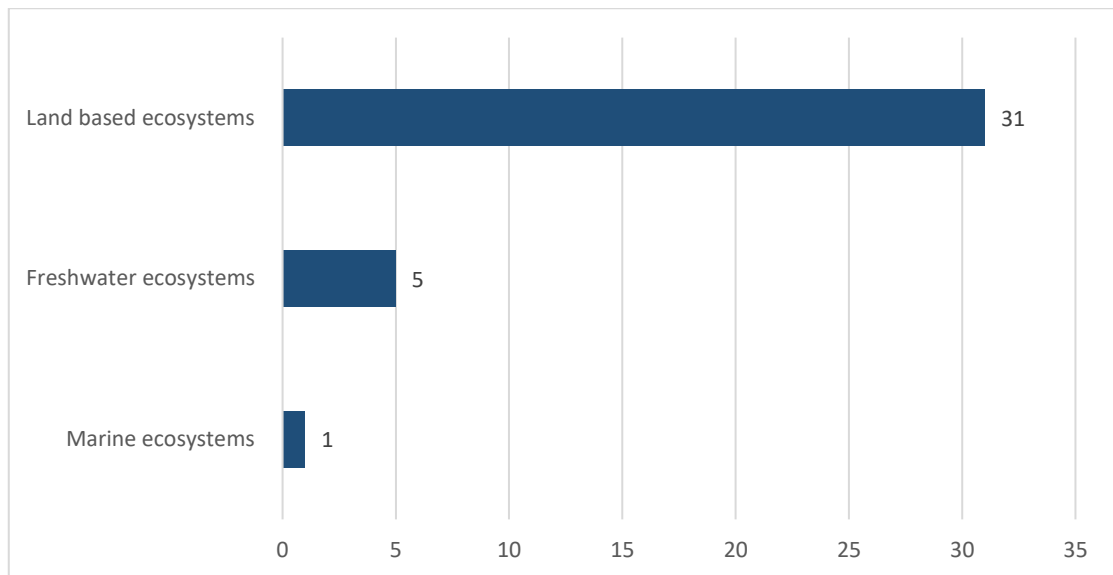


Fig. 15. Ecosystem type (frequency, number of documents)

Relations between ecosystems and framing strategies

The Table 17 indicates relations between framing strategies and types of different ecosystems related to the topic of biodiversity loss. “Land based ecosystems” seem to be most closely related to the), “prognostic framing strategy” (20 intersections) and “thematic framing strategy”, having 15 intersections in coded segments. It is also related to the “Diagnostic framing strategy” (12 intersections) and “episodic framing strategy” (10 intersections). Less often it is related to “gain framing strategy” (3 intersections) and “motivational framing strategy” (2 intersections). “Marine ecosystems” are related to the “thematic framing strategy”, having 2 intersections in coded segments. “Freshwater ecosystems” are seen to have a relation to the “episodic framing strategy”, “prognostic framing strategy”, having 2 intersections in coded segments. This ecosystem is also very little related to “diagnostic framing strategy” (1 intersection) and “motivational framing strategy” (1 intersection). “Loss framing strategy” poses no intersections with any type of ecosystems mentioned in the articles.

Table 17. Intersection of codes in a segment: framing strategy and ecosystem type

Framing strategy	Ecosystem type			Total
	Freshwater ecosystem	Marine ecosystem	Land based ecosystem	
Thematic framing strategy		2	15	17
Prognostic framing strategy	2		20	22
Motivational framing strategy	1		2	3
Loss framing strategy				0
Gain framing strategy			3	3
Episodic framing strategy	2		10	12
Diagnostic framing strategy	1		12	13
Total	6	2	62	

Relations between ecosystems and narrative focus

The Table 18 shows the relations between types of ecosystems and the narrative focus of the article. “Land based ecosystems” seem to be most closely related to the “solutions to biodiversity loss” type of narrative focus, having 9 intersections in coded segments. “Marine ecosystems” are also related to the “solutions to biodiversity loss” type of narrative focus, having 1 intersection in coded segments. “Freshwater ecosystems” are related to the “causes and drivers of biodiversity loss” type of narrative focus, having 1 intersection in coded segments. Narrative focus “consequences of biodiversity loss” poses no intersections with any type of ecosystems present in the analysed articles.

Table 18. Intersection of codes in a segment: narrative focus and ecosystem type

Narrative focus	Ecosystem type			Total
	Freshwater ecosystem	Marine ecosystem	Land based ecosystem	
Solutions to biodiversity loss		1	9	10
Consequences of biodiversity loss				0
Causes of biodiversity loss	1			1
Total	1	1	9	

3.7. Types of biodiversity analysis

Figure 16 below presents different types of biodiversity that were mentioned in the analysed articles. As we can see in Figure 16, the most popular type of biodiversity is “animals” appearing in 33 articles out of 60. The second most popular type of biodiversity mentioned was “plants” having appeared in 18 articles. This further indicates the previous speculations about the connections between the issue of biodiversity loss and agriculture in Lithuanian news media. Such types of biodiversity as “fungi” or “microorganisms” seem to be unpopular in Lithuanian news media, having appeared just in 3 and 1 document respectively.

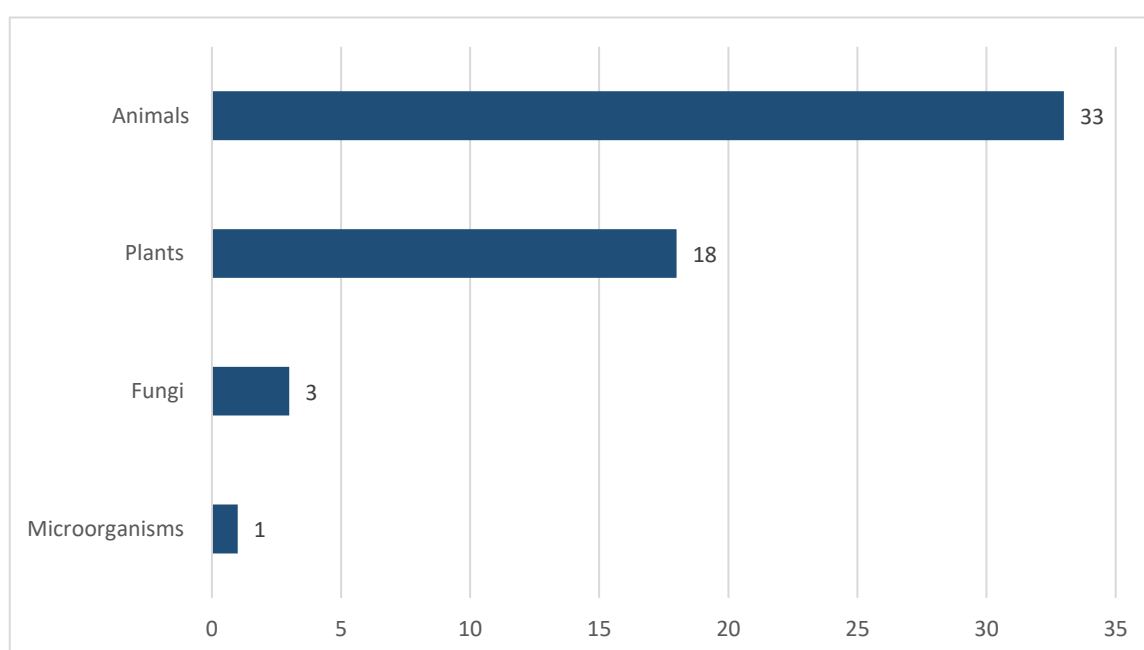


Fig. 16. Types of biodiversity (frequency, number of documents)

Relations between biodiversity and framing strategy

In Table 19 below we can see the relations between different framing strategies and types of biodiversity. “Animals” type of biodiversity seems to be closely related to the “episodic framing strategy”, having 47 intersections in coded segments. It is also related to “prognostic framing strategy” (33 intersections), “diagnostic framing strategy” (31 intersections), “gain framing strategy” (2 intersections) and “thematic framing strategy” (4 intersection). “Plants” type of biodiversity has a relation to the “prognostic framing strategy”, with 18 intersections in coded segments. It also possesses relations to “diagnostic framing strategies” (9 intersections), “episodic framing strategy” (5 intersections), “gain framing strategy” (2 intersections) and “motivational framing strategy” (1 intersection). “Fungi” and “microorganisms” types of biodiversity have intersection with “prognostic framing strategy” (3 and 1 intersections respectively). “Fungi” also has 1 intersection with “episodic framing strategy”. Loss framing strategy has no intersections with any type of biodiversity.

Table 19. Intersection of codes in a segment: framing strategy and biodiversity type

Framing strategy	Type of biodiversity				Total
	Microorganisms	Fungi	Plants	Animals	
Thematic framing strategy				4	4
Prognostic framing strategy	1	3	18	33	55
Motivational framing strategy			1		1
Loss framing strategy					0
Gain framing strategy			2	2	4
Episodic framing strategy		1	5	47	53
Diagnostic framing strategy			9	31	40
Total	1	4	35	117	

Relations between biodiversity and narrative focus

The relations between the types of biodiversity and narrative focus are presented in Table 20.

Table 20. Intersection of codes in a segment: narrative focus and biodiversity type

Narrative focus	Narrative focus				Total
	Microorganisms	Fungi	Plants	Animals	
Solutions to biodiversity loss		1	1	4	6
Consequences of biodiversity loss					0
Causes of biodiversity loss			3		3
Total	0	1	4	4	

“Animals” type of biodiversity is related to the “solutions to biodiversity loss” type of narrative focus, having 4 coded segments. “Plants” type of biodiversity is also related to the “solutions to biodiversity

loss” type of narrative focus, having 1 coded segment and with “causes of biodiversity loss” having 3 intersections. “Fungi” type of biodiversity has 1 intersection with “solutions to biodiversity loss”. There are no relations between any types of narrative focus and “microorganisms” and between “consequences of biodiversity loss” and any type of biodiversity.

3.8. Visual communication of biodiversity loss

As literature suggests, visual communication is important part of transmitting the message to the audience and increasing its effectiveness. The analysis of all 60 articles revealed that the majority of them (49 articles) included visual elements. In total, 72 photographs were used to illustrate these 49 articles.

The analysis of visual content revealed several categories of objects that are represented in the pictures in the analysed articles (see Table 21).

Table 21. Representation of the objects in visualization of the articles

Type of the object in the picture	Number of pictures	Short descriptions
Animals, birds, fishes	16	Different types of animals, in major cases – wolves, also some animals from the zoo
Landscapes / plants	17	Featuring landscapes, but also invasive species and protected areas
Forest	13	Forest pictures in summer and winter, peaceful
Humans	29	Three major types: politicians, regular people during holidays, peaceful, caring about nature and invasive, destructive, hunting
Civilization	5	Towns, buildings, cars

Figure 17 presents examples of the pictures of humans that accompany selected articles.

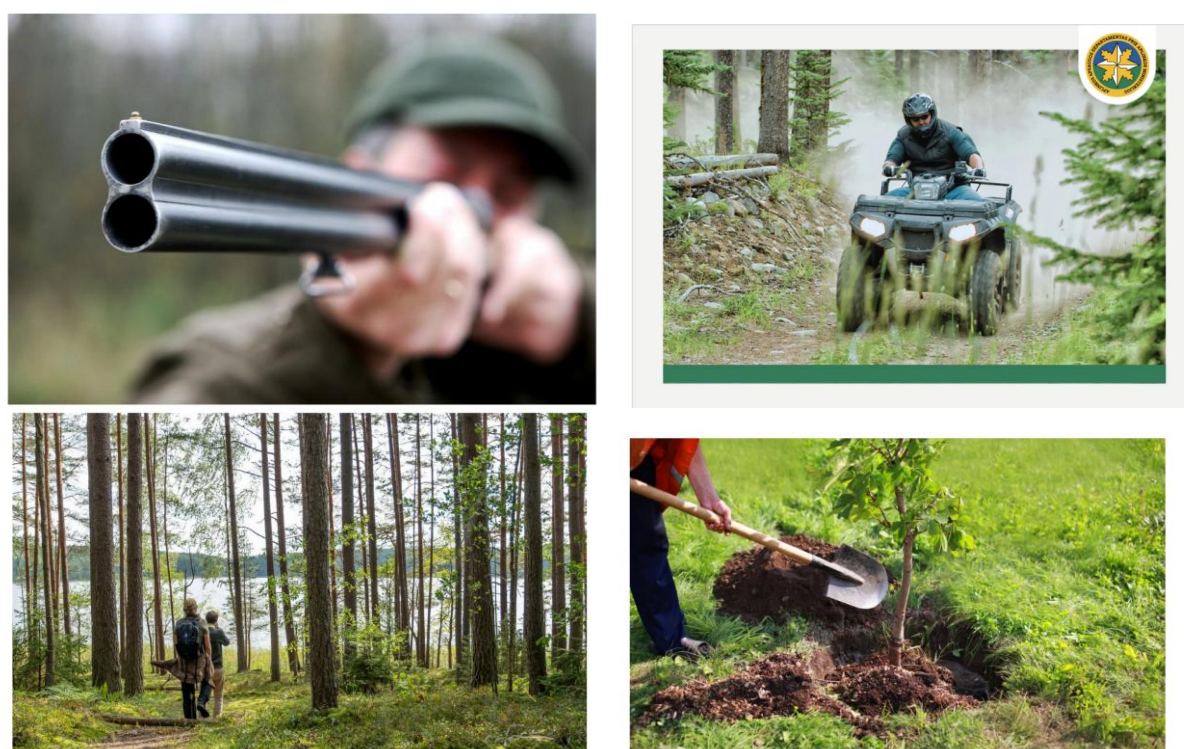


Fig. 17. Example of visuals illustrating topic of humans

The most common category of visual elements was humans, which appeared in 29 pictures. This type of visual element can be classified into three groups: politicians, ordinary people spending their time in nature, and individuals that have interactions with nature, including positive and negative interactions (see Fig. 17). Pictures of politicians usually accompany the articles that speak about legal regulation or poor policies. This category indicates that humans have strong representations in biodiversity-related communication and portrays them as possible actors for both contributions to the cause of biodiversity conservation or causes for its decline.

There are also 16 pictures that represent types of categories such as plants, animals, fish, and 17 pictures that portray landscapes and birds. These visuals highlight environmental/ecological contexts and settings. Visuals portraying plants include pictures of invasive species, in most cases, Lupins or Sosnovsky's hogweed. These pictures accompany articles that describe invasive species. Visual communication elements that present animals most commonly include images of wolves and zoo animals.

Wolves were the most common animals to have appeared in the analysed images. This is due to many articles on wolves, their management, and hunting regulations. Several visual elements showcase dead wolves, linking the hunters to the hunting practises to the broader frame of “solutions to biodiversity loss” (see Fig. 18). Those images indicate human dominance over nature, at the same time, conveying emotionally contradictory messages since the portrayal of dead animals contradicts with the broader goal of biodiversity protection and conservation. This indicates that Lithuanian news media are focusing on relations between wildlife and humans.



Fig. 18. Example of visuals illustrating topic of management of wolves population

Imagery related to forests was present in 13 pictures, most commonly depicting calming forest scenes across different seasons. These visual elements are usually strongly associated with positive emotions and natural beauty.

Lastly, the civilization-type visual elements were represented the least, appearing in 5 pictures. These pictures mainly feature cars, towns, buildings, and other similar visual elements. Such representation suggests that the analysed articles were more strongly associated with contexts in natural and semi-natural places than with urban environments.

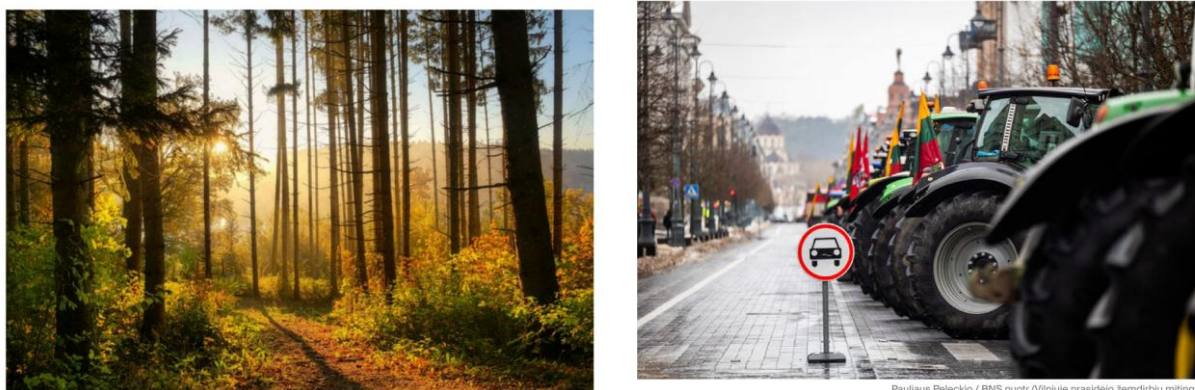


Fig. 19. Example of visuals illustrating topic of forest (left) and civilization (right)

This analysis indicates that visual elements related to biodiversity communication are not just used to illustrate problems but can also be used as a lens that shapes the emotional context of these issues. The analysis also indicates that biodiversity loss is often framed by narratives that highlight human experiences while representing nature as something to be managed or controlled.

3.9. Summary of the empirical research results

Summarizing the results of the empirical study, several major findings could be highlighted.

Quantitative data analysis shows:

- Analysed data suggests that the topic of biodiversity is relevant in Lithuanian news agencies. Research indicates that the topic of biodiversity loss was present during all of the analysed period. A big increase was noted in the beginning of 2024. According to the data, the yearly number of articles related to the loss of biodiversity is steadily increasing during the analysed time period, with some slight decreases in popularity during 2022 and 2025.

Qualitative findings show:

- According to the collected data “Strategies to cope with biodiversity loss” type of narrative was most commonly used. This indicates that the majority of articles in the data sample focuses on reporting about solutions and coping strategies related to biodiversity loss. Narratives related to “Causes” and “Consequences” of biodiversity loss seem to appear significantly less often. This indicates that when reporting on the topic of biodiversity loss, Lithuanian news media usually chooses a narrative framework which informs their audience about solutions and coping strategies.
- “Strategies to cope with biodiversity loss” is communicated using almost all of the framing strategies except the “loss framing strategy” which wasn't used at all. The most popular framing strategies related to this narrative are “prognostic” and “diagnostic”. This indicates that when it comes to this narrative Lithuanian news media communicates about it either by addressing the problem and proposing solutions or identifying the problem and attributing responsibility. Types of stakeholders mentioned in the articles that are related to this narrative are “politicians and official representatives”, “experts and specialists”, “farmers”, and “foresters”. This indicates that such a narrative is related

to individuals in agricultural and political spheres as both groups would benefit from solving the problem of biodiversity loss. Lastly, the types of ecosystems related to this narrative are “land-based” and “marine”, types of biodiversity related to this narrative are “animals”, “plants” and “fungi”. This data further suggests that this narrative is strongly related to articles within the agricultural sphere.

- “Causes of biodiversity loss” is communicated using “prognostic”, “motivational”, “episodic” and “diagnostic” framing strategies. The most popular framing strategy related to this narrative is “diagnostic”. This indicates that when it comes to this narrative Lithuanian news media communicates about it by identifying the problem and related causes. Types of stakeholders mentioned in the articles that are related to this narrative are “foresters” and “politicians and official representatives”. Such data indicates that this narrative is also related to agricultural and political spheres, suggesting that their representatives are not only interested in finding solutions to the problem of biodiversity loss, but the underlying causes as well. Lastly, the types of ecosystems related to this narrative are “freshwater”. Types of biodiversity related to this narrative are “plants”.
- “Consequences of biodiversity loss” is communicated using “thematic” and “diagnostic” framing strategies. The most popular framing strategy related to this narrative is “diagnostic”. This indicates that when it comes to this narrative Lithuanian news media communicates about it by identifying the problem and related causes. Types of stakeholders mentioned in the articles that are related to this narrative are “scientific community”. This indicates that the narrative related to causes is likely to involve the scientific community for their expertise. Lastly, this type of narrative was found to have no direct relations to any specific ecosystems or types of biodiversity. It is important to mention that this type of narrative was seen the least in all of the coded articles, so this lack of data can be due to the low usability of the narrative.
- According to the collected data “prognostic” and “episodic” framing strategies were used most often in Lithuanian news media. Another relatively popular framing strategy was “diagnostic”. Both, “thematic” and “motivational” framing strategies appear less in articles. Lastly, “gain framing strategy” appears very little in coded articles, while “loss framing strategy” does not appear at all. Collected data indicates that Lithuanian news media are most keen in constructing their articles using “prognostic”, “episodic” or “diagnostic” framing strategies and least likely to use “gain” or “loss” framing strategies.
- “Prognostic framing strategy” is used when the article is describing “poor policies” and “invasive species” types of causes related to the topic of biodiversity loss. It is also used to describe “conservation and protection” as well as “restoration and rehabilitation” types of direct solutions and “economic-financial”, “informational-educational”, “regulatory-administrative” types of indirect solutions for the problem of biodiversity loss. Stakeholders mentioned in the articles that use this framing strategy are “foresters”, “news agencies”, “scientific community”, “consumers and the general public”, “citizens”, “experts and specialists”, “business and industries”, “politicians or official representatives” and “farmers”. This framing strategy was used in articles that mention “freshwater” and “land based” ecosystems as well as talk about “microorganisms”, “fungi”, “plants” and “animals” type of biodiversity.

- "Episodic framing strategy" is used when the article is describing "invasive species", "illegal hunting", and "deforestation" types of causes related to the topic of biodiversity loss. It is also used to describe "conservation and protection" as well as "restoration and rehabilitation" types of direct solutions and "research", "economic-financial", "informational-educational", and "regulatory-administrative" types of indirect solutions for the problem of biodiversity loss. Stakeholders mentioned in the articles that use this framing strategy are "hunters", "farmers", "scientific community", "experts and specialists", "business and industries", and "politicians or official representatives". This framing strategy was used in articles that mention "freshwater" and "land based" ecosystems as well as talk about "fungi", "plants" and "animals" type of biodiversity.
- "Diagnostic framing strategy" is used when the article is describing "poor policies", "invasive species", "illegal hunting", "deforestation", and "urbanization" types of causes related to the topic of biodiversity loss. It is also used to describe "conservation and protection" types of direct solutions and "research", "economic-financial", and "regulatory-administrative" types of indirect solutions for the problem of biodiversity loss. Stakeholders mentioned in the articles that use this framing strategy are "foresters", "hunters", "news agencies", "scientific community", "NGOs", "experts and specialists", and "politicians or official representatives". This framing strategy was used in articles that mention "freshwater" and "land based" ecosystems as well as talk about "plants" and "animals" type of biodiversity.
- "Thematic framing strategy" is used when the article is describing "deforestation", "climate change", "invasive species" types of causes related to the topic of biodiversity loss. It is also used to describe "conservation and protection" as well as "restoration and rehabilitation" types of direct solutions and "research", "economic-financial", "informational-educational", and "regulatory-administrative" types of indirect solutions for the problem of biodiversity loss. Stakeholders mentioned in the articles that use this framing strategy are "foresters", "farmers", "citizens", and "politicians or official representatives". This framing strategy was used in articles that mention "marine" and "land based" ecosystems as well as talk about "animals" type of biodiversity.
- "Motivational framing strategy" is used when the article is describing "invasive species" types of causes related to the topic of biodiversity loss. It is also used to describe "conservation and protection" types of direct solutions and "innovation", "research", "economic-financial", and "regulatory-administrative" types of indirect solutions for the problem of biodiversity loss. Stakeholders mentioned in the articles that use this framing strategy are "foresters" and "politicians or official representatives". This framing strategy was used in articles that mention "freshwater" and "land based" ecosystems as well as talk about "plants" type of biodiversity.
- "Gain framing strategy" is used when the article is describing "conservation and protection" types of direct solutions and "economic-financial" types of indirect solutions for the problem of biodiversity loss. Stakeholders mentioned in the articles that use this framing strategy are "farmers", "experts and specialists", and "politicians or official representatives". This framing strategy was used in articles that mention "land based" ecosystems as well as talk about "plants" and "animals" type of biodiversity.
- "Loss framing strategy" was not used by the Lithuanian news outlets in relation to the topic of biodiversity loss.

- The visual communication analysis demonstrates that visual communication plays a significant role in biodiversity-related media coverage, as the majority of the analysed articles included photographs or other visual elements. The visuals were strongly dominated by human-centred and conflict-related representations, particularly images associated with wildlife management, hunting, and human interactions with nature.

Conclusions

Summarizing the theoretical and empirical findings, several conclusions may be drawn, addressing each of the objectives of this work.

1. The theoretical framework that was constructed in order to understand how news media are communicating about the topic of biodiversity loss, is based on 3 main theoretical approaches, that were identified using the literature analysis:
 - Agenda setting theory. It indicates how news agencies wish to portray the topic of biodiversity loss to the public. In communication of biodiversity loss, the most common narratives focus on “causes of biodiversity loss”, “consequences of biodiversity loss” and “strategies for coping with biodiversity loss”.
 - Framing theory. It indicates what specific communication strategies does the news media use when talking about different aspects related to the topic of biodiversity loss. The theoretical framework includes 7 main framing strategies indicated in the literature: “Prognostic”, “Diagnostic”, “Motivational”, “Episodic”, “Thematic”, “Gain”, “Loss” to use them for analysis of biodiversity loss communication. These framing strategies are important because they influence how biodiversity issues are understood emotionally, cognitively, and behaviourally.
 - Visual communication theory. It indicates how an individual's perception, engagement, and even interpretation of environmental issues can be influenced by certain visual elements. The research shows that articles with images usually have a greater impact on readers than those that use only text. The data also show that biodiversity loss is increasingly communicated through nonverbal media, such as videos and images. These visual elements boost the public's engagement and shape their understanding of the topic.
2. The combination of quantitative and qualitative methods gives a more comprehensive understanding of biodiversity loss communication by allowing examination of both, the scale and the meaning of media content. Quantitative analysis enables the identification of key topics, frequencies, and trends, while qualitative analysis helps to interpret narratives, reveal symbolic meanings, and identify communication strategies. Using both, quantitative and qualitative approaches together strengthens the reliability, validity and depth of the analysis, as quantitative methods reveal what is communicated and how often, while qualitative methods explain how and why biodiversity loss is framed in these particular ways.
3. Empirical research on biodiversity loss communication in news media in Lithuania shows that:
 - the topic of biodiversity loss was present during all of the analysed period. A big increase was noted in the beginning of 2024. According to the data, the yearly number of articles related to the loss of biodiversity was steadily increasing during the analysed time period, with some slight decreases in popularity during 2022 and 2025.
 - The narrative “Strategies to cope with biodiversity loss” was the most dominant in the analysed media content, indicating that Lithuanian news media primarily focuses on solutions and coping strategies rather than on the causes or consequences of biodiversity loss. This narrative was mainly communicated through prognostic and diagnostic framing strategies, suggesting that news media coverage often emphasized the problem and proposed solutions or the problem and attributed responsibility. The articles were strongly associated with stakeholders such as foresters, farmers, experts, and politicians,

and were mostly related to land-based and marine ecosystems, particularly focusing on animals and plants.

- The narrative “Causes of biodiversity loss” was most often communicated by using diagnostic framing strategy. This strategy emphasizes identifying environmental problems as well as their causes. This narrative was also primarily linked to foresters and political actors. It was also associated with freshwater ecosystems, indicating the relevance of biodiversity loss issues in agriculture and official policies.
- The narrative “Consequences of biodiversity loss” was the least represented in the analysed articles and was primarily communicated through diagnostic and thematic framing strategies. This suggests that Lithuanian news media mainly addressed the consequences of biodiversity loss by identifying related environmental problems and presenting them within a broader context. Articles related to this narrative most frequently involved representatives of the scientific community, indicating the importance of expert knowledge in communicating biodiversity-related impacts. No clear associations were identified between this narrative and specific ecosystems or biodiversity types, which may be explained by the relatively limited use of this narrative in the analysed media content.
- The analysis indicated that prognostic and episodic framing strategies were most frequently used in Lithuanian news media coverage of biodiversity loss with diagnostic framing strategy following close behind. Thematic and motivational framing strategies appeared less often, gain framing strategy was rarely used and loss framing strategy was not identified at all. These findings indicate that Lithuanian media tends to communicate issues related to biodiversity loss using such approaches as reporting on small events, finding solutions, or identifying the problem, while framing strategies that are based on gains or losses are largely absent from the analysed data.
- Visual communication has a significant role in biodiversity loss communication in news media, as the majority of the analysed articles included photographs. The visuals were strongly dominated by human-centred representations, portraying humans as possible actors for both contributions to the cause of biodiversity conservation or causes for its loss.

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5. European Commission. (2024d). European Green Deal. Accessed on 2025-11-05 at the address: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

Appendices

Appendix 1. List of analyzed articles

1. „Pabėgęs“ Sosnovskio barštis skėčius kelia ir Alytuje, ir rajone. (2025, August 5–7). Alytaus naujienos, 1.
2. 15min. (2024). Savaitgalį Šilutėje varžysis geriausi šienpjoviai: ar kas nurungs dalgio brolius? <https://www.15min.lt/gyvenimas/naujiena/keliones/savaitgali-siluteje-varzysis-geriausi-sienpjoviai-ar-kas-nurungs-dalgio-brolius-1630-2277400>
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