

Environmental Impacts Of The Russia-Ukraine War In Ukraine: Data-driven Analytical Approaches In Journalism

Yana Shekeriak-Kushka

Ivan Franko National University of Lviv

Abstract

This article examines the environmental impacts of the Russia–Ukraine war in Ukraine through data-driven approaches in journalism. It examines how ecological issues – particularly those related to water, soil, and air – have traditionally been addressed in Ukrainian environmental journalism and how these practices have evolved under wartime conditions. The study emphasizes the longstanding connection between ecological reporting and data journalism in Ukraine, highlighting the growing reliance on alternative data sources such as satellite imagery, remote sensing, and open-source intelligence. While Ukraine faces environmental challenges similar to those observed globally, the article argues that its primary causes and potential solutions are now directly linked to the war. The findings underline the critical role of data journalism in documenting environmental damage, supporting public awareness, and informing post-war recovery efforts.

Keywords: Environmental Journalism; Data Journalism; Ecology; Russia–Ukraine War; Ecological Impacts; Wartime Journalism; Media; Mass Communication.

Introduction

Ecology has traditionally been perceived as a field that appears relatively distant from everyday life. However, it is at the same time so deeply interwoven into daily practices that it influences and shapes even the smallest or most habitual human actions, such as the time of falling asleep depending on indoor temperature or the amount of water consumed at different times of day. Environmental journalism reflects

this dual position: on the one hand, media professionals address everyday ecological concerns, seeking to demonstrate how global environmental trends affect people's daily lives; on the other hand, they describe, analyze, and critically debate global environmental challenges and strategic responses to them.

Environmental journalism, at least in Ukraine, has also long been regarded as a field of relatively low prestige, especially when compared to the “serious” domains of political or economic reporting. This perception has been gradually changing. These shifts are more likely driven by growing environmental threats than by a deeper societal recognition of the importance of ecological issues. Educational exposure to environmental topics has also played a significant role in this transformation. Whereas a decade ago ecology was taught primarily to senior school students, today environmental knowledge is introduced much earlier in the educational system. At the basic level, the textbook “I Explore the World” familiarizes the youngest pupils with issues of environmental pollution, followed at later stages by courses such as “Ecology of the Native Land” and “Biology and Ecology”.

Environmental journalists not only seek to make the consequences of large-scale ecological problems tangible and accessible to individual audiences, but also increasingly operate at the intersection of environmental reporting and data journalism. This article adopts an analytical perspective to demonstrate that data constitute an integral and inseparable component of environmental journalism in Ukraine. Particular attention is paid to how this media synthesis – understood as the systematic integration of data collection, analysis, and visualization into environmental reporting – has been reshaped by the war. Since the onset of the full-scale invasion, the circulation, availability, and interpretation of environmental data within Ukraine's media landscape have fundamentally changed, thereby transforming both journalistic practices and how environmental issues are framed, explained, and debated in the public sphere.

The purpose of this article is to examine the environmental impacts of the Russia–Ukraine war in Ukraine through data-driven analytical approaches in journalism, with a particular focus on the integration of

environmental reporting and data journalism under wartime conditions. The study aims to demonstrate how data function as an essential component of ecological journalism in Ukraine and how this media synthesis has been transformed by the war.

To fulfill this aim, the article focuses on the following key **objectives**:

- to analyze the role of data as an integral component of environmental journalism in Ukraine and its development before the full-scale invasion;
- to examine how wartime conditions have transformed the circulation, accessibility, and use of environmental data in the Ukrainian media sphere;
- to identify water, soil, and air as key analytical domains for assessing war-related environmental damage;
- to assess how the war has reshaped journalistic practices and interpretative frameworks in data-driven environmental reporting.

Methodology

The study employs a combination of general scientific and specialized methods adapted to the analysis of environmental journalism and data-driven reporting under wartime conditions. Descriptive and analytical approaches were used to examine academic literature, journalistic materials, environmental reports, and media projects focused on ecological issues in Ukraine, with particular attention to data usage, visualization practices, and explanatory models in environmental reporting.

Comparative analysis was applied to contextualize Ukrainian environmental journalism within broader international practices, allowing for the identification of both shared global ecological challenges—particularly related to water, soil, and air—and context-specific transformations caused by the Russia–Ukraine war. This approach enabled the assessment of how similar environmental problems acquire distinct causes, narratives, and data practices in conditions of armed conflict.

Systems and structural-functional methods were used to analyze the interaction between environmental data production, journalistic

practices, and public communication, highlighting how data journalism functions as an integral component of environmental reporting in Ukraine. Particular emphasis was placed on changes in data circulation, accessibility, and interpretation resulting from wartime constraints, including disrupted monitoring systems and reliance on alternative data sources.

An important empirical and methodological dimension of the study is the author's participation as a project manager, educator, and researcher in the international Erasmus+ KA2 project "New Media for Green Citizenship: Empowering Youth as Active Reporters for Sustainable Citizenship through New Media Skills Development" (2021-1-DE04-KA220-YOU-000028739). Within this project, the development of the Green Reporters youth handbook, work with young participants from different countries, and the creation of digital platforms and publications provided qualitative insights into environmental storytelling, local ecological problem framing, and cross-cultural perspectives on environmental communication. These materials and experiences informed the analytical framework of the article and contributed to a multidimensional understanding of environmental journalism practices.

Generalization and synthesis were used to formulate conclusions regarding the role of data-driven environmental journalism in documenting war-related ecological impacts and shaping public discourse in Ukraine.

Research Findings

Environmental journalism, like any other media practice, follows (or tries to follow) a workflow that guides the production of meaningful and socially relevant stories. Based on practical work with students within an international environmental media project, this article relies on an expanded model of the journalistic process that includes the following interconnected stages: issue selection, research, story planning, data collection, editing, and dissemination (Arndt Selders, Yuriy Zaliznyak, and others, p.57) [1].

The process begins with identifying an environmental problem, clearly defining its scope and relevance within a specific local, national, or

global context. At this stage, journalists are expected to explain why the issue matters, whom it affects, and how it relates to broader environmental, social, or political processes. This initial framing is crucial for transforming abstract ecological challenges into comprehensible and relatable narratives.

The research phase involves collecting background information, reviewing scientific and policy sources, and mapping available datasets. In environmental journalism, this stage is closely linked to data journalism, as ecological issues often require quantitative evidence, long-term monitoring data, or comparative indicators. This is followed by story planning, during which journalists define the narrative structure, select appropriate formats (text, data visualization, multimedia), and determine the role of data in supporting the story's arguments.

Data collection constitutes a core stage of environmental reporting and may include official statistics, environmental monitoring data, satellite imagery, open-source intelligence, expert interviews, and community-generated data. The editing stage focuses not only on accuracy and clarity but also on ethical considerations, contextualization of data, and avoidance of alarmism or oversimplification.

Finally, promotion and dissemination are treated as integral parts of the journalistic process. Environmental stories are expected to reach and engage audiences across multiple platforms, fostering public discussion and awareness.

Importantly, environmental journalism often carries an implicit expectation of impact. A “green” reporter may anticipate that a story will provoke concrete consequences – encouraging public debate, influencing decision-making, or inspiring audiences to take action toward addressing the identified problem. In this sense, environmental journalism operates not only as a descriptive practice but also as a form of civic engagement aimed at supporting environmental responsibility and sustainable change (Arndt Selders, Yuriy Zaliznyak, and others, p.57) [1].

For making our green stories more engaging, we can use the so-called "Periodic Table of Storytelling," which contains a lot of possible elements that make up a story (Harris, J.) [2].

Data and Ecology

Data have always played a central role in environmental journalism, as ecological issues are inherently linked to measurement, monitoring, and long-term observation. Environmental reporting routinely relies on open environmental datasets, including data on air quality, water quality, greenhouse gas emissions, land use, and biodiversity indicators. Such datasets, often published by governmental agencies or international organizations, provide empirical foundations for identifying environmental risks, tracking changes over time, and comparing regional or national trends.

Environmental journalists frequently engage in collaboration with scientists, environmental experts, and data analysts to correctly interpret complex monitoring data, scientific reports, and geographic information system (GIS) maps. This interdisciplinary cooperation helps translate technical environmental data into accessible narratives while preserving scientific accuracy and contextual depth.

Data-driven approaches are particularly important in investigative environmental journalism, where journalists use quantitative evidence to uncover industrial pollution, illegal logging, river contamination, soil degradation, or violations of environmental regulations. By cross-referencing datasets, satellite imagery, and field observations, journalists can establish causal links between human activity and environmental harm.

The findings of such investigations are increasingly communicated through interactive maps, infographics, dashboards, and other visual formats based on open government data and independent monitoring sources. These tools not only enhance audience comprehension but also promote transparency and accountability by allowing users to explore environmental data independently. In this way, data function not merely as supporting evidence but as a core narrative and analytical element of contemporary environmental journalism.

We have some good examples of collaboration of data and ecology in media. For example, Ukrainian data journalism [Texty.org.ua](https://texty.org.ua), which, even before the full-scale invasion, systematically applied data-driven methods to environmental investigations. One illustrative example is the project on illegal amber mining, which combined satellite imagery, spatial analysis, and open data to document large-scale environmental destruction and its economic and social consequences [3]. Another significant pre-war investigation focused on deforestation, where journalists used geospatial data, official statistics, and visual mapping to reveal patterns of illegal logging and long-term ecosystem degradation [4]. Similar data-based practices were applied in media coverage of air pollution in Kyiv, where journalists combined state environmental monitoring data with satellite data from the ESA Sentinel program to identify and visualize chronic pollution hotspots (Vorontsova, O.) [5]. In parallel, specialized civic platforms such as Ecoaction (Екодія) developed comprehensive data-driven projects, including “Industrial Ukraine: Impact of Pollution on Inhabitants and the Environment in Five Industrial Cities,” demonstrating that the integration of data and ecology extended beyond newsrooms to dedicated platforms focused on environmental analysis, public engagement, and advocacy [6].

These projects demonstrate how, before the war, Ukrainian environmental journalism already relied on data analysis and visualization to uncover structural ecological problems, establish causal relationships, and present complex environmental processes in an accessible and evidence-based manner.

Ecological journalists, like all media professionals, are required to adhere to core journalistic standards, including timeliness, impartiality, factual accuracy, responsibility, respect for private life, and the principle of “do no harm” while defending the public interest. In this context, the use of data is particularly valuable, especially with regard to source reliability and verification. Data-driven approaches enhance transparency, strengthen the evidentiary and argumentative basis of journalistic work, and enable the identification and explanation of cause-and-effect relationships underlying environmental problems. By grounding environmental reporting in verifiable data, journalists can

more effectively substantiate their claims, reduce the risk of speculation, and contribute to informed public debate.

These pre-war examples form an important baseline for understanding how data-driven environmental journalism functioned under relatively stable conditions, against which the profound transformations of data practices, sources, and narratives caused by the war can now be more clearly traced.

Elements of an engaging story and standards for the Ukrainian environmental journalism have not changed, but context has

Ecology and Ukrainian data journalism: wartime

War changes many things, including the process of data circulation in the media. At the initial stage of the war, data processing practices underwent significant changes due to the closure of public registers and the introduction of multiple restrictions on access to information. However, data did not cease to exist; instead, new forms of data continued to accumulate under wartime conditions. These processes were increasingly shaped by collaboration between the state, citizens, media organizations, and volunteer initiatives. Journalists began to rely more extensively on open-source intelligence (OSINT) to document environmental damage and potential war crimes, while digital tools such as chatbots enabled the systematic collection of data directly from citizens. As a result, wartime data ecosystems in Ukraine have become hybrid in nature, combining official, civic, media, and volunteer-generated data.

If we talk specifically about ecology media, journalistic approaches have undergone a significant transformation under wartime conditions. There has been a marked shift toward the use of open-source intelligence (OSINT), satellite imagery, and remote sensing technologies as primary tools for documenting environmental damage. These methods enable journalists to record and analyze cases of environmental war crimes and ecocide, particularly in situations where on-the-ground access is limited or impossible. Data-driven techniques are increasingly applied to track oil spills, large-scale wildfires, damaged industrial facilities, and the destruction of ecosystems. Special attention is also given to monitoring the

consequences of military attacks on rivers, soil, forests, and protected natural areas. In this context, collaboration with international partners and investigative networks, including organizations such as UNESCO, GIJN, and OCCRP, has become essential for data verification, methodological support, and the global dissemination of findings.

For example Investigative projects by Radio Svoboda (Schemes) combine open-source intelligence (OSINT), satellite imagery, expert assessments, and official data to analyze how military actions have caused large-scale environmental harm, including contamination of land, destruction of ecosystems, and damage to industrial and energy infrastructure (Ovsyany, K.) [7].

At the same time, specialized environmental platforms such as *Ecoaction (Екодія)* have systematically documented how the Russian army has damaged Ukraine's environment, focusing on pollution, destruction of natural resources, and long-term ecological risks caused by shelling, fires, and occupation [8]. An important data-driven tool developed during the war is Ecoaction's interactive map of environmental damage, which visualizes verified cases of harm to ecosystems, water resources, soil, and protected areas, serving both journalistic and advocacy purposes [9].

These wartime projects demonstrate how environmental journalism has expanded beyond awareness-raising toward the systematic collection of evidence that may be used in legal, investigative, and international accountability processes. In this context, environmental damage is increasingly framed not only as a consequence of war but also as a potential form of ecocide. This framing is reflected in contemporary academic discussions that analyze large-scale environmental destruction during Russia's war against Ukraine through the lens of international environmental and humanitarian law (Zibtsev et al., 2022) [10].

Conclusions and Recommendations

The environmental challenges documented in Ukrainian journalism during the Russia–Ukraine war are structural rather than episodic and therefore require multidimensional analytical and journalistic responses. Environmental damage is not limited to isolated incidents

but affects interconnected ecological systems, demanding sustained data-driven monitoring, verification, and interpretation. No single journalistic or technological solution can adequately capture the scale and complexity of war-related environmental impacts; instead, a layered approach combining data journalism, investigative reporting, and international cooperation is required.

Environmental reporting in Ukraine consistently operates across three core ecological domains—air, water, and soil. Ukrainian journalists are not an exception in this respect; however, the causes of environmental degradation within these domains are directly shaped by warfare. Air pollution is intensified by missile strikes, drone attacks, fires caused by explosions, and the destruction of industrial infrastructure. Soil degradation is linked to shelling, chemical contamination, land mining, and salinization caused by military activity and debris, including remnants of ammunition and military equipment. Water-related problems range from catastrophic flooding and ecosystem collapse, as in the case of the Kakhovka Hydroelectric Power Plant, to acute water scarcity and infrastructure destruction, as observed in cities such as Mariupol.

Under these conditions, environmental journalism increasingly depends on OSINT, satellite imagery, remote sensing, and citizen-generated data. These tools allow journalists to document environmental harm even when access to affected areas is restricted. At the same time, collaboration with scientists, civil society actors, and international investigative networks remains essential for ensuring data accuracy, contextualization, and credibility.

From a normative perspective, environmental journalism in wartime must balance urgency with responsibility. Journalists should prioritize transparency of data sources, methodological clarity, and the clear explanation of cause-and-effect relationships. Data should not merely illustrate environmental damage but help audiences understand its origins, scale, and long-term consequences.

Finally, the findings of this study indicate that environmental journalism during war should not be reduced to descriptive reporting alone. Its broader role lies in sustaining public awareness, supporting

accountability for environmental war crimes, and contributing to post-war recovery and environmental restoration. The Ukrainian experience demonstrates that data-driven environmental journalism is not only a tool for documenting destruction but also a critical mechanism for preserving ecological knowledge and informing future reconstruction strategies.

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