

The formulation, implementation, and development of environmental policy: historical context, contemporary challenges, prospects for sustainable development, and the role of civil society, education, and universities

Viktor Zinchenko^{1,}, Nataliia Lakusha², Olga Gomilko³, Nataliia Salnikova⁴, Mykola Iehupov⁵, Uliana Tokarieva⁶, and Oksana Petriv⁷*

¹Institute of Higher Education, National Academy of Educational Sciences of Ukraine, Kyiv, Ukraine

²Department of Philosophy, Kyiv National University of Civil Engineering and Architecture, Kyiv-city, Ukraine

³H.Skovoroda Institute of Philosophy of The National Academy of Sciences of Ukraine, Kyiv, Ukraine;

⁴Mariupol State University, Kyiv, Ukraine;

⁵National University of Ukraine on Physical Education and Sport, Ukraine;

⁶Ternopil Volodymyr Hnatiuk National Pedagogical University, Ternopil, Ukraine

⁷Drohobych Ivan Franko State Pedagogical University, Drohobych, Ukraine

Abstract. The relevance of the study is driven by the urgent need to explore the transformative role of civil society and universities and higher education institutions in educational and environmental policy-making within the framework of Education for Sustainable Development (ESD). The article traces the historical evolution of environmental law from early societies to modern times, highlighting landmark milestones such as the US National Environmental Policy Act (NEPA) of 1969 and the Stockholm Declaration of 1972. Particular attention is paid to mechanisms of civil society and universities influence (advocacy, lobbying, and public mobilization) and the growing contribution of universities through curriculum development, interdisciplinary approaches, experiential learning, student-led sustainability projects, and university-city partnerships. The study examines current global and local environmental challenges (air and water pollution, electronic waste, climate change) as well as war-related ecological threats in Ukraine (military pollution, ecosystem destruction, nuclear risks). It analyses the potential of innovative technologies (renewable energy, biotechnology, and digital solutions) and research-driven innovation to achieve the 17 UN Sustainable Development Goals (2015). Special emphasis is placed on the integration of sustainability into higher education curricula, the development of sustainability literacy and ethical reasoning among students, the role of student engagement (sustainability clubs, competitions, and community-based projects), and industry–university–city collaboration as key drivers of systemic change. The author argues that overcoming the climate crisis requires not only regulatory and financial reforms but also a profound paradigm shift: moving from a culture of

* Corresponding author: vvzinchenko@ukr.net

consumption to responsible citizenship, strengthening global and local partnerships, and embedding ESD principles into both educational and environmental policy-making and urban governance.

1 Introduction

The relevance of the topic is determined by the need to study the growing role of civil society and universities in the context of educational and environmental policy making. In this context, this is due to a noticeable increase in the influence of civil society and universities on educational and environmental policy-making, which is to some extent related to the growth of public awareness of environmental issues and the growth of environmental social movements.

The study of the evolution of environmental law from primitive societies to the present, with an emphasis on key legislative acts and international agreements, emphasizes the dynamics of this area and its importance for the formation of modern educational and environmental policy.

The development of educational and environmental policy and law is linked to modern environmental challenges: air and water pollution, the problem of e-waste, chemical pollution, and climate change. These challenges are global in scope and have a direct impact on human health, biodiversity, and ecosystem stability.

New technologies in this area play a role in solving environmental problems: renewable energy sources, innovative waste management methods, biotechnology, information technology, which are important tools for reducing the negative impact on the environment and achieving sustainable development goals.

The concept of sustainable development, which emerged in the 80s of the twentieth century, offers ways for harmonious development between human needs and environmental protection. The seventeen UN Sustainable Development Goals, adopted in 2015, are a comprehensive program to address global challenges, including aspects of the economy, social issues, and the environment.

The topic is particularly relevant in the context of Ukraine, where the war has created unprecedented challenges for the environment. These include environmental pollution as a result of hostilities, destruction of ecosystems, difficulties in access to environmental monitoring, increased waste, nuclear safety issues, lack of funding, and impact on biodiversity. These issues require an integrated approach to the development of educational and environmental policy, namely, the focus on both reducing negative consequences and creating conditions for achieving sustainable development goals after the war.

The study of the role of civil society and universities in shaping educational and environmental policy is an important issue in the context of the ability to reveal the mechanisms of interaction between society, the state, and international organizations in the fight against environmental challenges. The ways to achieve sustainable development in the context of current crises, in particular in Ukraine, are considered. The topic under study has practical implications for the development of effective strategies in the environmental sphere, promotes the need for joint action by society and the public to preserve the environment.

2 Methodology

The research used a comprehensive interdisciplinary approach that combines qualitative and quantitative methods of analysis. The methodology is aimed at studying the historical development of environmental law, mechanisms of influence of civil society and universities,

current environmental challenges, the role of technology, and the specifics of Ukraine's educational and environmental policy in times of war.

The purpose of the article is to examine the role of civil society and universities in shaping educational and environmental policy, with a focus on its influence through advocacy, lobbying and public mobilization, as well as assessing current environmental challenges and technological solutions to achieve sustainable development goals. Particular attention is paid to the context of Ukraine at war.

3 Research results

The influence of civil society and universities on educational and environmental policy has become increasingly significant in recent decades. This process is connected with the growth of public awareness, the expansion of environmental movements, and the global urgency of climate change. Civil society institutions and universities contribute to policy development by mobilizing public support, generating expert knowledge, participating in advocacy campaigns, and holding governments accountable for environmental commitments. Their role is not limited to criticism of existing policy; rather, they act as mediators between scientific knowledge, public interests, and state regulation.

The historical development of environmental policy demonstrates that environmental protection became a public and legal priority through the interaction of social movements, academic expertise, and political institutions. Important milestones include the adoption of the U.S. National Environmental Policy Act in 1969 and the United Nations Conference on the Human Environment held in Stockholm in 1972. These events marked a transition from fragmented environmental measures to more systematic legal and institutional approaches. The Stockholm Declaration recognized the importance of environmental protection at the international level, while NEPA introduced environmental impact assessment as a mandatory component of federal decision-making in the United States [6, 7].

The formation of modern environmental law was gradual and reflected changes in economic activity, technological development, and social values. In early societies, relations with nature were regulated mainly by customs, religious rules, and practical needs. Ancient legal systems already contained norms related to water use, land management, and pollution prevention. In the Middle Ages, environmental regulation was mostly local and connected with agriculture, forests, hunting, and resource preservation. Industrialization radically changed the scale of human impact on nature, making environmental degradation a structural problem of economic growth. In response, states began to develop more formal environmental legislation aimed at controlling pollution, protecting natural resources, and balancing industrial development with public health and ecological stability.

In the twentieth century, environmental law became a complex system of national and international norms. The establishment of the International Union for Conservation of Nature in 1948, the Stockholm Conference of 1972, and the adoption of national environmental laws in many countries created the basis for contemporary environmental governance. Modern environmental law is based on the principles of sustainable development, prevention of environmental harm, and the “polluter pays” approach. These principles connect environmental protection with human rights, economics, public health, and scientific knowledge.

Civil society and universities influence environmental policy through advocacy, lobbying, public mobilization, research, and participation in public consultations. Environmental organizations use media, social platforms, expert reports, litigation, and educational campaigns to draw attention to pollution, climate risks, biodiversity loss, and unsustainable resource use. International organizations such as Greenpeace, the World Wildlife Fund, the Sierra Club, the Natural Resources Defense Council, Friends of the Earth,

and the Environmental Defense Fund demonstrate how public activism can shape environmental agendas and pressure governments to adopt stronger standards [4]. At the same time, universities contribute through research, interdisciplinary education, expert assessment, student initiatives, and cooperation with local communities.

Despite this influence, civil society organizations and universities face serious limitations. These include insufficient funding, regulatory restrictions, limited political will, and conflicts between environmental goals and economic interests. In many cases, public participation remains formal rather than effective. Therefore, environmental governance requires a genuine dialogue between the state, civil society, universities, business, and local communities. Such dialogue is necessary to combine environmental sustainability with social justice and economic feasibility.

International law plays a central role in environmental governance because many ecological threats are transboundary. Climate change, biodiversity loss, water pollution, waste flows, and resource depletion cannot be effectively addressed by individual states alone. International agreements establish common principles, promote cooperation, and influence national legislation. As environmental risks become more complex, international law becomes increasingly important for mobilizing coordinated action and ensuring that environmental protection remains a priority of global governance.

Ukraine provides a particularly relevant example of the need for integrated environmental policy. Its environmental legislation includes laws on environmental protection, environmental impact assessment, waste management, wildlife protection, greenhouse gas monitoring, and industrial pollution control. These laws are increasingly oriented toward harmonization with European Union standards. Yet the war has created unprecedented environmental challenges. Hostilities have caused pollution from shelling, fires, industrial destruction, military waste, and damage to ecosystems. The destruction of the Kakhovka hydroelectric power plant led to large-scale flooding and ecosystem disruption. Access to environmental monitoring has become limited, while risks related to nuclear facilities, including the Zaporizhzhia Nuclear Power Plant, remain critical. Under these conditions, environmental policy in Ukraine must address both immediate damage reduction and long-term sustainable recovery [9].

3.1 Types of environmental problems

Contemporary environmental problems are multidimensional and interconnected. Air pollution remains one of the most serious threats to public health and ecological stability. It is caused by transport, energy production, industrial emissions, and the continued use of fossil fuels. Although the spread of electric vehicles and renewable energy technologies has improved prospects for emission reduction, many countries still face high levels of greenhouse gas emissions and particulate pollution. Renewable energy sources, including wind, solar, hydropower, geothermal energy, biomass, biogas, and bio-liquids, are important instruments for reducing dependence on fossil fuels and supporting the transition to low-carbon development [10].

Water pollution is another major global challenge. It occurs when chemicals, industrial waste, plastics, sewage, oil products, bacteria, and agricultural pollutants enter water bodies. Polluted water threatens human health, agriculture, aquatic ecosystems, and food security. Contaminated drinking water can cause severe diseases, while polluted rivers, lakes, and oceans contribute to biodiversity loss and ecosystem degradation. Climate change further worsens water quality through floods, droughts, and extreme weather events. According to international estimates, billions of people still lack access to safe drinking water, and water scarcity is expected to affect an increasing share of the world's population [11]. A separate aspect of this problem is plastic pollution. The Great Pacific Garbage Patch illustrates the

scale of ocean contamination, where plastic waste decomposes into microplastics and enters marine food chains, eventually affecting humans.

Electronic waste is one of the fastest-growing environmental problems. It includes discarded devices with batteries, plugs, and electronic components containing toxic substances such as mercury and other hazardous materials. Improper disposal of e-waste contaminates soil, water, and air, while also wasting valuable metals and rare earth elements. Global e-waste generation is increasing much faster than documented recycling. In 2022, the world generated approximately 62 million tons of e-waste, while less than a quarter was properly collected and recycled [5]. Without circular economy practices, including repair, reuse, refurbishment, and certified recycling, e-waste will continue to increase environmental and health risks.

Chemical pollution is also closely connected with modern technological production. Semiconductor manufacturing illustrates this problem, as it requires large amounts of energy and water and uses hazardous chemicals and gases. The environmental footprint of chip production raises difficult questions because digital technologies are necessary for economic development, yet their production can conflict with climate and sustainability goals. Restrictions on fluorinated gases and discussions around PFAS regulation show the need to integrate environmental standards into industrial expansion [3].

Climate change intensifies many of these problems. It worsens air quality, increases heat stress, contributes to extreme weather, affects water availability, and raises the risk of climate-related diseases. Socially vulnerable groups are often more exposed to pollutants and less able to protect themselves from environmental risks. Addressing climate change therefore requires not only technological innovation but also social policy, environmental justice, and public health measures.

Technology can support the solution of environmental problems when it is applied within a sustainability-oriented policy framework. Renewable energy reduces fossil fuel dependence, innovative waste management decreases landfill pressure, biotechnology can reduce the use of pesticides and fertilizers, and digital technologies allow more accurate environmental monitoring through satellites, sensors, and analytical platforms. The Global Information Society Watch 2020 emphasizes that technological solutions are important for overcoming the environmental crisis and achieving sustainability [8]. At the same time, technology alone is insufficient. Environmental progress requires legal regulation, public participation, ethical responsibility, and the integration of sustainable development principles into education, governance, and economic planning.

The concept of sustainable development emerged as a response to these interconnected challenges. Since the Brundtland Report and the adoption of the 2030 Agenda for Sustainable Development, sustainability has been understood as a balance between economic development, social justice, and environmental protection. The 17 Sustainable Development Goals adopted by the United Nations in 2015 provide a global framework for addressing climate change, poverty, inequality, energy access, ecosystem protection, and responsible consumption [1, 2]. Their implementation remains difficult because of funding gaps, political conflicts, and socio-economic inequality. Nevertheless, international cooperation, private investment, technological innovation, and active participation of civil society and universities create opportunities for systemic transformation toward a more sustainable future.

4 Conclusions

Educational and environmental policy is an important element in ensuring the sustainable development of today's society. The evolution of environmental law - from religious and customary norms of primitive societies to a comprehensive system of international and

national legal mechanisms - reflects the gradual growth of environmental awareness, responsibility and the desire for justice.

It should be emphasized that civil society and universities is an important factor in the development and implementation of educational and environmental policy. Its influence is manifested through advocacy, lobbying, awareness raising, participation in the development of legislative initiatives and monitoring compliance with environmental standards. Active civic participation contributes to the formation of a sustainable environmental culture that unites society and the state. Civil society and universities institutions ensure transparency, responsibility, and accountability in the environmental governance system.

At the same time, a number of challenges have been identified that hinder the effective implementation of educational and environmental policy. These include insufficient funding, gaps in the regulatory framework, lack of political will, and conflicts between the economic interests of corporations and the needs of environmental protection. The transition from a profit-oriented growth model to development within environmental constraints remains one of the main challenges of our time.

Environmental issues are becoming particularly relevant in the context of the war in Ukraine. The hostilities cause large-scale environmental pollution, destruction of ecosystems, disruption of nuclear infrastructure, accumulation of military waste, and limited environmental monitoring capabilities. These problems are of a national and regional nature, which requires an integrated approach to post-war recovery with an emphasis on the environmental dimension.

In this context, it is important to harmonize Ukrainian environmental legislation with international standards, in particular in the areas of emissions control, waste management, biodiversity protection, and implementation of climate policy. Particular attention should be paid to the introduction of technological innovations, such as renewable energy sources and digital platforms for environmental monitoring.

Achievement of the UN Sustainable Development Goals, in particular those related to environmental sustainability, climate, aquatic and terrestrial ecosystems, is possible only if all stakeholders cooperate: the state, the public, the scientific community, business and international organizations. Modernization of the legislative framework is possible only if the public outlook is transformed through the formation of environmental ethics, development of environmental education, reduction of excessive consumption and responsible attitude to nature.

Thus, educational and environmental policy should be a holistic strategy that determines the future of humanity. It should be based on the principles of ethics, inclusiveness, scientific validity, and social justice. Only under these conditions is it possible to build a sustainable society in which environmental protection is a priority.

References

1. J. Sachs, *The Age of Sustainable Development* (Columbia University Press, 2015).
2. *17 Rooms Global Flagship Meeting New York City September 22, 2019 SUMMARY REPORT*. URL: https://www.brookings.edu/wp-content/uploads/2019/11/17R-Summary-Report_final_12.11.pdf
3. *Chip Production's Ecological Footprint* (INTERFACE Project). Mapping Climate and Environmental Impact. URL: <https://www.interface-eu.org/publications/chip-productions-ecological-footprint>
4. A. D. Tarlock, Chi.-Kent L. Rev. **68**, 61 (1992). URL: <https://scholarship.kentlaw.iit.edu/cgi/viewcontent.cgi?article=2856&context=cklawrevview>

5. J. R. McNeill, *Something New Under the Sun: An Environmental History of the Twentieth-Century World*. ISBN: 0-393-32183-5 pbk. URL: https://www.google.com.ua/books/edition/Something_New_Under_the_Sun/D4dOq9Llo_gC?hl=ru&gbpv=1
6. *Technology, the environment and a sustainable world: Responses from the global South* (APC, 2020). URL: <https://www.apc.org/en/pubs/global-information-society-watch-2020-technology-environment-and-sustainable-world-responses>
7. *Military and Postwar Environmental Policy of Ukraine: Realities and Prospects* (ICO 'Environment-Law-Human'). URL: <https://analytics.intsecurity.org/ukraine-war-impact-ecology/>
8. S. O. Kudrya (ed.), *Vidnovlyuvani Dzherela Enerhiyi* [Renewable Energy Sources] (Instytut Vidnovlyuvanoyi Enerhetyky NANU, Kyiv, 2020), 392 p.
9. J. Yijuan, *Front. Environ. Sci.* **13**, (2025). Sec. Environmental Policy and Governance. Volume 13 – 2025. URL: <https://www.frontiersin.org/journals/environmental-science/articles/10.3389/fenvs.2025.1667551/full>
10. *Challenges and Opportunities in the Implementation of the Sustainable Development Goals* (UNDP Serbia). URL: <https://www.undp.org/serbia/publications/challenges-and-opportunities-implementation-sustainable-development-goals>
11. B. Purvis, Y. Mao, D. Robinson, Three pillars of sustainability: in search of conceptual origins, *Sustain. Sci.* **14**, 681–695 (2019). DOI: 10.1007/s11625-018-0627-5
12. S. Karakullukcu, I. Dilavera, F. Gurcanb, M. Topbasa, O. F. Ursavasc, N. E. Beyhuna, *Climate change and water-related diseases: a bibliometric, knowledge map, topic modeling, and content analysis*. URL: <https://doi.org/10.2166/wh.2026.252>