

**ENSURING PUBLIC AND TERRITORIAL SAFETY UNDER
EMERGENCY CONDITIONS: INSTITUTIONAL, ENVIRONMENTAL
AND RISK-BASED APPROACHES**

Elena A. Borisova

Tashkent University of Information Technologies,

Tashkent, Uzbekistan

Abstract: *This paper examines institutional, environmental, and socio-economic mechanisms aimed at ensuring public and territorial safety under conditions of natural and technological emergencies. It analyzes the regulatory framework, the distribution of governmental responsibilities, and the licensing of hazardous activities within modern risk governance systems. Particular attention is given to environmental standards and liability mechanisms that shape preventive policy instruments. The growing interdependence between anthropogenic pressures and natural hazards is emphasized as a critical factor of systemic vulnerability. The study proposes a hierarchical and multi-level safety model that integrates sustainability principles, environmental protection, and long-term resilience strategies.*

Keywords: *emergency management, environmental safety, risk governance, technological accidents, natural hazards, sustainable development, environmental regulation.*

The development of an effective safety framework requires coordinated interaction between legislative, administrative, economic, and environmental governance systems. Such coordination must be supported by clearly defined institutional responsibilities and accountability mechanisms. Global statistics demonstrate that floods account for approximately 35% of natural emergencies, while hurricanes and storms represent 19%, and prolonged heavy rainfall contributes around 14%. These figures illustrate the dominant role of

hydrometeorological hazards in shaping contemporary disaster risks. In many cases, anthropogenic activity acts as a catalyst that amplifies natural processes and increases the probability of technological failures.

The dynamics of emergency situations can be divided into four interconnected phases: emergence, escalation, propagation, and consequence management. Each phase demonstrates specific causal mechanisms and operational challenges. The initial stage often originates from design deficiencies, technological malfunctions, insufficient regulatory compliance, or human error. During escalation, destructive impacts intensify rapidly due to the interaction between technical systems and environmental forces. Effective management therefore requires early detection tools, predictive modeling, and structured response protocols.

Contemporary socio-economic transformations significantly influence the scale and severity of emergency consequences. Privatization of water management infrastructure and other critical facilities introduces new governance complexities. Aging technological equipment, deteriorating treatment systems, and inadequate maintenance increase systemic fragility. Additional risks emerge from declining professional qualifications, insufficient funding, and weakened regulatory oversight. Together, these factors create a multi-dimensional risk environment that demands integrated institutional reform.

Ensuring safety under emergency conditions requires the implementation of preventive engineering and technical measures capable of influencing potential risk scenarios. Preventive infrastructure investments must be combined with strategic planning and risk-based assessment tools. An integrated organizational and economic mechanism should coordinate the actions of governmental authorities, private enterprises, and civil society institutions. Priority must be given to environmentally compatible technologies and sustainable production models. The principle of safety dominance should guide all economic decision-making processes without exception.

The safety problem demonstrates a hierarchical structure that requires

coordinated solutions at national, regional, municipal, and enterprise levels. Each level performs distinct but interdependent functions within the broader governance architecture. Regional autonomy increases the importance of localized risk assessment and adaptive policy design. Balancing safety objectives with economic growth and social development remains a complex and sometimes controversial task. Evidence-based instruments and transparent evaluation criteria are therefore essential for sustainable decision-making.

Emergency management mechanisms must be systematically aligned with rational natural resource use and comprehensive environmental protection strategies. Economic instruments, including incentives and penalties, should complement traditional regulatory approaches. Safety requirements must be embedded into long-term strategic planning as well as into everyday operational procedures. Such integration enhances institutional resilience and reduces cumulative environmental risks. Ultimately, sustainable development depends on the consistent harmonization of safety, ecological stability, and socio-economic progress.

Emergency safety management should be treated as an integrated systemic task that combines prevention, preparedness, response, and recovery. Institutional responsibility and regulatory coherence are central to this process. Risk governance principles recognized at the international level provide a methodological foundation for strengthening resilience. Technological modernization and environmental sustainability must advance simultaneously rather than separately. Only through coordinated multi-level action can the probability and severity of natural and technological disasters be substantially reduced.

References

1. Borisova, E.A. (2017). Complex systems modeling of environmental systems. *Ecological Systems and Instruments*, (11), 15-19.
2. Baskin, Y.G., Gorbunov, A.A., & Saveliev, Y.S. (2014). Prevention of Natural and Technological Emergencies. *Risk Management in the Technosphere*, No. 3.

3. Khaustov, S.N., Zaitsev, A.N., Popov, N.I., & Valuysky, V.E. (2010). Organization of Population and Territorial Protection in Emergency Situations. Voronezh: EMERCOM of Russia Press.
4. United Nations Office for Disaster Risk Reduction (UNDRR). (2015). Sendai Framework for Disaster Risk Reduction 2015-2030. UNDRR.
5. Global Assessment Report on Disaster Risk Reduction (GAR). (2022). Our World at Risk: Transforming governance for a resilient future. United Nations.
6. Intergovernmental Panel on Climate Change (IPCC). (2021). Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report (AR6). Summary for Policymakers.
7. Intergovernmental Panel on Climate Change (IPCC). (2023). AR6 Synthesis Report — Summary for Policymakers.
8. International Organization for Standardization. (2018). ISO 31000:2018 — Risk management — Guidelines. ISO.
9. International Risk Governance Council (IRGC). (2005; revised 2017). IRGC Risk Governance Framework and Guidelines for Emerging Risk Governance.
10. Centre for Research on the Epidemiology of Disasters (CRED). EM-DAT: The International Disaster Database.