



Publisher: Scientific-Professional Society for Disaster Risk Management

# International Journal of Disaster Risk Management



## Insurance as a Model for Protecting the Economic System from Natural Disasters

Luka Baturan<sup>1\*</sup>, Goran Milošević<sup>1</sup>, Cvjetana Cvjetković-Ivetić<sup>1</sup><sup>1</sup> University of Novi Sad, Faculty of Law, Novi Sad, Serbia, Trg Dositeja Obradovića 1, 21102 Novi Sad, Serbia; l.baturan@pf.uns.ac.rs (L.B.); g.milosevic@pf.uns.ac.rs (G.M.); c.cvjetkovicivetic@pf.uns.ac.rs (C.C.-I.).

\* Corresponding: l.baturan@pf.uns.ac.rs

Received: 1 February 2026; Revised: 19 April 2026; Accepted: 8 May 2026; Published: 23 May 2026.

### ABSTRACT

Natural disasters increasingly generate serious economic consequences, including direct property losses, disruption of production and trade flows, increased public expenditure, and pressure on state budgets. In this context, insurance represents an important instrument of disaster risk financing and economic system protection. The aim of this paper is to examine the role of insurance as a model for protecting the economic system from the consequences of natural disasters, with particular reference to the Republic of Serbia. The paper applies normative legal analysis, theoretical analysis, comparative analysis, and secondary data analysis. Special attention is given to the relationship between voluntary and compulsory insurance, public-private partnership models, catastrophe insurance pools, and the role of the state in disaster risk financing. The findings indicate that an effective insurance system can reduce the financial burden on the state, accelerate post-disaster recovery, and strengthen the resilience of households, businesses, and the wider economic system. However, in Serbia, the development of such a model requires stronger institutional support, improved insurance culture, subsidized premiums for vulnerable groups, reliable hazard data, and a clearer division of responsibilities between the state, insurers, and insured entities. The paper concludes that a combined public-private model of disaster insurance would be the most appropriate direction for strengthening economic resilience to natural disasters in Serbia.

### KEYWORDS

Insurance, protection, prevention, risk, disaster, public interest.

## 1. Introduction

The economy and economic theory are concerned with the study of the economic system, that is, with the examination of the relationships, instruments, institutions, and mechanisms through which economic and other social activities are directed, encouraged, regulated, and developed. These processes are reflected in the flows of production, distribution, exchange, and consumption within a given society, as well as within the broader framework of national and international economic relations. In this regard, different approaches to the organization of the economic system may be identi-



e-ISSN2620-2786

Academic Editor:  
Prof. Dr. Vladimir M. Cvetković  
Copyright: © 2026 by the authors.Baturan, L., Milošević, G., & Cvjetković Ivetić, C. (2026). Insurance as a Model for Protecting the Economic System from Natural Disasters. *International Journal of Disaster Risk Management*, 8(1), 445-464.

fied, ranging from market-based and planned systems to mixed economic systems. Although these approaches differ in terms of the role of the state, the market, and other actors, they are all based on the need to regulate economic relations and ensure the functioning, stability, and development of society (Cvetković, 2026).

In that sense, an economic system may be defined as a combination of institutions, organizations, people, resources, functions, and goals that individual societies establish, develop, and use in order to solve macroeconomic issues and provide answers to microeconomic questions in the process of reproduction, including production, distribution, consumption, and exchange (Dašić & Đombić, 2009, p. 115). This understanding of the economic system points to the totality of mutually connected and organized components of the economy. Accordingly, the economic system fundamentally includes the following elements (Bečkanov, 2012, pp. 61–69): institutional frameworks; the production system and elements of production; production relations; the technical-technological foundation; economic resources, including natural, human, and material resources; specialization; production effectiveness and efficiency.

The stability of the economic system is of particular importance for the functioning of the state and society. Starting from the National Security Strategy of the Republic of Serbia, the implementation of national security policy enables the achievement of economic development and the overall prosperity of the Republic of Serbia and its citizens (National Security Strategy of the Republic of Serbia, 2019). Therefore, the preservation of the country's economic system represents one of the preconditions for the realization of national interests and strategic objectives. Any serious disruption of the economic system may produce unfavourable economic results at both the microeconomic and macroeconomic levels, with additional repercussions in the economic-political, social, and security spheres.

Contemporary economic systems are increasingly exposed to various forms of risk and uncertainty. These risks arise from global economic instability, geopolitical tensions, technological changes, market disruptions, climate change, and the increasing frequency and intensity of natural disasters. Natural disasters represent a particularly complex form of threat because their consequences are not limited to the immediate destruction of property and infrastructure. They may also disrupt production processes, supply chains, public finances, employment, social stability, and the normal functioning of institutions. In this way, natural disasters can generate both direct and indirect economic losses and may significantly weaken the resilience of the economic system (Cvetković, 2026).

The consequences of natural disasters are especially visible when damage suffered by individuals, households, and business entities is transferred from the microeconomic to the macroeconomic level (Ayalew & Lema, 2025; Beli, Renner, Cvetković, Ivanov, & Gačić, 2025; Desalit, Duque, Edradan, Enciso, Enriquez, & Pan, 2025; Djebari & Bestandji, 2025; Goswami & Ahmad, 2025; Karmaker & Cvetković, 2026; Matewos, 2025; Nayak & Nayak, 2026). Damage to private property, agricultural land, production facilities, transport infrastructure, energy systems, and public services may reduce economic activity, increase public expenditure, lower tax revenues, and create additional pressure on the state budget. If such consequences are not managed through previously established financial and institutional mechanisms, the state is often forced to intervene through extraordinary budgetary allocations, post-disaster compensation, borrowing, or international assistance. Such an approach may be necessary in the short term, but it is not always financially sustainable in the long term.

For this reason, the protection of the economic system from natural disasters requires not only emergency response and reconstruction, but also preventive and financial mechanisms that enable risk reduction, risk transfer, and faster recovery (Ayalew & Lema, 2025; Dada et al., 2025; Djebari & Bestandji, 2025; Inusa et al., 2025). In economic, legal, and security theory, insurance is recognized as one of the key instruments for managing the financial consequences of adverse events. Through insurance, risks are transferred from individuals and legal entities to insurance companies, while losses are distributed across a wider risk community. In the context of natural disasters, insurance may contribute to the protection of citizens' and businesses' property, the reduction of fiscal pressure on the state, and the strengthening of the overall resilience of the economic system (Cvetković, 2026).

In this respect, insurance should be viewed not only as a private contractual relationship between the insurer and the insured, but also as an important mechanism of public interest. Its role is reflected in raising the level of preventive measures and actions, encouraging responsible risk management, supporting post-disaster recovery, and improving the capacity of society to respond to emergency situations. Properly designed insurance mechanisms can enable insurance entities and protection system entities to reduce disaster risks and manage emergency situations more efficiently.

However, the effectiveness of insurance as a model for protecting the economic system depends on several factors. These include the level of insurance culture, the affordability of premiums, the availability of reliable risk data, the existence of hazard and vulnerability maps, the role of the state, the capacity of insurance companies, and the legal framework regulating disaster risk financing. In countries where voluntary disaster insurance is insufficiently developed, including the Republic of Serbia, the question arises as to whether a purely market-based model can provide adequate protection, or whether a combined public-private model is necessary (Cvetković, 2021; Cvetković, 2023; Cvetković et al., 2021a; Tanasić & Cvetković, 2024; Cvetković et al., 2021b; Cvetković et al., 2017; Cvetković et al., 2016).

The subject of scientific research in this paper is the possibility of applying insurance as a model for protecting the economic system from risks and threats caused by natural disasters.

The aim of the paper is to examine, through the application of legal, economic, and security analysis, whether and to what extent the insurance system can serve as an effective model for protecting the economic system from natural risks and threats. More specifically, the paper seeks to determine whether insurance can contribute to the protection of citizens' and businesses' property at both the microeconomic and macroeconomic levels, reduce the financial burden on the state, and improve the overall capacity for disaster risk management.

In accordance with the defined subject and aim, the paper is guided by the following research questions:

RQ1: To what extent can insurance reduce the macroeconomic and microeconomic consequences of natural disasters?

RQ2: Which insurance model would be most appropriate for strengthening disaster risk financing and economic system protection in the Republic of Serbia?

The main hypothesis of the paper is that the implementation of an effective insurance system can reduce the risks and threats posed by natural disasters and significantly contribute to raising the level of protection of the country's economic system. In this context, special attention is given to the relationship between voluntary and compulsory insurance, the role of the state, public-private partnership models, and the possibility of developing a more comprehensive disaster insurance framework in the Republic of Serbia.

## **2. Methodology**

This paper applies a qualitative research design based on normative legal analysis, theoretical analysis, comparative analysis, and secondary data analysis. Such an approach is appropriate because the subject of the paper is not limited only to the legal nature of insurance contracts, but also includes the broader economic, security, institutional, and public-policy role of insurance in protecting the economic system from the consequences of natural disasters.

Normative legal analysis is used to examine the legal and strategic framework relevant to disaster risk reduction, emergency management, national security, and insurance in the Republic of Serbia. This includes the analysis of legal definitions, institutional responsibilities, and the role of the state in preventing, mitigating, and compensating the consequences of natural disasters. Special attention is given to the legal understanding of disasters, natural hazards, emergency management, and the protection of property and economic interests.

Theoretical analysis is applied in order to explain the relationship between natural disasters, economic system vulnerability, risk transfer, and insurance as a mechanism of financial protection. Through this approach, insurance is considered not only as a private contractual relationship between the insurer and the insured, but also as a broader instrument of disaster risk financing, economic resilience, and public interest protection.

Comparative analysis is used to examine selected international models of natural disaster insurance, especially public-private partnership arrangements, compulsory and voluntary insurance models, catastrophe insurance pools, and state-supported insurance mechanisms. Comparative examples such as Türkiye, Romania, France, and Italy are relevant because they show different ways in which states and insurance markets cooperate in the field of disaster risk financing. These examples provide a basis for considering which model could be suitable for the Republic of Serbia.

Secondary data analysis is used for the interpretation of available institutional and statistical data on natural disaster losses, insured losses, and catastrophe risk financing (Cvetković & Renner, 2024). The paper relies on data and reports from insurance and reinsurance institutions, international organizations, academic literature, legal acts, strategic documents, and relevant professional sources. These data are used to identify the scale of economic losses caused by natural disasters, the importance of insured losses, and the existence of the protection gap between total economic losses and insured losses.

The paper also applies a synthetic approach in order to connect legal, economic, and security perspectives into a single analytical framework. This is important because the protection of the economic system from natural disasters cannot be explained only through one discipline. It requires the simultaneous consideration of legal regulation, economic consequences, institutional capacities, insurance mechanisms, state responsibility, and disaster risk governance.

The methodological procedure consists of several steps. First, the paper defines the economic system and explains its vulnerability to natural disasters. Second, it analyzes the global consequences of natural disasters and the importance of insured losses. Third, it examines insurance as a mechanism of risk prevention, compensation, and financial stabilization. Fourth, it compares voluntary, compulsory, public-private, and parametric insurance models. Fifth, it evaluates the applicability of these models to the Republic of Serbia and formulates policy recommendations for the development of a more effective natural disaster insurance framework.

The research is guided by the following research questions:

RQ1: To what extent can insurance reduce the macroeconomic and microeconomic consequences of natural disasters?

RQ2: Which insurance model would be most appropriate for strengthening disaster risk financing and economic system protection in the Republic of Serbia?

The main hypothesis of the paper is that the implementation of an effective insurance system can reduce the risks and threats posed by natural disasters and significantly contribute to raising the level of protection of the country's economic system. This hypothesis is examined through the analysis of theoretical arguments, legal and strategic frameworks, comparative insurance models, statistical indicators of disaster losses, and the specific conditions of the Republic of Serbia.

The limitations of the research should also be noted. The paper is based primarily on qualitative analysis and secondary sources, while it does not include original empirical research such as surveys, interviews, or actuarial modelling. Therefore, its contribution is primarily analytical, normative, and policy-oriented. Nevertheless, this approach enables the identification of key institutional, legal, economic, and insurance-related conditions necessary for the development of a more sustainable model of natural disaster risk financing.

### **3. The economic system vulnerability to natural disasters**

The entire lifespan of a person is permeated by their striving to preserve essential life functions and interests, to maintain and increase material wealth, to achieve functional belonging to a privileged or some other group, as well as to satisfy other human needs. In the pursuit of achieving his fundamental goals, man creates various mechanisms and systems for fulfilling needs and interests. Those needs and interests are sometimes in the service of achieving the general goals of society, and sometimes they are the result of its egoism and petty self-interest. In this broader social and economic context, the protection of life, property, production capacities, and public goods becomes one of the basic functions of every organized community. Searching the mechanisms and possibilities to achieve his goal, a person almost always faces various challenges and threats to his survival or property.

The occurrence of the endangerment of the vital values of society is a characteristic of all systems and states. From the standpoint of protecting the economic system, the term endangerment refers to social, natural, and technical hazards disrupting the economic system and the property of physical and legal entities, that is, the vital economic and other values of the state and society (Milošević & Stajić, 2022, p. 145). Natural hazards, depending on the intensity of their impact, can cause negative consequences not only within the microeconomic area where the undesired event occurred, but also at the macroeconomic level. The infrastructure destruction unavoidably results in a reduction or temporary inability to distribute material goods to the affected area, the destruction or partial damage of production facilities, agricultural crops, long-term plantations, etc. The decline in microeconomic results inevitably produces negative implications in the macroeconomic sphere through a pronounced economic system imbalance (Milošević & Čaušić, 2022). This means that natural disasters do not affect only individual households, companies, or local communities, but may also disturb the functioning of the wider economic system through reduced production, increased public expenditure, supply-chain disruptions, and the weakening of fiscal stability (Cvetković, 2026).

Depending on the type of hazards that may threaten society, instruments are formulated for their identification, measures of prevention and protection against the consequences, as well as for risk assessment and monitoring. Hazard identification, location and size of the affected area, risk assessment and monitoring represent crucial processes that enable the creation of a protection system (Katančević & Karović, 2016, p. 93). Natural hazards can have the characteristics of disasters. Natural hazards are defined as natural processes or phenomena that may cause human casualties, injuries or other health impacts, material damage, loss of livelihoods and services, social and economic disruptions, or environmental degradation (ISDR, 2009, as cited in Cvetković, 2020, p. 84). Therefore, the management of natural hazards requires an integrated approach that connects risk identification, prevention, preparedness, financial protection, emergency response, and post-disaster recovery (Hanspal et al., 2026).

According to the legislation in the Republic of Serbia: A disaster represents a natural calamity or a technical-technological accident whose consequences endanger the safety, life, and health of a larger number of people, material and cultural goods, or the environment on a larger scale, and whose occurrence or consequences cannot be prevented or mitigated by the regular actions of the competent authorities and services. Accordingly, a natural disaster, or an extreme weather event, is a phenomenon of hydrological, meteorological, geological, or biological origin, caused by the action of natural forces such as an earthquake, flood, torrent, storm, heavy rain, atmospheric discharges, hail, drought, landslides or soil slips, snow accumulation and avalanche, extreme air temperatures, ice accumulation on waterways, pandemic, epidemic of infectious diseases, epidemic of livestock infectious diseases, and the occurrence of pests, as well as other large-scale natural phenomena that may endanger the safety, life, and health of a larger number of people, material and cultural goods, or the environment to a significant extent (Law on Disaster Risk Reduction and Emergency Management, 2018, Art. 2, para. 1, items 1–2).

The above indicates that natural disasters are situations caused by natural, rather than human or technical-technological events, that is, the events caused by the action of natural forces on which human factors have no influence, i.e., they are natural phenomena causing dangers to humans, animals,

and material assets (Bošković, 2017, p. 605). As such, by their actions they undoubtedly endanger the economic system and the vital values of society. However, although the initial trigger of such events is natural, the scale of their consequences often depends on human, institutional, spatial-planning, infrastructural, and economic factors. Poor land-use planning, insufficient investment in prevention, inadequate maintenance of infrastructure, low insurance coverage, and weak preparedness can significantly increase the final level of damage (Mavrodieva et al., 2019; Perić & Cvetković, 2019; Cvetković & Martinović, 2021; Beli et al., 2025; Milenković & Cvetković, 2025; Joshi & Poudel, 2025).

The economic consequences of natural disasters can be devastating and, through their impact, may significantly affect the balance of economic entities, as well as the macroeconomic stability of the overall economic system. These consequences are most often reflected in direct economic losses, including material damage caused by the destruction of infrastructure, buildings, production facilities, production capacities, and productive resources. In addition, natural disasters usually lead to an increase in public consumption, primarily through higher costs related to the renewal and rehabilitation of affected economic entities.

Furthermore, natural disasters may contribute to a reduction in Gross Domestic Product, since damage to production capacities can result in lower output and a decline in employment. They can also disrupt production and trade flows by interrupting supply chains, thereby affecting exports, imports, and the broader flow of economic activity. In addition to these material and structural effects, disasters may produce undesirable psychological consequences among employees and decision-makers (Cvetković, 2026). Fear of future disasters can influence investment decisions and consumption patterns, which may slow economic growth (Thankappan et al., 2026).

Natural disasters can also require changes in economic policy. Decision-makers, primarily the Government, may be forced to adjust existing economic policies in response to disaster consequences and risks, which can lead to the introduction of new economic regulations, measures, and institutional mechanisms. Finally, disasters may generate serious social consequences, such as migration, unemployment, reduced employee income, and similar problems, which can further increase pressure on public spending and additionally burden the country's economic system.

The listed consequences show that natural disasters produce a chain reaction within the economic system. Initial physical damage to property, infrastructure, agricultural assets, or production facilities is transformed into financial losses for households, companies, and public institutions. These financial losses then lead to reduced consumption, lower production, weaker investment activity, employment disruptions, and a decline in public revenues. At the same time, the state is required to increase expenditure for emergency response, reconstruction, compensation, subsidies, and social support. In this way, microeconomic losses gradually become a macroeconomic problem (Cvetković, 2026).

This mechanism is particularly important in countries where disaster insurance is insufficiently developed. If households and businesses are not insured, post-disaster recovery depends mainly on personal savings, loans, state assistance, donations, or international support. Such a model is often unpredictable and financially unsustainable, especially when disasters affect large areas or repeat in short periods. For that reason, the development of insurance mechanisms should be understood as part of a broader strategy of economic protection and disaster risk financing.

Due to all the aforementioned adverse effects, it is necessary for the economic system to develop its own strategy and mechanisms for managing risks and threats, to minimize the impacts of natural disasters. Such a strategy should include preventive measures, risk assessment, infrastructure resilience, financial preparedness, insurance coverage, public-private cooperation, and clearly defined responsibilities of the state, economic entities, insurance companies, and citizens. In this sense, insurance represents one of the instruments through which the economic consequences of natural disasters can be distributed, absorbed, and managed in a more predictable and sustainable way.

## 4. Global Consequences of Natural Disasters

According to Aon data, the total losses from global natural disasters in 2019 referred to 409 natural disasters worldwide, including 158 floods and 114 severe weather events. There were 33 tropical cyclones and 32 earthquakes, while winter weather, forest fires, European wind storms, droughts, and other hazards account for the remaining events. Global losses in 2020 amounted to 210 billion dollars, which is significantly more than 166 billion dollars in 2019. In 2020, there were 980 disasters that caused losses. Natural disasters in 2020 caused 8,200 deaths, compared to 9,435 in 2019. In 2023, according to Aon data, the economic losses from global natural disasters are estimated at 380 billion dollars, which is above both the long-term and short-term averages. They are mainly caused by earthquakes in Türkiye and Syria, followed by severe convective storms and floods (Aon, 2026).

The global consequences of natural disasters should also be observed through long-term geo-spatial and temporal patterns (Cvetković et al., 2024). Recent research based on the international EM-DAT database indicates that disasters are not randomly distributed in space and time, but are shaped by geographical exposure, socio-economic vulnerability, urbanization, governance capacity, and the level of preparedness. In a global analysis of natural and man-made technological disasters from 1900 to 2024, a total of 25,836 disasters were recorded worldwide, of which 16,567, or 69.41%, were natural disasters, while 9,269, or 30.59%, were man-made technological disasters. This confirms that natural disasters represent the dominant category of recorded disaster events at the global level and that their consequences require systematic economic, institutional, and insurance-based responses (Cvetković et al., 2024).

The same research shows that Asia is the most disaster-prone continent, accounting for 41.75% of all recorded disaster events, followed by Africa, North America, Europe, South America, and Oceania. Such findings are important because they demonstrate that the global consequences of natural disasters are unevenly distributed. Countries and regions with high population density, rapid urbanization, vulnerable infrastructure, and lower levels of institutional preparedness are often more exposed to severe human and economic consequences. This means that disaster risk is not determined only by the natural hazard itself, but also by the social, economic, demographic, and institutional conditions in which the hazard occurs (Cvetković et al., 2024).

Floods and storms are particularly important from the perspective of economic protection and insurance. Long-term EM-DAT-based analysis indicates that floods represent one of the most frequent types of natural disasters globally, while storms and earthquakes are among the events that generate the highest economic losses. These findings are directly relevant to the subject of this paper, because they show that the protection of the economic system from natural disasters cannot rely only on post-disaster state intervention. Instead, it requires pre-established mechanisms for risk financing, risk transfer, and the distribution of losses through insurance and other financial instruments (Cvetković et al., 2024).

Natural disasters brought about economic losses in the year 2025 as well. Although overall damage was lower than in previous years, events such as the California wildfires and major storms in the USA still led to losses of \$260 billion. In addition to the aforementioned, the year 2025 was marked by extreme heat waves that caused at least 25,000 deaths worldwide and significant economic consequences (Aon, 2026).

The economic burden of natural disasters is also reflected in the growing gap between total economic losses and insured losses. In many countries, only a part of disaster-related damage is covered by insurance, while the remaining costs are borne by households, businesses, local communities, and the state. This protection gap is especially problematic in less developed insurance markets, where low insurance penetration, limited insurance culture, insufficient purchasing power, and expectations of state compensation reduce the willingness of citizens and companies to insure property against natural hazards. As a result, natural disasters may place considerable pressure on public finances and slow down economic recovery.

From the perspective of disaster risk management, the consequences of natural disasters are therefore multidimensional. They include immediate human losses, destruction of property and

infrastructure, interruption of production and trade flows, increased public expenditure, decline in household income, business interruption, and long-term weakening of local and national economic capacities. At the macroeconomic level, these effects can be reflected in lower GDP growth, reduced fiscal revenues, higher reconstruction costs, and increased dependence on borrowing or external assistance. At the microeconomic level, they directly affect households, farmers, entrepreneurs, companies, and local communities.

All of this indicates that global natural disasters are a reminder that communities, companies, and governments play a significant role in building resilience and improving financial protection. The more it is invested in preparedness, adaptation, and risk management, the better positioned we are to reduce long-term impacts and protect people and property upon the occurrence of a disaster (Milenković, 2025; Mančić, 2025; Gajović et al., 2025; Miletić & Stojanović, 2025; Janković et al., 2025)..

Therefore, the global experience with natural disasters clearly confirms the need to strengthen disaster risk financing mechanisms. Insurance has an important role in this process because it enables the transfer of part of the financial consequences from individuals, businesses, and the state to the insurance sector. However, insurance should not be understood as an isolated market product, but as part of a broader system of prevention, preparedness, resilience building, public-private cooperation, and sustainable economic protection. For countries such as the Republic of Serbia, these global trends provide an important argument for developing a more comprehensive model of natural disaster insurance, including voluntary and compulsory elements, public-private partnerships, risk-based premiums, state support for vulnerable categories, and stronger public awareness of the benefits of insurance (Cvetković et al., 2024).

## 5. Natural disaster risk insurance

### 5.1. Insurance as a risk prevention measure

We are witnesses to constant and undesired events surrounding us, which, by the manner in which they occur and produce consequences, may threaten the security, stability, peace, and normal functioning of society. Therewith, events that arise as a result of natural factors, such as natural disasters, cause unrest and anxiety because they directly endanger human lives, property, economic activity, infrastructure, and the environment. Natural catastrophes cause humanitarian effects, including loss of human lives, physical and psychological injuries to individuals, economic effects, which can be direct, in terms of damage and destruction of infrastructure, residential and commercial buildings, and other material forms of assets, and indirect, e.g., due to the interruption of business operations and lost earnings, as well as environmental effects, such as loss of arable land and degradation of ecosystems (Kočović et al., 2014, p. 8).

The response to the consequences of natural disasters can vary, but fundamentally there are two possible approaches to ensuring compensation for economic damages resulting from such unwanted events. One of the approaches implies that property damages are compensated with funds from borrowing, state aid, or humanitarian donations. The second approach involves compensating for damages resulting from natural disasters through insurance (Kočović et al., 2014, p. 8). The first approach is predominantly reactive, because it is activated after the occurrence of damage and often depends on available public funds, political decisions, donor support, or borrowing capacity. The second approach is more preventive and financially predictable, because it enables the prior distribution and transfer of risk through an organized insurance mechanism.

Insurance, by its manner of operation and expression, plays an important role in the society and economy of any country, as it provides economic protection to the insured. Thus, in the event of certain adverse events, the insured has the right to indemnification for damages or payment of the insured amount, meaning that the insurer will fully or partially reimburse the insured for the economic consequences of the adverse event, thereby enabling the protection and sustainability of the state's economic system. In this way, the insurance system, on one hand, allows the insured to transfer risk to the insurer, thereby achieving security and financial stability for the insured, and

on the other hand, contributes to the development of the economy and mobilization, as well as to a more effective allocation of available financial resources in society (Derenčinović Ruk, 2025, p. 652).

In the context of natural disasters, insurance should therefore be understood not only as a mechanism for post-disaster compensation, but also as an instrument of disaster risk financing, prevention, and economic resilience. Its preventive function is reflected in the fact that insurance companies, through risk assessment, premium differentiation, policy conditions, and incentives for risk reduction, can encourage households, businesses, and local communities to invest in safer construction, infrastructure protection, emergency planning, and other preventive measures. Through its actions, insurance can create the sustainability of the economic system by building social resilience that focuses on improving disaster resilience as well as enhancing access to the protection of citizens' lives and health. The above indicates that insurance can be a "key" to accessing the sustainability of the risk framework, or a tool for managing the sustainability of the economic system against the consequences of natural disasters.

The insurance system is able to mitigate the negative effects of natural disasters by paying compensation for damages after disasters, providing financial protection to the injured, so that the reconstruction of damaged property can begin without delay (Doganić & Paunović, 2021, p. 47). This is particularly important because the speed of recovery after a disaster often determines whether households, companies, and local communities can return to normal functioning or whether disaster consequences will produce long-term social and economic instability. From the insurance aspect, in order for an event to be considered catastrophic, it is necessary that the amount of damage caused or the number of human casualties exceeds a corresponding, predefined amount. The threshold of the given values is adjusted over time to economic trends, as well as the risks of endangered areas.

According to Aon, a disaster as a natural event is considered to be an event that causes any of the following: 25 million dollars or more in insured property losses; ten fatalities; 50 people injured; and 2,000 claims filed for damages, that is, damaged houses and buildings (Aon, 2026). In accordance with the generally accepted terminology of Swiss Re, as one of the world's leading reinsurers, a loss event is classified as catastrophic if it causes total damages of at least USD 96 million, or insured damages exceeding USD 48 million. Further, an event is considered catastrophic if it results in at least 20 deaths, 50 injured people, or the loss of homes of at least 2,000 people (Swiss Re, 2014, as cited in Kočović et al., 2014, p. 8).

Such thresholds show that catastrophic events are not ordinary insured events, because they simultaneously affect a large number of insured persons, generate a concentration of claims, and may threaten the financial stability of insurers if risks are not properly diversified, reinsured, or supported through public-private mechanisms. For this reason, natural disaster insurance cannot be viewed only through the logic of individual insurance contracts, but must also be considered from the perspective of systemic risk management and the protection of the economic system as a whole.

From the perspective of natural disaster insurance, we point out the amounts of insured losses for events that represent total global losses from world natural disasters in 2019, 2020, and 2024. Insured losses from natural disasters in 2019 totalled 71 billion dollars as of January 2020, which is a decrease compared to 100 billion dollars in 2018. Typhoons Hagibis and Faxai, both in Japan, were the largest insured losses in 2019, resulting in losses of 9 billion and 6 billion dollars, respectively. Insured losses from 2020 events totalled 82 billion dollars, up from 71 billion dollars in 2019. In 2024, the amount of damage covered by insurance remained high and amounted to 127 billion dollars (Insurance Information Institute, 2026).

These figures confirm that natural disasters increasingly generate high insured losses, but they also point to a broader problem: a significant part of total disaster damage often remains uninsured. This difference between total economic losses and insured losses is commonly referred to as the protection gap. The wider the protection gap, the greater the burden placed on households, businesses, local governments, and the state budget after disasters. Therefore, increasing insurance coverage is not only a matter of private financial protection, but also an important component of public financial stability and disaster risk governance.

**Table 1.** Losses from natural disasters in the United States in 2025, in millions of US dollars (Insurance Information Institute, 2026).

Disaster	Number of occurrences	Casualties	Economic losses	Insured losses
Tropical cyclone	1	8	432	188
Strong convective storm	52	138	67,872	52,296
Forest fire, drought, heat-wave	9	468	61,453	43,021
Winter weather	7	33	1,983	1,404
Floods	15	202	10,309	6,169
Total	84	849	142,049	103,078

Note: Economic and insured losses are expressed in millions of US dollars. Economic losses refer to the total estimated financial damage caused by the disaster, while insured losses refer to the portion of losses covered by insurance policies. The data refer to natural disaster losses in the United States in 2025.

The material interests' preservation of the entire national economy and the social community necessitates active state participation in the domain of promoting insurance against natural risks. Thereat, there are various forms of public-private partnerships. Thus, thanks to the private-public partnership, losses from natural disasters are significantly covered in the USA by the system of unwanted event insurance, indicating that there are possibilities for adequate management of natural disasters through various insurance models.

The example of the United States shows that even in highly developed insurance markets, the role of the state remains important. Public authorities provide the regulatory framework, support risk mapping and data availability, participate in specific insurance schemes, and intervene when disaster losses exceed the capacity of private actors. This confirms that effective disaster insurance systems usually require cooperation between the state, insurance companies, reinsurers, local governments, businesses, and citizens.

## 5.2. Voluntary and compulsory insurance against natural disasters

Insurance against natural disasters is an important aspect of risk management in the economic system. However, this insurance differs from other types of insurance from a business perspective. The difference originates from the very nature of the event, making it difficult to assess the overall potential exposure and the costs of the insured loss, especially because a catastrophic event leads to an exceptionally large number of compensation claims. Hence, it is difficult for catastrophe insurance issuers to effectively manage catastrophe risk.

Taking these aspects into account, insurance against natural disasters undoubtedly represents an important instrument for protecting economic interests and stability in society, and in this sense, when choosing an insurance model, it is necessary to consider the key aspects of insurance against natural disasters, namely:

- risk assessment: Insurance companies must conduct detailed risk analyses to determine the likelihood and potential damage from natural disasters in specific regions and periods;
- coverage: Insurance policies may cover various aspects, including property, business interruptions, and third-party liability;
- premiums: the amount of premiums depends on the risk level of a certain area;
- provision of funds: Insurance can help businesses and individuals recover from the financial consequences of disasters, enabling them to restore their activities more quickly;
- preventive measures: encouraging clients to take actions to reduce risk, such as improving infrastructure, acquiring protective equipment, or developing protection and emergency response plans.

In addition to these elements, the choice of insurance model should also take into account affordability, social equity, administrative feasibility, the role of subsidies, the availability of reliable hazard data, and the ability of insurance companies to manage accumulated catastrophic losses. This is especially important in countries where insurance culture is insufficiently developed and where citizens often expect the state to compensate disaster-related damage.

History teaches us that certain natural events repeat in the same and altered form with greater or lesser intensity of undesired outcome (Ainuddin, Routray, & Ainuddin, 2014; Aitsi-Selmi, Egawa, Sasaki, Wannous, & Murray, 2015; Masys, 2015; Phillips, 2015; Schulze, Lorenz, Wenzel, & Voss, 2015). Therefore, insurance emerges as one of the best ways to manage catastrophic risks. It can be adapted and used through the form of various models. In practice, insurance against natural disasters is applied through a model of voluntary and mandatory insurance.

Voluntary insurance against natural disasters is a tool allowing the insured to disperse risk at a price that is not too high. However, voluntary insurance is characterized by an insurance system covering natural disasters in such a way that it is purchased mainly by policyholders located in high-risk areas. This may lead to adverse selection, because persons and businesses with higher exposure are more motivated to purchase insurance, while those with lower perceived risk often remain outside the insurance pool. As a result, the insurance base may become too narrow, premiums may increase, and the sustainability of the model may be weakened.

Mandatory insurance against natural disasters is a mechanism that entails the obligation of the risk-exposed entity to insure its property, economic resources, and other assets against an undesirable natural event. This model of catastrophic risk insurance should be developed through a public-private insurance model, by forming an insurance pool composed of solvent insurance companies. The mandatory insurance model would include a large number of insured individuals, which would ensure the spreading of risk at a lower level, and consequently lower insurance premiums (Jovanović, 2025). Mandatory natural disaster insurance results in less pressure on the state budget when a natural disaster occurs, but it requires a clear definition of the appropriate role of the public sector, as such a model must align the interests of both the private and public sectors, and it must be a combination in which everyone benefits (Doganić & Paunović, 2021, p. 47).

At the same time, compulsory insurance may also generate certain challenges. If introduced without adequate preparation, it may be perceived as an additional financial burden for citizens and businesses. This is particularly relevant for low-income households, rural populations, farmers, and small enterprises. Therefore, compulsory insurance should not be introduced as a purely administrative obligation, but as part of a broader public policy model that includes subsidized premiums for vulnerable groups, transparent risk maps, public education, preventive incentives, and clearly defined limits of state compensation after disasters.

In order to clarify the meaning of insurance as a model for protecting the economic system, it is necessary to point out that this model should not be understood only as a classical individual insurance contract. In the context of natural disasters, the insurance protection model includes a wider institutional, financial, and regulatory framework through which disaster risks are identified, assessed, transferred, distributed, and compensated. Therefore, the model may include voluntary insurance, compulsory insurance, public-private partnership, catastrophe insurance pools, state-supported reinsurance mechanisms, subsidized premiums, and, in certain cases, parametric insurance instruments.

For the Republic of Serbia, the most appropriate solution would not be a purely voluntary model, because voluntary insurance usually results in low insurance coverage and adverse selection. In such a model, insurance is most often purchased only by those who are already aware that they are exposed to high risk, while a large part of the population and business sector remains uninsured. On the other hand, a fully compulsory model could generate public resistance if introduced without adequate preparation, subsidies, public education, and a clear explanation of its benefits. Therefore, the most suitable direction for Serbia would be a combined public-private model of natural disaster insurance.

Such a model should include several interconnected components. First, it should be based on cooperation between the state, insurance companies, reinsurers, local self-government units, and citizens. Second, it should include the establishment of a national catastrophe insurance pool composed of solvent insurance companies. Third, the state should provide the regulatory framework, risk maps, hazard data, supervision, and possible reinsurance or guarantee support in the case of extreme catastrophic losses. Fourth, insurance companies should be responsible for issuing policies, collecting premiums, assessing risks, processing claims, and paying compensation. Fifth, vulnerable households and low-income groups should be supported through subsidized premiums, in order to prevent compulsory or semi-compulsory insurance from becoming a socially unfair financial burden.

In this regard, the role of the state should be clearly distinguished. The state may act as a regulator, by adopting legal rules and defining minimum insurance requirements; as a provider of risk data, by preparing flood maps, seismic maps, landslide maps, and other hazard assessments; as a subsidy provider, by financially supporting vulnerable categories of the population; as an insurer of last resort or reinsurance supporter, in the case of extremely large catastrophic losses; and as a post-disaster compensation actor, although this role should be gradually reduced and made more predictable through a developed insurance framework.

**Table 2.** Comparative overview of selected natural disaster insurance models

Country	Type of model	Covered risks	Role of the state	Role of private insurers	Character of insurance	Relevance for Serbia
Türkiye	Turkish Catastrophe Insurance Pool	Primarily earthquake risk	Establishes and supports the legal and institutional framework	Sell policies and participate in the implementation of the system	Compulsory in defined cases	Useful example of a national catastrophe insurance pool
Romania	PAID – Natural Disaster Insurance Pool	Earthquakes, floods, and landslides	Provides the legal basis for compulsory household disaster insurance	Participate through the insurance pool	Compulsory household insurance	Relevant because of regional and transition similarities
France	Cat Nat system	Natural disasters officially recognized by the state	Declares natural disaster status and provides state-backed reinsurance	Include natural disaster coverage within property insurance contracts	Semi-compulsory through property insurance	Useful for linking private insurance with state guarantee
Italy	Developing climate and catastrophe insurance framework	Floods, earthquakes, and other natural hazards	Increasingly promotes stronger catastrophe insurance mechanisms	Expected to provide market-based coverage with public support	Moving toward stronger mandatory elements	Relevant for gradual reform of the Serbian model

The comparative overview shows that natural disaster insurance is rarely left entirely to the free market. In most countries, the state has an important role in establishing the legal framework, providing reinsurance support, subsidizing vulnerable groups, or ensuring that disaster insurance becomes widely accessible. At the same time, private insurers remain necessary for policy administration, premium collection, claims processing, and risk assessment. These examples indicate that Serbia should not rely exclusively on voluntary insurance, because such models often result in low insurance penetration and a significant protection gap. A combined public-private model would therefore be more appropriate for the Serbian context.

From the perspective of the Republic of Serbia, insurance against natural disasters does not have a tradition of application, nor an adequately developed public institutional framework for this form of economic system protection. This situation can be explained by a low insurance culture, insuf-

ficient awareness among potential policyholders about the benefits provided by this type of risk management, as well as the low living standards of the population (Kočović et al., 2014, p. 14).

The experience of the Republic of Serbia, especially after major flood events, shows that the economic consequences of natural disasters are still largely managed through state intervention, post-disaster compensation, donations, borrowing, and international assistance (V. Cvetković, 2025; V. M. Cvetković, Aleksov, Renner, Gačić, Ivanov, & Milašinović, 2025). Although these mechanisms are important in the immediate aftermath of a disaster, they do not represent a predictable and financially sustainable model of disaster risk financing. The burden of recovery is therefore often transferred to the state budget, while households, farmers, entrepreneurs, and companies remain insufficiently protected before the occurrence of a disaster.

One of the main barriers to the development of natural disaster insurance in Serbia is the low level of insurance culture. Many citizens do not perceive insurance as a preventive instrument, but as an additional cost. This attitude is strengthened by limited disposable income, insufficient public education, lack of trust in insurance institutions, and the expectation that the state will provide compensation after major disasters. Such expectations may reduce individual responsibility for risk management and weaken the development of a broader disaster insurance market.

For this reason, Serbia needs a gradual and socially sensitive approach. The introduction of compulsory or semi-compulsory disaster insurance should be accompanied by public education, transparent explanation of benefits, subsidized premiums for vulnerable households, reliable hazard maps, and clear legal rules on the limits of post-disaster state compensation. Without these elements, compulsory insurance could be perceived as an additional fiscal burden rather than as a mechanism of protection and resilience (Milenković et al., 2024; Cvetković et al., 2026a; Cvetković et al., 2026b; Milenković & Cvetković, 2026).

### *5.3. Parametric insurance as an innovative disaster risk financing instrument*

In addition to traditional indemnity-based insurance, parametric insurance has become increasingly important in the field of disaster risk financing. Unlike traditional insurance, where compensation is paid after the assessment of actual damage, parametric insurance provides payment when a predefined parameter or trigger is reached. Such triggers may include rainfall intensity, river water level, wind speed, earthquake magnitude, drought index, or other objectively measurable indicators.

The main advantage of parametric insurance is the speed of payment. Since compensation does not depend on lengthy damage assessment procedures, funds can be made available shortly after the disaster occurs. This is particularly important for emergency response, temporary accommodation, restoration of basic services, recovery of agricultural production, and the rapid stabilization of households, local governments, and small businesses.

However, parametric insurance also has certain limitations. The most important limitation is basis risk, which means that the insured party may suffer actual damage even if the predefined parameter is not reached, or may receive payment even when actual damage is limited. For this reason, parametric insurance should not be viewed as a complete replacement for traditional insurance, but rather as a complementary instrument within a broader disaster risk financing framework.

For the Republic of Serbia, parametric insurance could be considered particularly in relation to floods, droughts, agriculture, and local government disaster financing. Its application would require reliable hydrological, meteorological, seismic, agricultural, and geospatial data, as well as cooperation between the state, insurers, scientific institutions, and local self-government units. In this way, parametric insurance could contribute to faster liquidity after disasters and reduce the delay between the occurrence of damage and the availability of recovery funds.

#### 5.4. Proposed insurance model for the protection of the economic system in Serbia

Taking into account the current level of insurance culture, the economic capacity of households, exposure to floods and other natural hazards, and the dominant role of the state in post-disaster compensation, the most appropriate model for Serbia would be a combined public-private disaster insurance model. This model should not be based exclusively on voluntary insurance, because voluntary insurance usually leads to low coverage and the concentration of insured persons only in high-risk areas. At the same time, a fully compulsory model could create resistance if introduced without adequate subsidies and public support.

The proposed model should include several elements. First, a national catastrophe insurance framework should be established by law, clearly defining the roles of the state, insurance companies, local governments, and insured persons. Second, a public-private catastrophe insurance pool should be considered as a mechanism for spreading disaster risk across a larger number of insured persons and insurance companies. Third, basic disaster insurance coverage could be gradually linked to property insurance, especially for residential buildings, agricultural assets, and business facilities located in high-risk areas. Fourth, the state should introduce subsidized premiums for low-income households and socially vulnerable groups. Fifth, insurance premiums should be connected with preventive measures, so that households, companies, and local governments that invest in risk reduction may benefit from lower premiums.

Such a model would reduce pressure on the state budget after disasters, increase the financial responsibility of property owners, improve the speed of recovery, and strengthen the resilience of the economic system. The role of the state would remain essential, but it would gradually shift from ad hoc post-disaster compensation toward prevention, regulation, risk financing, and support for vulnerable groups.

#### 5.5. Policy recommendations

Based on the previous analysis, several policy recommendations can be formulated for the Republic of Serbia.

First, Serbia should establish a national catastrophe insurance framework that would define the roles of the state, insurance companies, local governments, and insured persons in disaster risk financing.

Second, a public-private catastrophe insurance pool should be considered as a mechanism for spreading disaster risk across a larger number of insured persons and insurance companies.

Third, subsidized premiums should be introduced for low-income households and vulnerable social groups, in order to avoid the social injustice that could arise from compulsory insurance.

Fourth, reliable hazard and risk maps should be developed and made available to insurers, municipalities, businesses, and citizens. These maps are necessary for accurate premium calculation and for the identification of high-risk areas.

Fifth, insurance premiums should be linked to preventive measures. Households, companies, and local governments that invest in flood protection, building reinforcement, drainage systems, emergency planning, and other preventive measures should be rewarded through lower premiums.

Sixth, public education on disaster insurance should be strengthened. Citizens should understand that insurance is not only a financial product, but also a mechanism of preparedness, recovery, and economic resilience.

Seventh, the state should clearly define the limits of post-disaster compensation. If citizens expect full compensation from the state after each disaster, they may have little motivation to purchase insurance or invest in prevention.

Eighth, parametric insurance should be considered as a complementary instrument for risks such as floods, droughts, and agricultural losses, especially in cases where rapid liquidity after a disaster is more important than lengthy individual damage assessment.

## 6. Conclusion

Insurance against natural disasters can be very useful for protecting property and financial stability, but it is important to carefully study the insurance terms and understand all aspects before making a specific insurance decision. Investing in insurance can be a wise decision, but it is necessary to be aware of potential drawbacks as well. In this regard, insurance against natural disasters has the following advantages:

- financial support: insurance provides relatively stable sources of financial security in case of damage caused by natural disasters;
- risk reduction and psychological peace: insurance can reduce stress and worry related to potential losses;
- local economies source of support: the stability of the funding source enables local economies to recover more quickly;
- planning and prevention: insurance companies often provide resources and information on how to prepare for natural disasters;
- faster property restoration: insurance contributes to faster property restoration and the return to pre-disaster living conditions;
- business and investment protection: insurance protects capital owners, investments, and business viability.

Insurance against natural disasters also has drawbacks, which relate to:

- insurance costs: due to increased risk, insurance premiums may be high;
- policy limitation risk: due to the pronounced risk, insurance policies may have certain limitations, which means that the damage may not be fully covered;
- complexity of procedures: understanding insurance conditions and claim procedures can be demanding, which contributes to the complexity and complication of the implementation of the insured event;
- timeframe for the payment of an insured event: the timeframe for processing a compensation claim can be time-consuming, which can be problematic from the trust perspective.

Despite these limitations, the overall analysis confirms that insurance has significant potential as a model for protecting the economic system from the consequences of natural disasters. Its importance is not limited to the compensation of individual damage, but extends to the preservation of business continuity, reduction of pressure on public finances, stabilization of local economies, and strengthening of the resilience of the wider economic system.

The main theoretical conclusion is that insurance represents a mechanism of risk transfer, risk distribution, and financial stabilization. It transforms uncertain and potentially devastating losses into a more predictable system of premiums, reserves, compensation, and recovery financing. In this sense, insurance contributes to the transformation of disaster management from a predominantly reactive model into a more preventive and financially sustainable model.

The practical implication for the Republic of Serbia is that the existing approach to natural disaster damage compensation should be gradually supplemented by a more developed disaster insurance framework. Such a framework should combine the strengths of the private insurance market with the regulatory, social, and financial role of the state. This is particularly important because low insurance culture, limited purchasing power, and expectations of state compensation continue to represent serious barriers to wider insurance coverage.

Therefore, future public policy should be directed toward the establishment of a national disaster insurance framework, the development of a public-private catastrophe insurance pool, subsidized premiums for vulnerable households, the preparation of reliable hazard and risk maps, stronger public education on the importance of insurance, and the linking of insurance premiums with preventive measures. In this way, insurance can become not only a financial product, but also an important instrument of disaster risk reduction, economic protection, and long-term societal resilience.

## 7. References

1. Ainuddin, S., Routray, J. K., & Ainuddin, S. (2014). People's risk perception in earthquake prone Quetta city of Baluchistan. *International Journal of Disaster Risk Reduction*, 7, 165-175.
2. Aitsi-Selmi, A., Egawa, S., Sasaki, H., Wannous, C., & Murray, V. J. I. j. o. d. r. s. (2015). The Sendai framework for disaster risk reduction: Renewing the global commitment to people's resilience, health, and well-being. 6(2), 164-176.
3. Aon. (2026). 2026 climate and catastrophe insight. <https://www.aon.com/en/insights/reports/climate-and-catastrophe-report>
4. Ayalew, N. A., & Lema, A. T. (2025). Conflict Risk Monitoring for Conflict Prevention in Ethiopia: The Case of Ataye Town, North Shewa, Amhara Region. *International Journal of Disaster Risk Management*, 177-202. <https://doi.org/10.18485/ijdrm.2025.7.1.10>
5. Ayalew, N. A., & Lema, A. T. (2025). Conflict Risk Monitoring for Conflict Prevention in Ethiopia: The Case of Ataye Town, North Shewa, Amhara Region. *International Journal of Disaster Risk Management*, 7(1), 177-202.
6. Bečkanov, G. S. (2012). *Ekonomska teorija [Economic theory]*. Moskva-Sankt Peterburg-Kijev-Harkov-Minsk.
7. Beli, A., Renner, R., Cvetković, V. M., Ivanov, A., & Gačić, J. (2025). A cross-national study of disaster risk management: Strengths and weaknesses in Bulgaria, Romania, and Albania with reflections on Serbia. *International Journal of Disaster Risk Management*, 7(1), 431-460. <https://doi.org/10.18485/ijdrm.2025.7.1.25>
8. Beli, A., Renner, R., Cvetković, V. M., Ivanov, A., & Gačić, J. (2025). A Cross-National Study of Disaster Risk Management: Strengths and Weaknesses in Bulgaria, Romania, and Albania with Reflections on Serbia. *International Journal of Disaster Risk Management*, 7(1).
9. Bošković, M. (2017). *Leksikon bezbednosti [Lexicon of security]*. Beograd-Novi Sad.
10. Cvetković, V. (2014). Analysis of geospatial and temporal distribution of floods as natural emergencies. *Archibald Reiss Days* (Vol. 2, pp. 371-389). Beograd: Academy of Criminalistic and Police Studies.
11. Cvetković, V. (2021). *Pravni i bezbednosni aspekti upravljanja rizicima od prirodnih i antropogenih katastrofa [Legal and security aspects of disaster risk management]*. Beograd: Pravni fakultet u Novom Sadu; Naučno-stručno društvo za upravljanje rizicima u vanrednim situacijama.
12. Cvetković, V. (2023). *Integrirano upravljanje rizicima od katastrofa: Pripremljenost, ublažavanje, odgovor i oporavak [Integrated disaster risk management: Preparedness, mitigation, response and recovery]*. Beograd: Naučno-stručno društvo za upravljanje rizicima u vanrednim situacijama.
13. Cvetković, V. (2025). First responders in the Western Balkans: Strengthening Capacities and Preparedness for a Resilient Future. *International Journal of Disaster Risk Management*, 7(2), 361-384.
14. Cvetković, V. (2026). *Upravljanje rizicima od katastrofa: teorija, koncepti i metode [Disaster Risk Management: Theory, Concepts and Methods]*. Scientific-Professional Society for Disaster Risk Management, Belgrade.
15. Cvetković, V. M. (2020). *Upravljanje rizicima u vanrednim situacijama [Risk management in emergency situations]*. Beograd.

16. Cvetkovic, V. M., & Martinović, J. (2021). Innovative solutions for flood risk management. *International Journal of Disaster Risk Management*, 2(2), 71–100. <https://doi.org/10.18485/ijdrm.2020.2.2.5>
17. Cvetković, V. M., Aleksov, B., Renner, R., Gačić, J., Ivanov, A., & Milašinović, S. (2025). Community-Based Disaster Risk Reduction: Overcoming Barriers to Build Stronger Communities. *International Journal of Disaster Risk Management*, 7(2), 113–129. doi:10.18485/ijdrm.2025.7.2.7
18. Cvetković, V. M., Milenković, D., & Lukić, T. (2026). Measuring community disaster resilience in Serbia using an adapted BRIC framework grounded in DROP: Index construction and regional disparities. *Geosciences*, 16(4), 135. <https://doi.org/10.3390/geosciences16040135>
19. Cvetković, V. M., Milenković, D., Bašić, J., Lukić, T., & Renner, R. (2026). Predictive model of community disaster resilience across Serbia: A BRIC–DROP composite index and spatial patterns. *Safety*, 12(3), 59. <https://doi.org/10.3390/safety12030059>
20. Cvetković, V. M., Renner, R., Aleksova, B., & Lukić, T. (2024). Geospatial and Temporal Patterns of Natural and Man-Made (Technological) Disasters (1900–2024): Insights from Different Socio-Economic and Demographic Perspectives. *Applied Sciences*, 14(18), 8129.
21. Cvetković, V. M., Tanasić, J., Ocal, A., Kešetović, Ž., Nikolić, N., & Dragašević, A. (2021). Capacity development of local self-governments for disaster risk management. *International Journal of Environmental Research and Public Health*, 18(19), 10406.
22. Cvetković, V., & Renner, R. (2024). Comprehensive databases on natural and man-made (technological) hazards and disasters: Mapping risks and challenges. Belgrade: Scientific-Professional Society for Disaster Risk Management.
23. Cvetković, V., Lipovac, M., & Milojković, B. (2016). Knowledge of secondary school students in Belgrade as an element of flood preparedness. *Teme*, 15(4), 1259–1273.
24. Cvetković, V., Radovanović, M., & Milašinović, S. (2021). Disaster risk communication: Attitudes of Serbian citizens. *Sociological Review*, 55(4), 1610–1647.
25. Cvetković, V., Roder, G., Tarolli, P., Öcal, A., Ronan, K., & Dragičević, S. (2017). Gender disparities in flood risk perception and preparedness: A Serbian case study. *Geophysical Research Abstracts*, 19, EGU2017-6720.
26. Dada, K. S. J., Hamza, J. M., & Mohammed, H. A. (2025). Disaster Risk Management in Libraries and Information Centers: Global Strategies, Challenges, Policy and Recommendations. *International Journal of Disaster Risk Management*, 203–214. <https://doi.org/10.18485/ijdrm.2025.7.1.11>
27. Dašić, D., & Đombić, I. (2009). *Uvod u ekonomiju [Introduction to economics]*. Banja Luka.
28. Derenčinović Ruk, M. (2025). The role of the state in insurance of natural disaster risks – What is the right way, EU initiative and examples from France and Italy. *Zbornik Pravnog fakulteta Sveučilišta u Rijeci [Proceedings of the Faculty of Law of the University of Rijeka]*, 46(3), 651–676.
29. Desalit, P., Duque, G. B., Edradan, T. M., Enciso, K. H., Enriquez, M. R., & Pan, W. K. M. (2025). Predictors of Disaster Response Self-Efficacy Among Adult Residents in Selected Highly-Dense Barangays in Tondo, Manila. *International Journal of Disaster Risk Management*, 7(1), 301–312.
30. Djebari, S., & Bestandji, S. (2025). The Role of Spatial Analysis in Notifiable Disease Monitoring and Health Risk Management: A Case Study of Constantine. *International Journal of Disaster Risk Management*, 215–234. <https://doi.org/10.18485/ijdrm.2025.7.1.12>
31. Djebari, S., & Bestandji, S. (2025). The Role of Spatial Analysis in Notifiable Disease Monitoring and Health Risk Management: A Case Study of Constantine. *International Journal of Disaster Risk Management*, 7(1), 215–234.
32. Doganić, J., & Paunović, M. (2021). Upravljanje rizicima od prirodnih katastrofa [Management of risks from natural disasters]. *Tokovi osiguranja [Insurance Trends]*, 3, 37–70.
33. Gajović, A., Cvetković, V., Renner, R., & Cvetković, V. (2025). Advancing the circular economy through construction and demolition waste management for disaster risk-informed practice:

- Comparative insights from Serbia and the European Union. *International Journal of Contemporary Security Studies*, 1(2), 51–66. [https://doi.org/10.18485/fb\\_ijcss.2025.1.2.4](https://doi.org/10.18485/fb_ijcss.2025.1.2.4)
34. Goswami, T., & Ahmad, A. (2025). Integrating Disability into Disaster Management Education in India: A Critical Review. *International Journal of Disaster Risk Management*, 7(1), 163-176.
  35. Hanspal, M. S., Cvetković, V. M., Lipovac, M., & Popović, D. J. (2026). Regulating Emerging Technologies in Disaster Management: A Comparative Analysis of Security Governance and Legal Liability in India and Serbia. *International Journal of Disaster Risk Management*, 8(1), 147-162. <https://doi.org/10.66050/5jedtn66>
  36. Insurance Information Institute. (2026). Facts + statistics: U.S. catastrophes. <https://www.iii.org/publications/insurance-handbook/insurance-and-disasters/facts-statistics-us-catastrophes>
  37. Inusa, M., Chukwudi Nnaemeka, E., Nyomo, J. D., Osawe, I. E., Obadaki, Y. Y., Ismail, A., ... Abdullahi Bichi, A. (2025). Nature and Extent of Flood Risk Downstream of the Kubanni Dam, Kaduna State, Nigeria. *International Journal of Disaster Risk Management*, 1–14. <https://doi.org/10.18485/ijdrm.2025.7.1.1>
  38. Janković, L., Cvetković, V. M., Gačić, J., Renner, R., & Jakovljević, V. (2025). Integrating psychosocial support into emergency and disaster management and public safety: The role of the Red Cross of Serbia. *International Journal of Contemporary Security Studies*, 1(1), 99–124. [https://doi.org/10.18485/fb\\_ijcss.2025.1.1.8](https://doi.org/10.18485/fb_ijcss.2025.1.1.8)
  39. Joshi, K. D., & Poudel, D. K. (2025). Transforming landscapes, shaping risk: Land cover change and disaster vulnerability in Parshuram Municipality (2005–2025). *International Journal of Disaster Risk Management*, 7(2), 551–564. <https://doi.org/10.18485/ijdrm.2025.7.2.31>
  40. Jovanović, J. (2025). Građani Srbije više brinu za automobile, nego zbog požara i poplava [Serbian citizens worry more about cars than about fires and floods]. *Biznis.rs*, 16.7.2025. <https://biznis.rs/vesti/srbija/gradjani-srbije-vise-brinu-za-automobile-nego-zbog-pozara-i-poplava/>
  41. Karmaker, R., & Cvetković, V. (2026). Policy, Risk and Innovation: A Mixed-Methods Framework for Using AI to Foster Inclusion in Marginalized Communities in Bangladesh. *International Journal of Disaster Risk Management*, 8(1), 385-408.
  42. Katančević, V. T., & Karović, S. (2016). Identifikovanje opasnosti, procena rizika i monitoring kao oblik ranog upozorenja [Identification of hazards, risk assessment and monitoring as a form of early warning]. *Vojno delo*, 2, 84-107.
  43. Kočović, J., Paunović, B., & Jovović, M. (2014). Mogućnosti upravljanja katastrofalnim rizicima [Possibilities of managing catastrophic risks]. *Novi ekonomist*, 8(16), 7-15.
  44. Law on Disaster Risk Reduction and Emergency Management [Zakon o smanjenju rizika od katastrofa i upravljanju vanrednim situacijama]. (2018). *Službeni glasnik Republike Srbije*, 87/2018.
  45. Mančić, T. (2025). Climate change as a security challenge, risk and threat of the 21st century and its consequences on critical infrastructure. *International Journal of Contemporary Security Studies*, 1(1), 191–204. [https://doi.org/10.18485/fb\\_ijcss.2025.1.1.14](https://doi.org/10.18485/fb_ijcss.2025.1.1.14)
  46. Masys, A. (2015). *Disaster management: enabling resilience*: Springer.
  47. Matevos, K. (2025). Domestic Hiking Tourism for Post-COVID Recovery and Transformation. *International Journal of Disaster Risk Management*, 7(1), 283-300.
  48. Mavrodieva, A. V., Budiarti, D. S., Yu, Z., Pasha, F. A., & Shaw, R. (2019). Governmental incentivization for SMEs' engagement in disaster resilience in Southeast Asia. *International Journal of Disaster Risk Management*, 1(1), 32–50. <https://doi.org/10.18485/ijdrm.2019.1.1.2>
  49. Milenković, D. (2025). Theoretical, institutional and organizational aspects of the integrated disaster risk reduction system: Towards a deeper understanding of disaster resilience in Serbia. *International Journal of Contemporary Security Studies*, 1(1), 175–190. [https://doi.org/10.18485/fb\\_ijcss.2025.1.1.13](https://doi.org/10.18485/fb_ijcss.2025.1.1.13)
  50. Milenković, D., & Cvetković, V. (2026). Disaster resilience in Serbia: A narrative synthesis of institutional, social, and perception-based evidence. *Scientific and Professional Conference*

- “Predrag Marić”, Faculty of Security Studies, University of Belgrade, 1(1), 173–204. <https://doi.org/10.5281/zenodo.19910047>
51. Milenković, D., & Cvetković, V. M. (2025). Rethinking disaster resilience: Conceptual framework, core dimensions, and key actors. *International Journal of Disaster Risk Management*, 7(2), 455–468. <https://doi.org/10.18485/ijdrm.2025.7.2.25>
  52. Milenković, D., Cvetković, V. M., & Renner, R. (2024). A systematic literary review on community resilience indicators: Adaptation and application of the BRIC method for measuring disasters resilience. *International Journal of Disaster Risk Management*, 6(2), 79–104.
  53. Miletic, S., & Stojanović, T. (2025). Risks and threats to critical infrastructure with reference to trends in the protection of critical infrastructure in the Republic of Serbia. *International Journal of Contemporary Security Studies*, 1(2), 203–214. [https://doi.org/10.18485/fb\\_ijcss.2025.1.2.15](https://doi.org/10.18485/fb_ijcss.2025.1.2.15)
  54. Milošević, G., & Čaušić, L. (2022). Ekonomske posledice prirodnih katastrofa [Economic consequences of natural disasters]. In *Zbornik radova [Proceedings]*. Beograd: Naučno-stručno društvo za upravljanje rizicima od katastrofa, Međunarodni institut za istraživanje katastrofa.
  55. Milošević, G., & Stajić, Lj. (2022). Ekonomska bezbednost [Economic security]. Novi Sad.
  56. National Security Strategy of the Republic of Serbia [Nacionalna strategija bezbednosti Republike Srbije]. (2019). *Službeni glasnik Republike Srbije*, 94/2019.
  57. Nayak, J., & Nayak, M. R. (2026). Disaster Recovery and Data Integrity in Odisha: Institutional Corruption, Crop Loss Mismatches, and the Case for District-Level Destruction Scorecards. *International Journal of Disaster Risk Management*, 8(1), 91-102.
  58. Perić, J., & Cvetković, V. M. (2019). Demographic, socio-economic and phycological perspective of risk perception from disasters caused by floods: Case study Belgrade. *International Journal of Disaster Risk Management*, 1(2), 31–45. <https://doi.org/10.18485/ijdrm.2019.1.2.3>
  59. Phillips, B. D. (2015). *Disaster recovery*: CRC press.
  60. Schulze, K., Lorenz, D. F., Wenzel, B., & Voss, M. (2015). Disaster Myths and their Relevance for Warning Systems. Paper presented at the ISCRAM.
  61. Tanasić, J., & Cvetković, V. (2024). The efficiency of disaster and crisis management policy at the local level: Lessons from Serbia. Belgrade: Scientific-Professional Society for Disaster Risk Management.
  62. Thankappan, A., & Ponnambath, H. S. K. (2026). Tracing Forty Years of Research on the Bhopal Gas Tragedy: Trends, Themes, and Future Directions. *International Journal of Disaster Risk Management*, 31–54. <https://doi.org/10.66050/k5sxgr16>.



