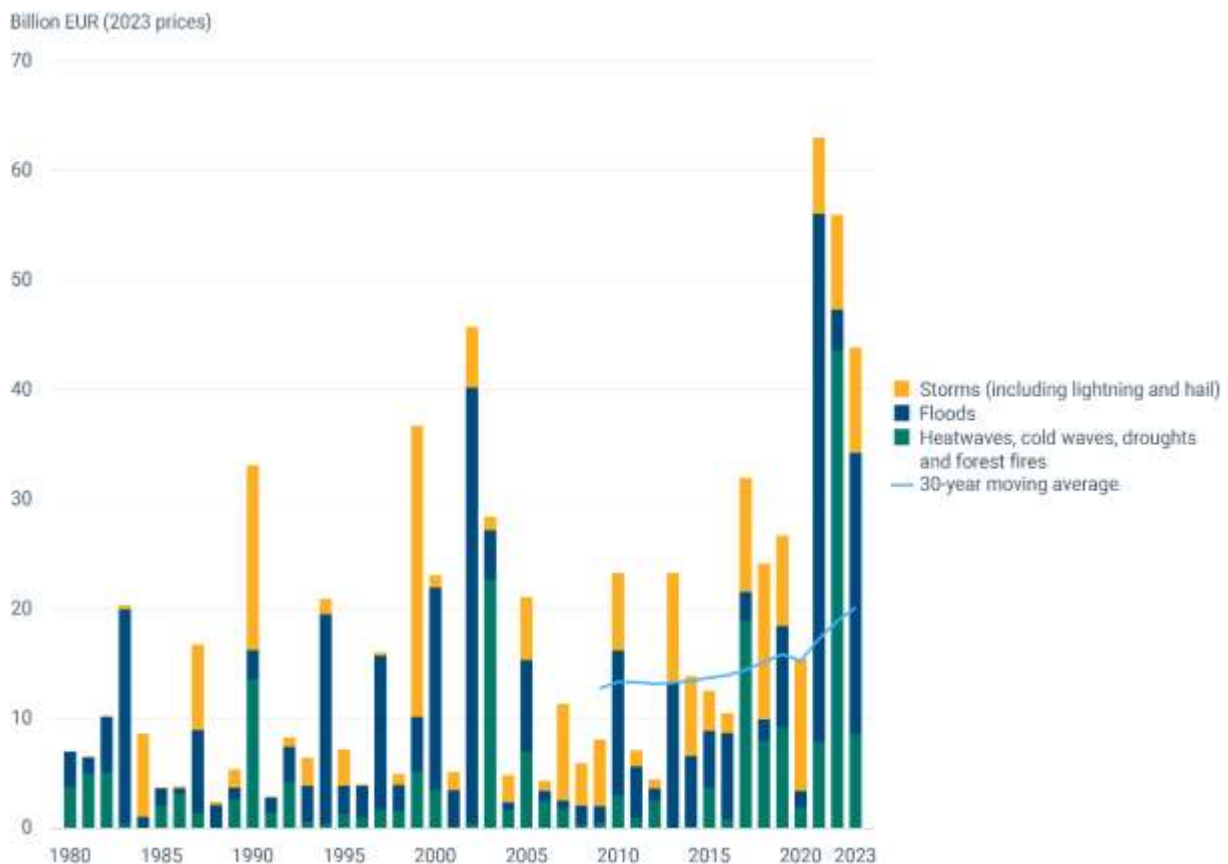


## FLOOD RISKS IN THE UKRAINIAN CARPATHIANS: THE ROLE OF INSURANCE AND CLIMATE SERVICES

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Floods are one of Ukraine's most serious natural threats, particularly in the Carpathian region. They cause significant economic and social damage, destroying infrastructure, harming agriculture, and threatening the well-being of local communities. The mountainous terrain, high precipitation levels, and human activities such as deforestation contribute to the frequency and intensity of floods, which have become more severe due to climate change. In recent decades, an increase in flood frequency and intensity has been observed, necessitating a comprehensive approach to risk management (Fig.1).



**Fig. 1.** Annual economic losses caused by weather- and climate-related extreme events in the EU Member States [1]

One of the key tools in this regard is climate services, which provide scientifically based data on climate change, extreme weather events, and their

impacts on natural systems. These services rely on hydrometeorological observations, numerical modeling, and historical data analysis to predict flood probability, assess long-term risks, and adapt infrastructure to changing climate conditions.

Despite increasing flood risks, property insurance against such natural disasters remains underdeveloped in Ukraine. In 2023, property insurance accounted for only 13% of the total insurance market, mostly linked to bank loans rather than real protection against natural disasters. Most insured properties are located in major cities, while high-risk regions have minimal coverage. At the same time, there is effective international experience in integrating insurance programs with climate services. For example, the United States operates the National Flood Insurance Program (NFIP), which uses climate forecasts and risk assessments to determine insurance rates [2]. In Japan, mandatory disaster insurance ensures rapid compensation for affected populations and businesses [3].

Integrating climate services into the insurance sector in Ukraine would improve risk assessment, enable the development of regionally adapted insurance policies, and encourage preventive measures among the population. Additionally, implementing government-backed insurance programs, subsidizing premiums for high-risk regions, and incentivizing private insurers to expand coverage could significantly enhance the situation. To mitigate the negative impacts of floods, it is also crucial to develop alternative compensation mechanisms, such as government support for infrastructure restoration, construction of protective structures, and environmental measures promoting natural water flow regulation.

The development of flood insurance combined with climate services will minimize economic losses and improve regional preparedness for extreme weather events. The use of modern risk assessment and management approaches will contribute to sustainable regional development, reduce socio-economic losses, and enhance public protection.

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