

T7 • Extreme Events and Climate Change: Prevention and Mitigation

1. BACKGROUND

Climate change is fundamentally reshaping the frequency, intensity, and impacts of extreme weather events, making prevention and disaster-risk management central priorities for sustainable development, economic stability, and human security. The Mediterranean region is widely recognized as a climate-change hotspot, warming faster than the global average. According to the Mediterranean Experts on Climate and Environmental Change (MedECC), temperatures in the Mediterranean Basin have already risen by about 1.5°C above pre-industrial levels, compared with roughly 1.2°C globally. These changes are already affecting water availability, agriculture, infrastructure, ecosystems, public health, and human security.

One of the region's defining challenges is the simultaneous experience of water scarcity and excess water. Recurrent droughts, declining water resources, and desertification processes coexist with increasingly severe floods and flash floods, creating complex risks that require urgent integrated adaptation and disaster-risk-management strategies. Across the Mediterranean, the Maghreb, Mashreq, and Balkans face distinct but interconnected climate challenges. North African countries are confronting severe water stress and desertification that threaten food security and rural livelihoods. In the Eastern Mediterranean and Mashreq, prolonged heatwaves, declining water availability, and extreme weather events intersect with rapid urbanization, demographic pressures, and existing socio-political vulnerabilities. Meanwhile, the Balkans are experiencing more frequent floods, wildfires, and temperature extremes that expose infrastructure gaps and test disaster-preparedness systems. Many of these risks transcend national borders, affecting shared river basins, coastal zones, energy networks, migration dynamics, and regional supply chains. As a result, climate-related extreme events are no longer only environmental concerns; they have become strategic policy, security, and development priorities.

Although governments and regional organizations are investing in adaptation, disaster-risk reduction, early-warning systems, and resilience-building measures, important gaps remain in preparedness, prevention, governance coordination, financing, and knowledge sharing. Given the Mediterranean's shared ecosystems, interconnected resources, and common exposure to climate risks, stronger regional cooperation offers a unique opportunity to exchange experience, develop coordinated approaches, and strengthen resilience across the basin.

The Mediterranean's diversity of climatic, socio-economic, and governance contexts makes it a valuable testing ground for innovative adaptation and risk-management solutions with potential relevance beyond the region.

Recent advances in Artificial Intelligence (AI), machine learning, remote sensing, and digital platforms offer unprecedented opportunities to integrate large volumes of hydro-meteorological, environmental, and socio-economic data, improving risk forecasting, early-warning systems, scenario analysis, and decision support for climate adaptation and disaster-risk management. Therefore, the panel will examine how countries of the Maghreb, Mashreq, and Balkans can enhance their capacity to anticipate, prevent, prepare for, respond to, and recover from climate-related extreme events, while building resilience at local, national, and regional levels.

2. KEY CHALLENGES AND OBJECTIVES

The panel's overarching objective is to identify actionable strategies that strengthen the prevention and management of climate-related extreme events through better preparedness, evidence-based decision-making, adaptation measures, financing mechanisms, and regional cooperation. By comparing experiences across the Maghreb, Mashreq, and Balkans, the discussion will seek to generate practical lessons for strengthening the full disaster-risk-management cycle.

Specific objectives are: Identify effective prevention and preparedness strategies, promote science-informed decision-making, exchange adaptation and disaster-risk-management experiences, explore opportunities for regional cooperation and financing, highlight scalable operational solutions.

Challenge 1 • Managing Compound and Cascading Risks

Climate hazards increasingly interact with social, economic, and environmental vulnerabilities. Droughts can intensify wildfire risks; heatwaves can strain energy systems and public health services, and floods can simultaneously disrupt transport, agriculture, and critical infrastructure. Policymakers need integrated approaches capable of anticipating systemic consequences across sectors and territories.

Challenge 2 • Bridging Science and Operational Decision-Making

Climate science, forecasting, and risk assessment have advanced significantly, but translating knowledge into operational decisions remains difficult. Artificial Intelligence, machine learning, and advanced data analytics can improve the integration of satellite observations, weather forecasts, hydrological models, and socio-economic information, enabling more accurate prediction of extreme events, impact assessment, and timely decision-making. Strengthening climate services, AI-enabled forecasting systems, risk communication, and decision-support tools is therefore essential to support prevention, preparedness, and emergency management.

Challenge 3 • Strengthening Prevention, Preparedness, and Early Warning

Many communities remain highly exposed because of insufficient monitoring capacities, fragmented warning systems, limited preparedness, and weak institutional coordination.

Expanding multi-hazard early warning systems and strengthening local and national preparedness are critical for effective risk reduction.

Challenge 4 • Enhancing Regional Cooperation

Shared water resources, transboundary ecosystems, regional energy networks, migration dynamics, and cross-border emergency management mechanisms require stronger cooperation frameworks, knowledge-sharing platforms, and coordinated prevention and response strategies.

Challenge 5 • Overcoming Implementation and Financing Barriers

Many successful adaptation initiatives have demonstrated their effectiveness in reducing the impacts of droughts, floods, and other climate hazards. However, barriers to replication and scaling remain significant. Strengthening institutional capacities, transferring good practices, and improving access to technical and financial resources are essential for wider implementation across the Mediterranean.

3. GUIDING QUESTIONS

- What policy and institutional reforms are needed to shift from reactive disaster response to proactive prevention and risk management?
- How can climate information, Artificial Intelligence, forecasting systems, and digital decision-support tools be better integrated to strengthen prevention, early warning, and operational decision-making?
- How can regional cooperation frameworks strengthen transboundary risk management, resilience financing, and the exchange of knowledge and good practices?

4. EXPECTED OUTCOMES

Outcome 1 • Stronger Integrated Risk Governance

The panel will highlight the need for integrated governance frameworks that connect climate adaptation, civil protection, water management, energy, and development policies, while strengthening cooperation among countries of the Maghreb, Mashreq, and Balkans.

Outcome 2 • Greater Investment in Prevention and Early Warning

The discussion is expected to emphasize that prevention and preparedness are more cost-effective than post-disaster recovery, reinforcing the case for investment in early-warning systems, monitoring networks, resilient infrastructure, nature-based solutions, and community preparedness. The discussion will identify innovative financing mechanisms and investment approaches capable of supporting prevention, preparedness, adaptation, and resilient infrastructure.

Outcome 3 • Improved Science-Based Decision-Making

The discussion is expected to highlight the role of Artificial Intelligence, digital technologies, climate services, and integrated forecasting systems in transforming large and heterogeneous datasets into actionable information for prevention, preparedness, emergency response, and long-term climate adaptation.

Outcome 4 • Promotion of Operational Adaptation Solutions

Through concrete examples, the panel is expected to demonstrate that practical adaptation measures can significantly reduce the social, economic, and environmental impacts of extreme events and identify solutions that can be replicated across the region.

Outcome 5 • Stronger Multi-Stakeholder Partnerships

The panel is expected to reinforce the importance of cooperation among hydro-meteorological services, civil protection authorities, local governments, civil society, the private sector, researchers, insurers, and international donors in designing and implementing effective resilience strategies.