EMS Annual Meeting Abstracts
Vol. 16, EMS2019-961, 2019

How do you act in case of (hydro-meteorological) extreme events and how do you deal with the forecast uncertainty or lack of information?

Pekka Tiainen
Ministry of the Interior, Department for Rescue Services, Finland

"How do you act in case of (hydro-meteorological) extreme events and how do you deal with the forecast uncertainty or lack of information?"

"How do we get the general public and those in authority/responsibility positions to understand that warnings of severe weather and related events require them to act?"

Extreme weather and climate events are getting more and more regular and we are phasing longer heat and rainy periods but also extreme cold temperatures. For civil protection authorities this means new challenges and we need to start preparing for new challenges. Many things for the future preparations we know, but there also things what we do not know. We must apply what we know and acknowledge the gaps in our knowledge, prioritizing ways to understand what we do not yet know. There forecasters and weather services can help us a lot. The starting point of our approach is that no single authority has the capacity to create a comprehensive picture of the vulnerabilities of national preparedness arrangements. Therefore, we need a model where all actors do their share in ensuring resilience. To respond to the changing risk landscape, Finland uses the concept of comprehensive security. In the concept, all stakeholders - authorities, the business community, NGOs and individuals - are important in safeguarding critical functions of society.
The concept is based on an all-hazards, whole-of-government and whole-of-society approach which applies to all natural and man-made emergencies. In the cooperation model, actors share and analyse security information, prepare joint plans and train together. Each administrative branch is responsible for comprehensive security in its own area.

The policies on risk response are turning towards a more adapted risk management approach (Risk = Hazard + Exposure + Vulnerability). This means proper risk (hazard) assessment, proper risk (hazard) mapping and risk (hazard) management plans. Risk management plans should cover all phases of the disaster management cycle (i.e. prevention, preparedness, response and recovery). The emphasis is on prevention and preparedness phases of the cycle. One of the crucial elements prevention and preparedness are efficient Multi Hazard Early Warning Systems (MH-EWS).

The key on the emergency response in front of the weather and climate hazards comes from the fact that we have skills to anticipate them (depending on the hazard, from few hours to months, or seasons in the case of droughts). So the response/emergency management of weather and climate induced hazards can start before the event occurs, what is in fact the crucial aspect that makes them different to other hazards and emergencies in which the anticipation skills doesn't exist (e. g., earthquakes or industrial accidents). Because of the uncertainty in probability, the civil protection and first responder institutions are often times forced to respond once the emergency occurs or the disaster is in place (reactive approach). Reliable and high probability forecast would lover the triggering threshold of authorities. In addition, the information should be more accurate regarding time, location and expected impact (nowcasting). That would support a real-time management of the risk before the emergency occurs.

This anticipation is crucial to reduce the exposure and the real impacts with a good management and communication of the information (and the human reactions). And it is the key to support a more effective and faster pro-active emergency response through the activation of the self-protection protocols of the population at risk, and the deployment of the first responders resources enough time in advance at the location they can be most crucial. Therefore, the management of the response to these weather and climate events should start before their occurrence (proactive approach).

Thus, providing efficient support to emergency management operations should be much more than an advanced monitoring of how the event evolves once initiated (i.e. in the case of a weather induced fire or a flood event). It will require the continuous update of the anticipated evolution of hazards and expected impacts through the integration of innovative technology to transform observations, forecasts and impacts models into real time products and services to support decisions makers. It means that actions that first responders, emergency managers, public and private operators of critical infrastructures and networks, as well as affected citizens, can take to reduce efficiently the exposure and the real impacts.

Early lessons on MH-EWSs highlight that early warning practice can still improve from past experiences and increase its efficiency, at the level of analysis (data collection and risk assessments) and ensuring action (response). National institutions need to exercise strong ownership of the risk assessment and identification steps of the system. There is no single "off-the-shelf" EWS; instead, a variety of practices make the MH-EWS design diverse and context specific (GAR 2019).

In conclusion, to face the challenge of the weather and climate extreme events, it becomes crucial to develop tools to support decision makers in real-time coordination of the emergency management operations capitalizing on the advances in observation systems and in forecasting models able to anticipate the phenomena triggering these events and their impacts.