

The resilience of cities against extreme weather

October 5 2016



Credit: Thesupermat

The frequency and severity of the latest extreme weather events in Europe has raised an alarm urging both local authorities and scientists to act. Part of the solution to counter the devastating effects of floods on

human communities could be long-term climate forecasting, backed by assessments on the vulnerability of towns and cities

As centres of innovation and growth, European cities are home to around 75 percent of the continent's population and use about 80 percent of the energy it produces.

"Because of the concentration of people and economic assets, towns and cities are extremely vulnerable to the impacts of [climate change](#), including impacts on health, infrastructure and quality of life, with the urban poor being the most affected segment of society," says Alessandra Sgobbi, policy officer at the Adaptation Unit of the Directorate-General for Climate Action (DG CLIMA).

Over the past three decades, Europe has seen a 60 percent increase in [extreme weather events](#). One of the most stunning examples comes from Venice: There were 125 events in 2014, compared to only 35 in 1983 and 44 in 1993. Of these, seven were extreme in 2014, compared to only one in 1983.

Moreover, in 2014, flooding and winter storms caused an estimated €20 billion in disruption to the economy in the UK alone, while damage by the flash floods in Genoa amounted to €100 million.

"Human action is often the culprit when cities are vulnerable to these phenomena, examples being poor planning or building design in risk-prone areas," adds Sgobbi.

Experts estimate that, unless action is taken now, the economic costs to E.U. cities could exceed €190 billion annually by 2070.

In France, 23 urban areas have over 100,000 inhabitants settled in flood zones. "Cities represent the biggest stakes, but every community has its

specific means to manage the risk and some are better prepared than others," says Yann Eglin, risk management engineer at the National Research Institute of Science and Technology for Environment and Agriculture (IRSTEA) in France.

Paris was one of the French cities that suffered considerable damage after heavy rainfalls in early June 2016. Electricity grids, the basement of Louvre museum, part of the metro system and rail lines were affected.

"Whenever there is flooding, rescue teams need to know all the points where water may enter into the underground transport network so that they can deploy devices to protect station entrances, air vents and any other duct likely to let water in," says Charles Perrin, hydrologist at IRSTEA.

Scientists stress the need for planning and preparation to avoid wasting time when a flood alert is issued. "A well-anticipated crisis can often mean that many lives and properties are saved. Preparing the return to normality is equally important. This is what makes a city resilient," says Eglin.

The scientific community is trying to come up with the necessary mechanisms to protect against severe weather conditions. In this context, European researchers and experts are working on a project called RAIN, focused on developing a series of mitigation tools to enhance the security of the pan-European infrastructure networks, such as transport, energy and telecommunication systems. The Helsinki floods of 2005 are one of their case-studies.

"An important step is to be able to carry out long-term risk assessments, scenario analysis and forecasting. This will help planning and implementation processes and allow us to develop a comprehensive

picture of current and future climate change risks while managing the associated uncertainty," says Beatriz Yordi, head of the Adaptation Unit in the DG Climate Action.

At the prevention level, scientists must make sure that the forecasting tools are adapted to the potential changes in rivers and seas. At the mitigation level, decision makers need to determine how the climate interacts with socio-economic factors, including changes in urbanisation and demographics.

Provided by Youris.com

Citation: The resilience of cities against extreme weather (2016, October 5) retrieved 17 April 2024 from <https://phys.org/news/2016-10-resilience-cities-extreme-weather.html>

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