Scientists are developing methods and tools that look at multiple natural hazards

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Multiple disasters can have a cumulative impact leading to great human and financial loss. The awareness of all possible risks is of fundamental importance. A good example is the extent of the damage caused by the Kobe earthquake that hit Japan in April 2001. "They basically designed buildings to withstand typhoons, but not earthquakes which have opposite engineering requirements; a rigid structure versus a flexible structure," says Kevin Fleming, a researcher at GFZ, the German research centre for geosciences, in Potsdam, "and not considering all the interactions is at best inefficient and at worst counter-productive."

Fleming is also the project manager of the EU-funded MATRIX research project. It aims at developing methods and tools that look at multiple natural hazards and how they interact. Besides earthquakes and tsunamis, the multiple hazards include volcanoes, landslides, wildfires, draughts, cyclones, coastal submersions, river flooding, and storms. One of their centres of interest is the so-called cascade effects. The earthquake that triggered a tsunami in Japan in 2001 is a classic example. The project researchers also investigate how given events can impact upon the environment, making it more vulnerable to future events.

The study focuses on case studies in three locations, Naples, Italy, Guadeloupe, France, and Cologne, Germany. "We found that adopting a multi-type approach is very useful at a very fundamental level in the community. I mean everyone, the policeman should talk to the fire brigade, talk to the parish priest, whoever... We learned to look not only at direct losses, such as how many people died, numbers of cars lost, but at indirect losses, such as reputation, or the destruction of social structure," Flemins tells youris.com.

And the project also includes a virtual city, which is a subset of the project shared IT system shared, called MATRIX CITY. "It is a framework for evaluating multiple risks and improving the analysis of uncertainties and their propagation of throughout the whole risk chain," says Fleming. However, this tool will need further development in order to make it a tool suitable for researchers and stakeholders. "We are not solving all the problems, but it is a start," he adds.

Some experts agree that the project multi-risk approach is promising. But it will have to be explored for rural areas as well, according to Colin McQuinstan, a disaster risk reduction expert at Practical Action, an international non-governmental organisation fighting poverty based in Rugby, UK. While cities have to take into account evacuation plans

using mass transit, rural areas can be affected by the absence of infrastructure to reach remote areas quickly.

However, the scope of such research programs, which is essentially designed to be used in a European context, may not easily be widened to the developing world. "Africa is too poor to use a sophisticated methodology that requires high-resolution data," comments Guy Weets, an independent consultant based in Belgium, and scientific coordinator of the CLUVA project. Whereas some of these scientific approaches are drowned out by these countries' primary concern: poverty, argues Weets. "To divert large amounts of money to divert possible catastrophic events with a return frequency of 20 years, compared to the pressing needs of poverty, health care, and so on... [is] no way to convince the stake holders," concludes Weets.

More information: matrix.gpi.kit.edu/

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