European Commission

Science for Environment Policy

Flood strategies could be improved with help of socio-demographic data

Flood management could be improved by including socio-demographic information in the assessment of flood risk, suggests new research. The research combined traditional flood risk assessment with information on the 'social vulnerability' of people living in flood risk areas. The results show that there are almost twice as many people of high social vulnerability (e.g. low-income or elderly) in flood risk areas of Rotterdam as low social vulnerability people.

19 March 2015
Issue 408

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Source: Koks, E.E., Jongman, B., Husby, T.G., Botzen, W.J.W. (2014). Combining hazard, exposure and social vulnerability to provide lessons for flood risk management. *Environmental Science and Policy* 47: 42–52. DOI:10.1016/j.envsci.2014.10.013.

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Read more about: Natural hazards, Risk assessment, Water

Flood risk assessments are used by policy and decision makers to select between different flood risk management strategies, such as physical defences (e.g. sandbags or embankments), as well as non-physical measures, such as encouraging homeowners and businesses to purchase flood insurance. However, the effectiveness of policy measures to reduce flood risk also depends on the ability of households to respond to floods.

In this study, traditional flood risk assessment methods were combined with an assessment of social vulnerability. 'Social vulnerability' is a measure of the ability of people or social groups to withstand adverse events, such as natural disasters. People such as the elderly, unemployed and those with a low income are typically more socially vulnerable as they may have a lower ability or fewer resources to cope with disasters.

As such, the social characteristics of households in areas exposed to flooding can be considered important to the feasibility of flood risk management policies. However, they are not usually considered in traditional flood risk assessment.

The researchers assessed flood risk using socio-demographic information from Rotterdam in the Netherlands as a case study. They used freely available socio-demographic data from the Dutch Central Bureau for statistics, based on a postcode system. This information was then combined with data on the geographic co-ordinates of the postcodes, allowing them to be combined with information of flood hazard zones.

The methodology was applied to Rotterdam for present day flood risk and a future scenario, based on climate change projection for the year 2050 (derived from the Dutch KNMI'06 climate change scenarios).

The results showed that there were twice as many households in a high social vulnerability category in flood-prone areas as there were people of low social vulnerability. In un-embanked areas, which have less physical protection from flooding, high social vulnerability households constituted 20% of the population, compared with just 6% for low social vulnerability households.

The analysis of future risk showed that there could be a 6% increase in the number of high social vulnerability households, and a 2% increase in low social vulnerability households in un-embanked areas.

Groups of either high or low social vulnerability tended to cluster together, suggesting a degree of segregation in the study areas and therefore exposure to flood risk.

The study's authors say that this approach allows a more detailed assessment of flood risk management strategies, which moves beyond cost-benefit analysis and enables more effective, equitable and acceptable risk management strategies.

For example, elderly people are less able to rapidly place sandbags in front of their houses to protect them from water. As such, the researchers suggest that neighbourhoods with a large elderly population may be better protected by infrastructural measures – rather than relying on individual mitigation measures.

Additionally, people with a low income are less able to afford flood insurance, which limits their ability to recover from a flood event. Social vulnerability information could be used to overcome this by targeting subsidy and voucher programmes at locations with higher levels of social vulnerability.

The authors conclude that incorporating a social vulnerability assessment into flood risk management could help tailor strategies to local differences.