

Science for Environment Policy

Coastal flooding: failing to adapt is not an option, says study

Climate change will lead to an increased risk of flooding and huge economic losses if countries do not invest in appropriate adaptation measures, according to a new study. The research estimates the risks posed by flooding to cities around the world and the associated economic losses in 2005 and 2050, and suggests that flood protection must be increased to maintain the same level of risk to coastal cities.

Annual economic losses due to **flooding** were estimated by the researchers for 136 coastal port cities, including 18 EU cities. Based on 2005 data, they estimated current total losses to be US \$6 billion (€4.4 billion) per year. They then forecasted losses for the year 2050, for various future climate change and adaptation scenarios.

Based on socioeconomic change alone, losses due to flooding were estimated to reach US \$52 billion (€38 billion) by 2050, but could climb to US \$1 trillion (€740 billion) without climate change adaptation measures, when the effects of climate change and subsidence were accounted for in the calculations. If investments in adaptation could maintain coastal protections at their current levels, losses in 2050 could be limited to US \$60-63 billion (€44-46 billion) per year.

The study also lists the 20 most vulnerable coastal port cities in terms of current and future flooding losses. The top 20 consists mostly of cities in developing countries, where flood protection is poor. The majority are in Asia, and no European cities appear in this list. However, three cities in the southern US appear in the top four because they are both wealthy, so stand to lose more, and poorly protected. The city at the top of the list is Guangzhou, China.

Together, these four cities account for 43% of global economic losses caused by coastal flooding. Annual losses for Guangzhou are estimated at US \$687 million (€507 million) in 2005, and over \$13 billion (€10 billion) in 2050 – 1.32% of its GDP in both cases. The future scenario assumes an optimistic situation for sea level rise and investments in adaptations that maintain a similar likelihood of flooding.

However, five European cities appear on a separate list of the cities that will experience the greatest increases in economic losses due to flooding between 2005 and 2050: Marseille, Napoli, Athens, Istanbul and Izmir. When the top 20 cities with the greatest expected increases in losses are mapped, hotspots appear in the Mediterranean Basin, the Gulf of Mexico and East Asia.

According to the authors, although there are uncertainties in their analysis, there are three broad conclusions that can be drawn from the study:

- 1) Failing to adapt is not an option, particularly as the cost of adaptation is far lower than the damage costs that could be incurred without adaptation.
- 2) Maintaining the same level of risk posed by coastal flooding requires increasing protection above current levels.
- 3) Even if flood risk is maintained or reduced, losses from floods that do occur will increase.

They recommend investing in mitigation measures, including disaster planning, insurance schemes and post-disaster response.

In the EU, the Floods Directive¹ requires Member States to assess flood risks for all water courses and coastlines, and take measures to reduce flood risks. In addition, the EC's initiative on marine spatial planning and integrated coastal management² requires the establishment of coastal management strategies to protect against future threats to coastal areas, including climate change and flooding.



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1. http://ec.europa.eu/environment/water/flood_risk/index.htm

2. <http://ec.europa.eu/environment/iczm/home.htm>