Socio-economic resilience to natural disasters

A tool for risk-informed development planning applied to Mumbai

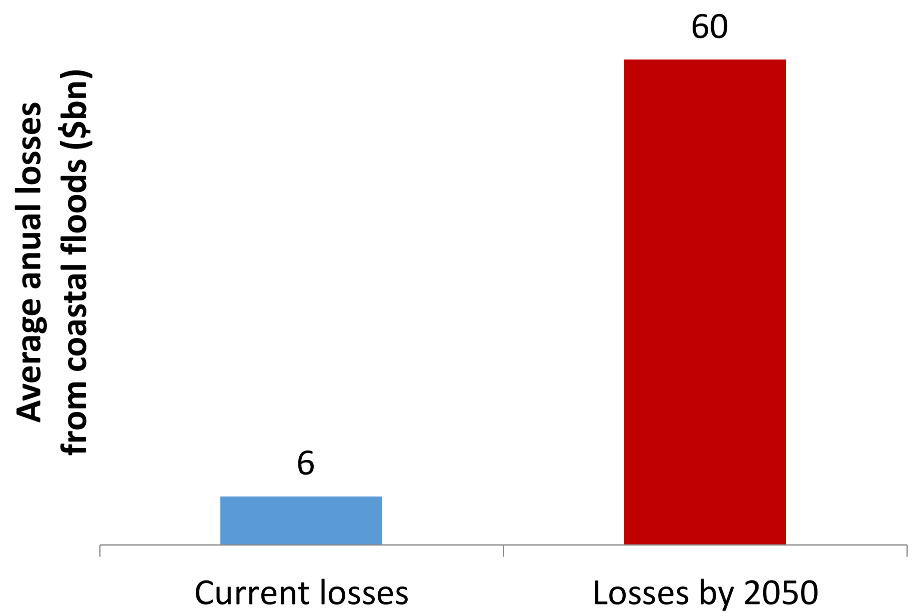
Stephane Hallegatte, Mook Bangalore, Adrien Vogt-Schilb

WORLD BANK GROUP
Climate Change

Photo: AP

Asset losses due to flood are increasing.
What can we do to reduce resulting welfare losses?

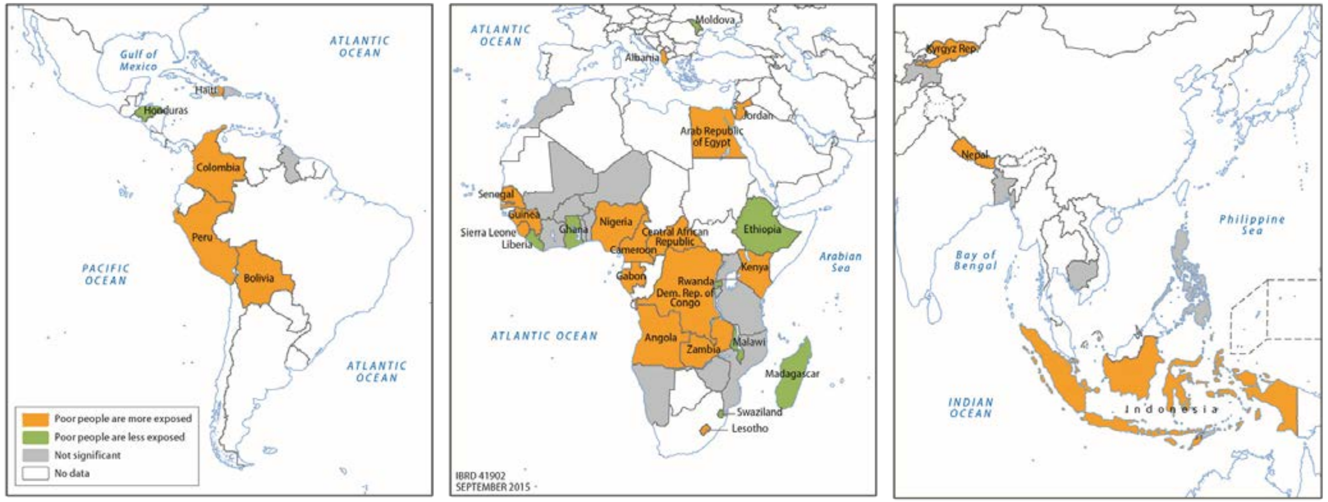
Economic growth, urbanization, subsidence and climate change can dramatically increase losses in coastal cities



Hallegatte, Stephane, et al. "Future flood losses in major coastal cities." *Nature climate change* 3.9 (2013): 802-806.

Welfare losses will depend on local socio-economic capacity

Poor people are often **more exposed** to natural disasters such as urban floods



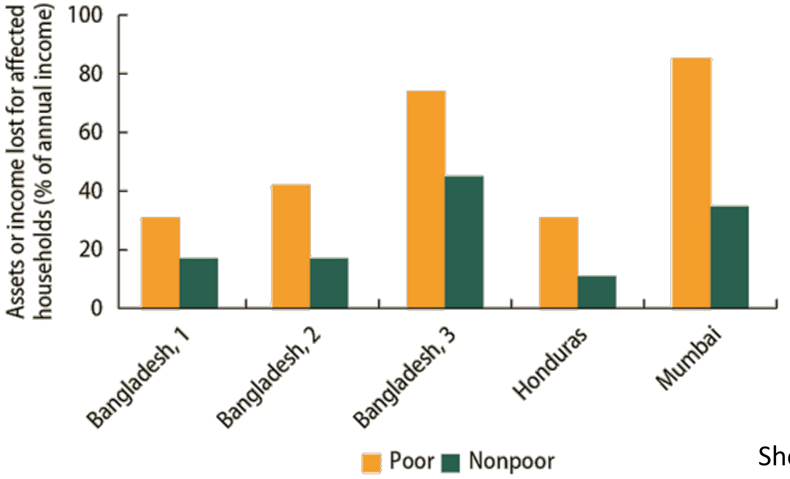
Shock Waves report

Poor people have access to **less support to cope**

	Poor	Non-poor
Saved at a financial institution (%)	8%	21%
Average transfer from social protection and remittances ($/day)	$0.5/day	$2/day

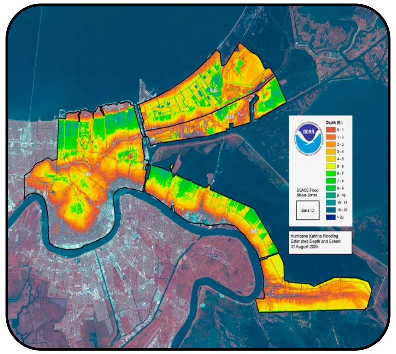
Data for Indonesia from FINDEX and ASPIRE

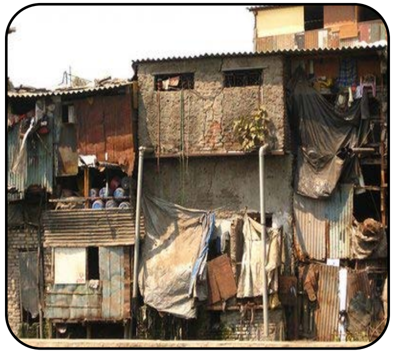
Poor people **are more vulnerable** – they lose more when they are affected



Shock Waves report

The **socio-economic resilience tool** combines information on **risk and socio-economic factors**





Hazard

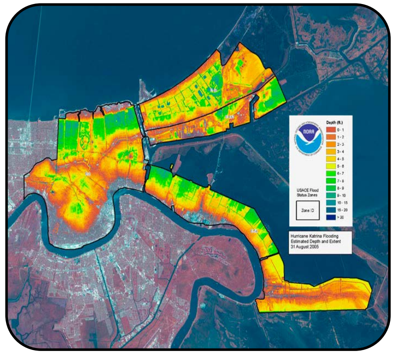
Exposure

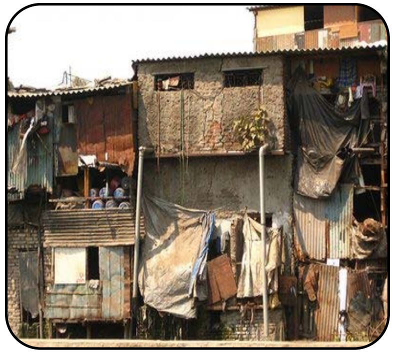
Vulnerability

Coping capacity

Asset losses

The **socio-economic resilience tool** combines information on **risk and socio-economic factors**





Hazard

Exposure
(poor people)

Exposure
(non-poor people)

Vulnerability
(Poor people)

Vulnerability
(non-poor people)

Coping capacity
(poor people)

Coping capacity
(non-poor people)

Asset losses

Welfare losses

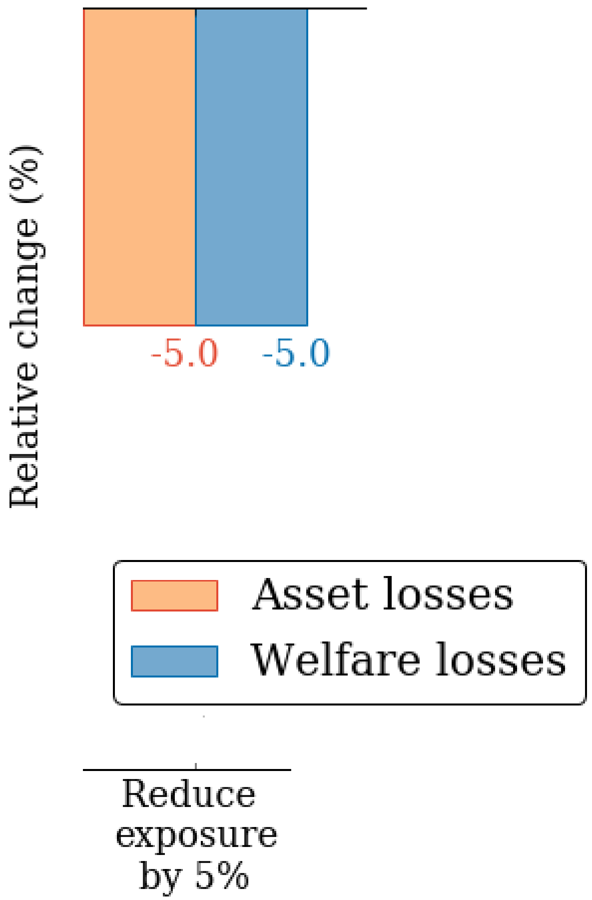
Application to the 2005 floods in Mumbai

Total **asset losses: Rs. 35 bn**

- **Poor people** were **disproportionally affected** (39% vs 18%)
- **Poor people lost relatively more** (13% of income versus 9% of income)
- **Ex-post support was limited** to about 10% of losses

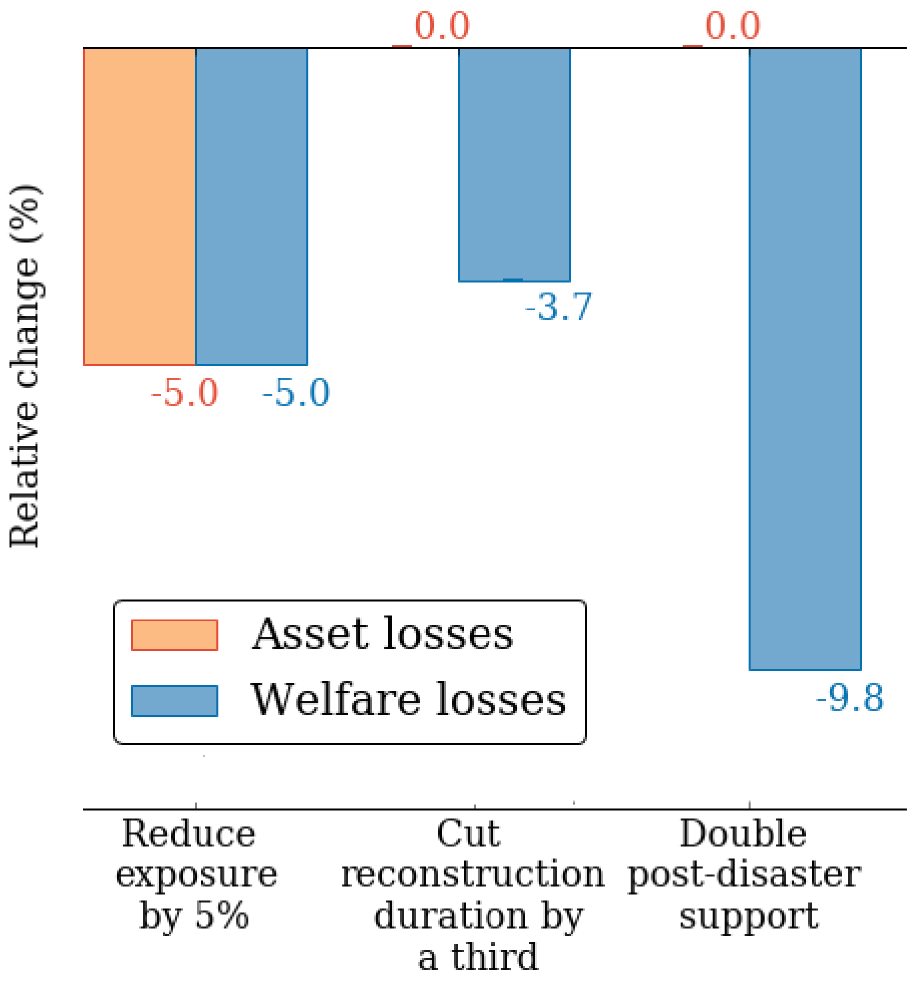
➔ Estimated **welfare losses are much higher: Rs. 60 bn**

What can we do to reduce welfare losses in Mumbai?



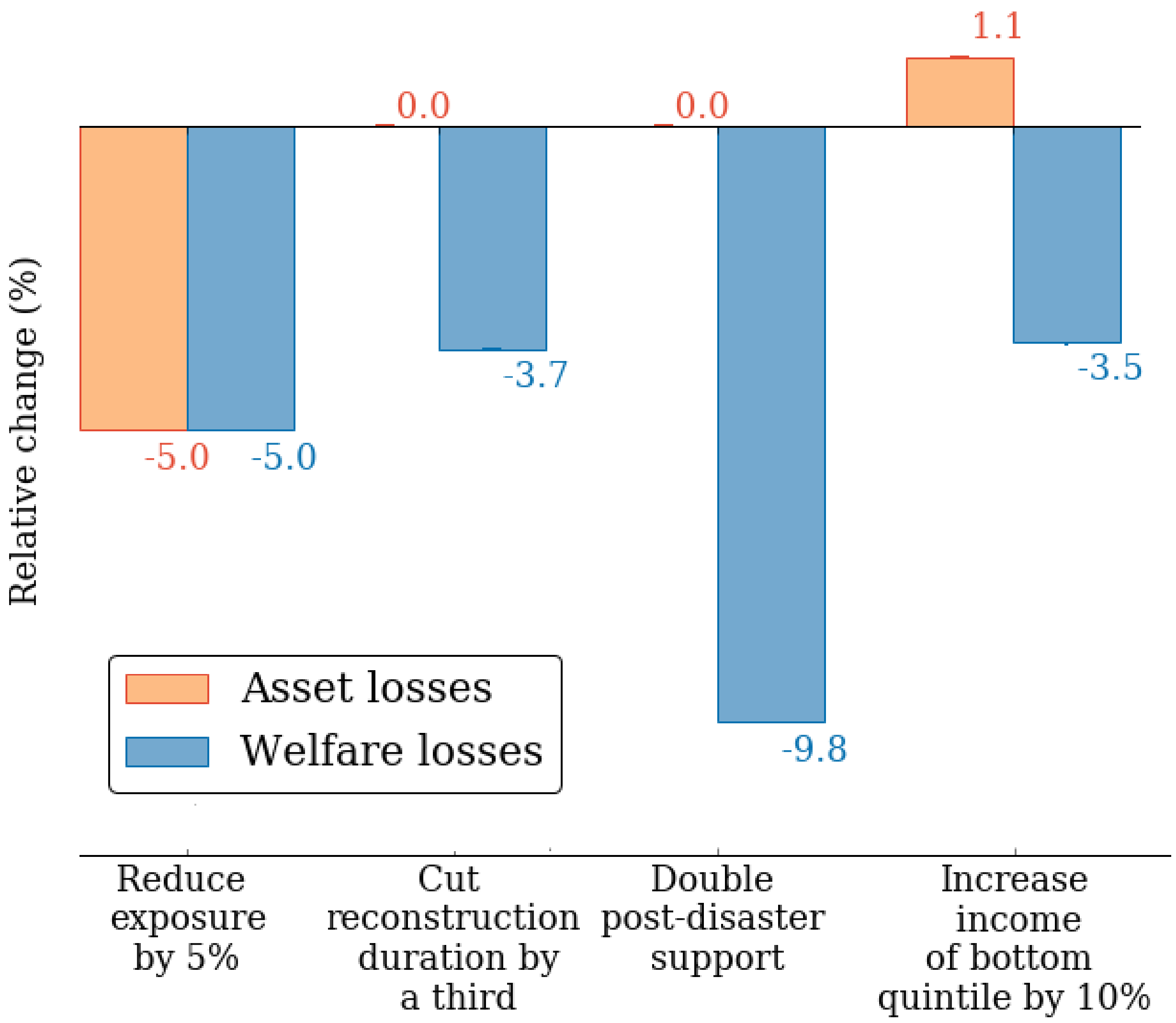
Welfare losses can be reduced *by* reducing asset losses

What can we do to reduce welfare losses in Mumbai?



Facilitating recovery can reduce welfare losses from *unchanged asset losses*

What can we do to reduce welfare losses in Mumbai?



More asset losses does not necessarily mean more welfare losses: what drives asset losses matters.