Socio-economic resilience to natural disasters
a framework for risk-informed development planning
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The World Bank
Project A
Costs $100 million
Prevents on average $20 million of losses per years

Project B
Costs $90 million
Prevents on average $5 million of losses per years
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Prevents on average $20 million
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THANKS!
Usual risk assessment combines hazard, exposure and vulnerability of assets...
Poor people are often more exposed to these shocks
take the case of Nigeria

Poor people are 50% more likely to be flooded

Poor people are 130% more likely to be affected by a drought

Poor people are 80% more likely to be affected by extreme heat

Poor people are losing more than they are affected

And poor people receive less support after shocks and disasters
Usual risk assessment combines hazard, exposure and vulnerability of assets...
And we account for the specific situation of the poor, to calculate the welfare losses due to disasters.

\[
\text{Socio-economic resilience} = \frac{\text{Asset losses}}{\text{Welfare losses}}
\]
• If resilience is 100%, losing $1 in a disaster has the same effect on well-being as a decrease in GDP by $1, equally distributed in the population.

• If resilience is 50%, losing $1 in a disaster has the same effect on well-being as a decrease in GDP by $2, equally distributed in the population.
Data sources used for the global application

**Hazard**
- Flood level from GLOFRIS global model
- Protections using global database FLOPROS

**Exposure**
- Localization of people and assets based on Landscan global data
- Case study results for the over-exposure of poor people (WB Shock Waves report)

**Asset vulnerability**
- Housing quality based on USGS/PAGER global database and simple vulnerability functions
- Early warning (from HFA) reduces losses

**Impact on income**
- Diversification of income through transfers (from ASPIRE and others)
- Link between assets and income, using average capital productivity (PWT)
- Simple assumption for the duration of reconstruction

**Coping capacity and social protection**
- Scale-up of social protection, based on credit ratings and HFA monitor
- Financial inclusion from FINDEX
- Access to education and health and employment opportunity (WDI)

**Impact on welfare**
- Marginal utility of consumption ($\eta=1.5$)
- Share of income of bottom quintile (WDI)
- Poverty traps modeled as life-long reduced earning
Assessment of risk and resilience to floods in 116 countries...
In Germany, losing $1 in a disaster has the same effect on well-being as a decrease in GDP by about $1.2.

In Malawi, losing $1 in a disaster has the same effect on well-being as a decrease in GDP by $2.
Application to the Philippines at the provincial level

Risk to assets

Socio-economic resilience

Risk to welfare
Assessing policy and project benefits in welfare terms

Maguindanao

- Protection (+1 yr) 290
- Exposure of poor households (-1%)
- Asset vulnerability for poor households (+1%)
- Exposure of nonpoor households (-1%)
- Share of risk transferred nationally (+1%)
- Income of poor families (+1%)
- Poverty incidence (-1%)
- Reactivity to early-warnings (+1%)
- Scale-up of social protection for poor households (+1%)
- Average income in the province (+1%)
- Social protection for poor households (+1%)
- Asset vulnerability for nonpoor households (+1%)
- Access to early warning (+1%)
- Scale-up of social protection for nonpoor households (+1%)
- Social protection for nonpoor households (+1%)

Effect on welfare losses
Effect on asset losses

百万比索/年
Assessing policy and project benefits in welfare terms

Some policies and projects can reduce welfare losses by reducing asset losses...
Assessing policy and project benefits in welfare terms

Other policies leave asset losses unchanged, but they decrease resulting welfare losses by building socio-economic capacity.
Assessing policy and project benefits in welfare terms

Finally, some policies increase asset losses, but they increase capacity even more, and ultimately reduce welfare losses.

In all cases, we find that reducing poverty increases asset losses, but decreases welfare losses.
Disaster losses are increasing. But it does not mean that the impact on well-being is increasing.