Centre for Climate Change Economics and Policy

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Economic benefits of disaster risk reduction and adaptation: are we too loss-centric?

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In collaboration with GFDRR/Worldbank and Overseas Development Institute

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The line of argument

- Disaster losses are hampering economic development and growth.
- Global awareness and responsiveness to these damages is also increasing – mainly on the recovery side.
- Insufficient investments are made in disaster risk management (DRM).
- Co-benefits of DRM expenditure are either unknown or under-valued.

Hypothesis:

- these full benefits represent a 'resilience dividend' for incentivizing DRM investments

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A perspective 'beyond losses'

	No extreme event	Yes, extreme event
No DRM investment	1. No risk reduction, got lucky	2. Highest regrets, highest costs
Yes, DRM investment	3. Low regrets (when full benefits are included)	4. No regrets

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Initial research objectives

- Research the understanding the full benefits of investments in disaster risk management (DRM).
- Explore methods including CBA.
- Present evidence on the full economic benefits (or otherwise) of investments in DRM at different scales.
- Examine how such information can be integrated with the concerns and incentives of key decision-makers regarding DRM and its position in the economy.
- Provide evidence to governments that will incentivize them to focus more attention and investment on ex ante DRM than on disaster recovery.

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The wider benefits of DRM/CA

- wider benefits of expenditures: independent from the occurrence of a loss (no regret measure)
- Positive externalities / spillovers
- Examples:
  - macro-economic growth,
  - fiscal flows,
  - investment climates for wider foreign and domestic investment,
  - skills
  - health,
  - helping poor households creating pathways out of poverty,
  - social cohesion and stability,
  - improving environmental management
-

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Types of economic benefit I

Type of economic benefit	Metrics	Examples of assessments
Narrow loss centric		
Reduced economic costs of a disaster at national level	GDP, employment, poverty level, foreign investment; national budget/tax revenue	• CatSim probabilistic tools (Hochrainer et al., 2013) – such as examination of the benefits and costs of improving or retrofitting residential structures in four highly exposed developing countries • Inter-American Development Bank Disaster Deficit Index (IADB, 2008) • Empirical analysis of the effects of climate hazards on national-level economic growth (Brown et al., 2013) • An assessment of the potential impact of climate change on flood risk in Mumbai (Ranger et al.,2011)
Project- level loss reduction	Local flood defenses; property –level resilience measures	• Protective benefits related mainly to the raising of house plinths (IFRC, 2012) • 'Developing the evidence base for flood resilience at property level' - based on a new economic model to quantify the costs and benefits of resilience and resistance at a property level (Thurston, 2008).
Saved post-disaster aid	Avoidance of the humanitarian consequences of a disaster	• A cost benefit analysis of Self Help Groups in Ethiopia (Tearfund, 2013)

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Types of economic benefit II

Co-benefits beyond losses		
Direct and extended economic benefits	Economic benefits unrelated to the occurrence of a loss, arising from the DRR activity. The value of the provision of services such as water, electricity and shelter/ the value of the improving women's involvement within communities.	• A dam to prevent flooding also generating hydroelectricity (Benson and Twigg, 2007) • Boats are provided for evacuation purposes but in times outside flood events the boats are used as fishing vessels, generating income (Cabot Venton and Venton, 2004; Tearfund, 2013 p.35)
Broader development benefits	Supporting efforts to alleviate poverty / opening up earning opportunities	• Investments in disaster risk reduction can yield long-term development benefits, including progress on the Millennium Development Goals (UN, 2010)

Table 2: Types of benefits resulting from disaster risk reduction measures - sources: Australian Government, 2009; Benson and Twigg, 2007; Cabot Venton et al., 2012; Escaleras and Register, 2011; Hallegatte and Przyluski, 2010; Kousky, 2012; ERM, 2005.

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Appraisal methods for adaptation

- Cost-benefit-analysis: Most common approach, can take different forms such as scenario-based CBA (Defra, 2013) and probabilistic CBA (Hochrainer et al., 2013).
- Multi-Criteria Analysis: Qualitative based approach with ranked initiatives for both financial and non-financial criteria (DCLG, 2009).
- Cost-Effectiveness Analysis: Quantitative approach for the policy option that provides a specific output at the lowest cost.
- Robust Decision Making: Quantitative approach assessing all proposed initiatives and identifies the most robust. (Groves and Lempert 2007)
- Real Options Analysis: Estimates the 'value of the option' for each initiative
- Vulnerability and Capacity Assessment: assesses the characteristics of a community in relation to their vulnerability through participatory tools to aid disaster preparedness programmes.
- Monitoring and Evaluating: A mixed-methods approach building from available data, stakeholder groups and historical trends.
- 'toolkit': hosts a range of evaluation methods (Berger and Chambwera, 2010)

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Examples from other areas

- Amann (2006) reviews different methods used to evaluate non-energy benefits of home retrofitting programs.
- Saez et al., (1998) measure the external benefits of building a biomass plant.
- the co-benefits arising from public infrastructure investment (Cohen and Paul 2005)

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The question of scale

- **local or project level**: the benefit is directly linked to a certain location where the DRM measure is implemented,
- **national level:** an aggregate, macro-economic view is applied, considering the implications on GDP, national employment, federal budgets or poverty reduction efforts.

- **substitution effects:** investment does not show benefits nationally. Job creation and growth impact of DRM investment could just be a sign of reallocation of resources from another productive investment opportunity

- Example: flood and coastal erosion risk management in England, where the government is trying to "*identify the factors affecting the extent to which individual capital investments (schemes) are likely to lead to a net additional Gross Value Added (GVA) and employment impact at the national level*" (Defra, 2013).

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