Assessing our Coastal Green Infrastructure Investment Allocation: A Coastal Portfolio Check-up

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Reef conservation
Reefs for coastal defense
People and infrastructure at risk
Global coastal spending
2004-2013

Mangroves act as natural defenses that protect people and property from storms, reducing coastal risk. Yet the benefits are often not fully accounted for in policy and management decisions, and mangroves continue to be lost.

This work rigorously values the coastal protection benefits provided by mangroves socially and economically. By identifying where these natural coastal defenses provide the greatest flood reduction benefits, this work informs policies for adaptation, sustainable development, and environmental restoration.

Key Points

- This work uses rigorous hydrodynamic and economic models to identify where mangroves provide the greatest benefits worldwide.
- Mangroves reduce annual flooding to people by more than 50%, providing benefits to more than 17 million people every year.
- Mangroves reduce annual property damages by more than 24%, with an annual value of more than US $82 billion.
- Vietnam, India, China, Bangladesh, and the Philippines have the greatest number of people receiving annual flood reduction benefits from mangroves.
- China, USA, India, Mexico, and Vietnam receive the greatest annual avoided damages to property from mangroves.
- Mangroves can reduce social vulnerability as measured by the World Risk Index. The countries that receive the greatest risk reduction benefits from mangroves are Guyana, Mozambique, Belize, Guinea-Bissau, and Suriname.
- Mangrove restoration can be a highly cost-effective strategy for risk reduction. Hundreds of thousands of hectares have already been restored.
- These results can inform strategies for adaptation, risk reduction, and environmental management, and the development of innovative finance tools that use the risk reduction benefits of mangroves to pay for their restoration.

This work was produced through a collaboration between The Nature Conservancy (M. W. Beck, S. Narayan, D. Trespalacios), The Environmental Hydraulics Institute of Cantabria (I. J. Losada, S. Torres, P. Menéndez, P. Díaz-Simal, A. Espejo), and the Bündnis Entwicklung Hilft (P. Mucke).

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Global coastal spending
2004-2013

Source: MunichRe

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Global coastal spending
2004-2013

Funding amount (2011 $US 1 bil.)

Uninsured
Insured

Storm losses
International infrastructure aid

Source: MunichRe
Source: AidData

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Global coastal spending
2004-2013

International aid for coastal infrastructure

- World Bank: 68%
- Other: 32%

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Gray infrastructure solutions

Seawall (gray infrastructure) in Grenada, Grenada. © Marjo Aho for The Nature Conservancy
Degraded ecosystems

Waves with degraded coastal habitats.

Healthy ecosystems = Natural Infrastructure

Waves decreased with healthy coastal habitats.
Natural Infrastructure: Reefs

Effects of Reefs on Flood Reduction

Avoided Flood Damage in $M/20\ km$ coastline

Natural Infrastructure: Mangroves

Mangroves in the Philippines: Annual Expected Benefits

- People Flooded (Millions):
  - With mangroves: 2.5
  - Without mangroves: 3
  - Increase: 24%

- Property Damaged (Billions US $):
  - With mangroves: 3.5
  - Without mangroves: 5
  - Increase: 28%

High Resolution Flood Mapping in the Philippines

Flood Height – Tropical Cyclone (1 in 50 year event)

Current Mangroves

No Mangroves

Global coastal spending
2004-2013

Funding amount (2011 $US 1 bil.)

- **Uninsured**
- **Insured**

- Storm losses
- International infrastructure aid
- Conservation & restoration

Source: MunichRe

Source: AidData

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2004-2013

Funding amount (2011 $US 1 bil.)

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  - Insured
  - Uninsured

- International infrastructure aid

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Source:
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- AidData

Global coastal spending
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International aid for coastal infrastructure

- GEF: 47%
- World Bank: 24%
- Other: 29%

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Implications and Opportunities

• Include Nature in Industry Risk Models
• Pre- and post-disaster spending
• Private incentives- Insurance, Resilience Bonds
• Public incentives- Pre- and Post- disaster spending from public and government sources
• Prioritizing Natural Infrastructure in Policy Decisions

Photo credit: Jim Wright/LightHawk/TNC
Hurricane Sandy
Recommendations to ICRI

Increase global investment and develop innovative funding mechanisms;
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ICRI Members promote conservation and restoration
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ICRI Members promote conservation and restoration

Strengthen partnerships
Thank you

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