

LIFELINES

The Resilient Infrastructure Opportunity





Resilient Infrastructure?

Resilient Infrastructure?

A long, straight road stretching into the distance under a cloudy sky. The road is flanked by a concrete guardrail on the left and a metal railing on the right. Streetlights are visible along the road. The background shows a flat landscape with some distant structures and utility poles.

assets

Resilience of infrastructure *assets*

Resilient infrastructure is less costly to maintain and repair

Resilient Infrastructure?



services

assets

Resilience of infrastructure *services*

Resilient infrastructure provides more reliable services

Resilient Infrastructure?



users

services

assets

Resilience of infrastructure *users*

Resilient infrastructure makes people better able to cope with and recover from shocks

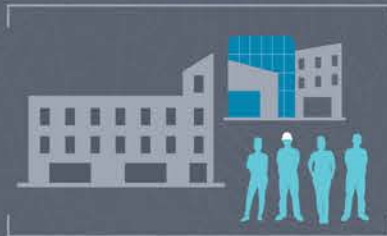
Natural Shocks



Infrastructure



Firms



People





People wait in line for water after the 2010 earthquake in Port au Prince, Haiti.



A traffic jam after flooding
in Chiangrai, Thailand



Diagnosis



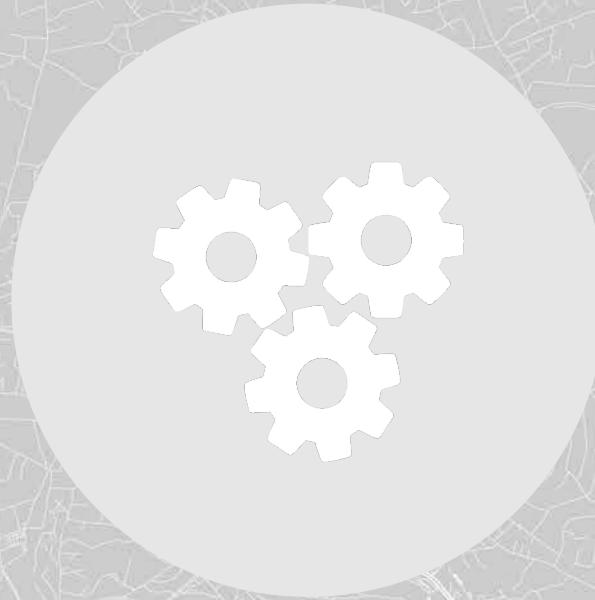
Solutions



Recommendations



Diagnosis



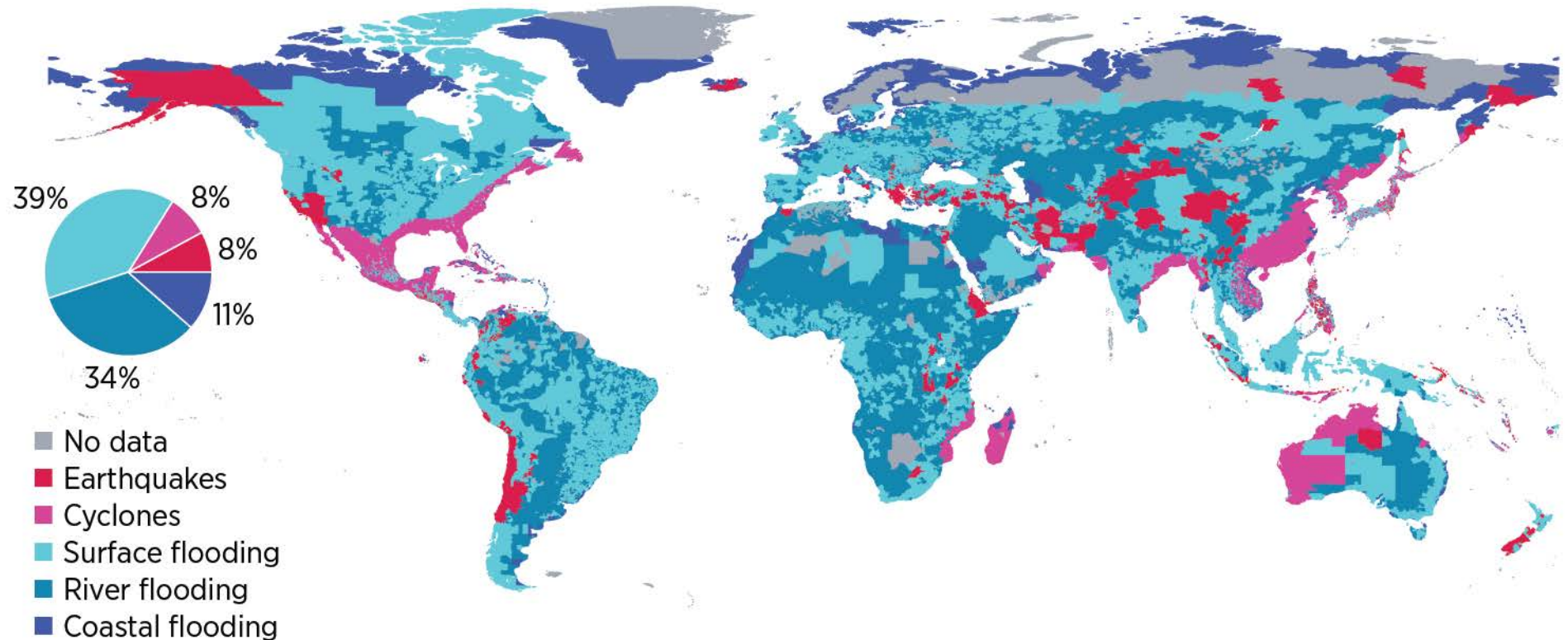
Solutions



Recommendations

The lack of resilient infrastructure is harming people and firms

Damages and repair costs are significant ...



\$30 billion

Annual global damages to transport and power generation

\$18 billion

Annual damages to low- and middle-income countries

... but repairs are only part of the problem.

\$391–\$647 billion

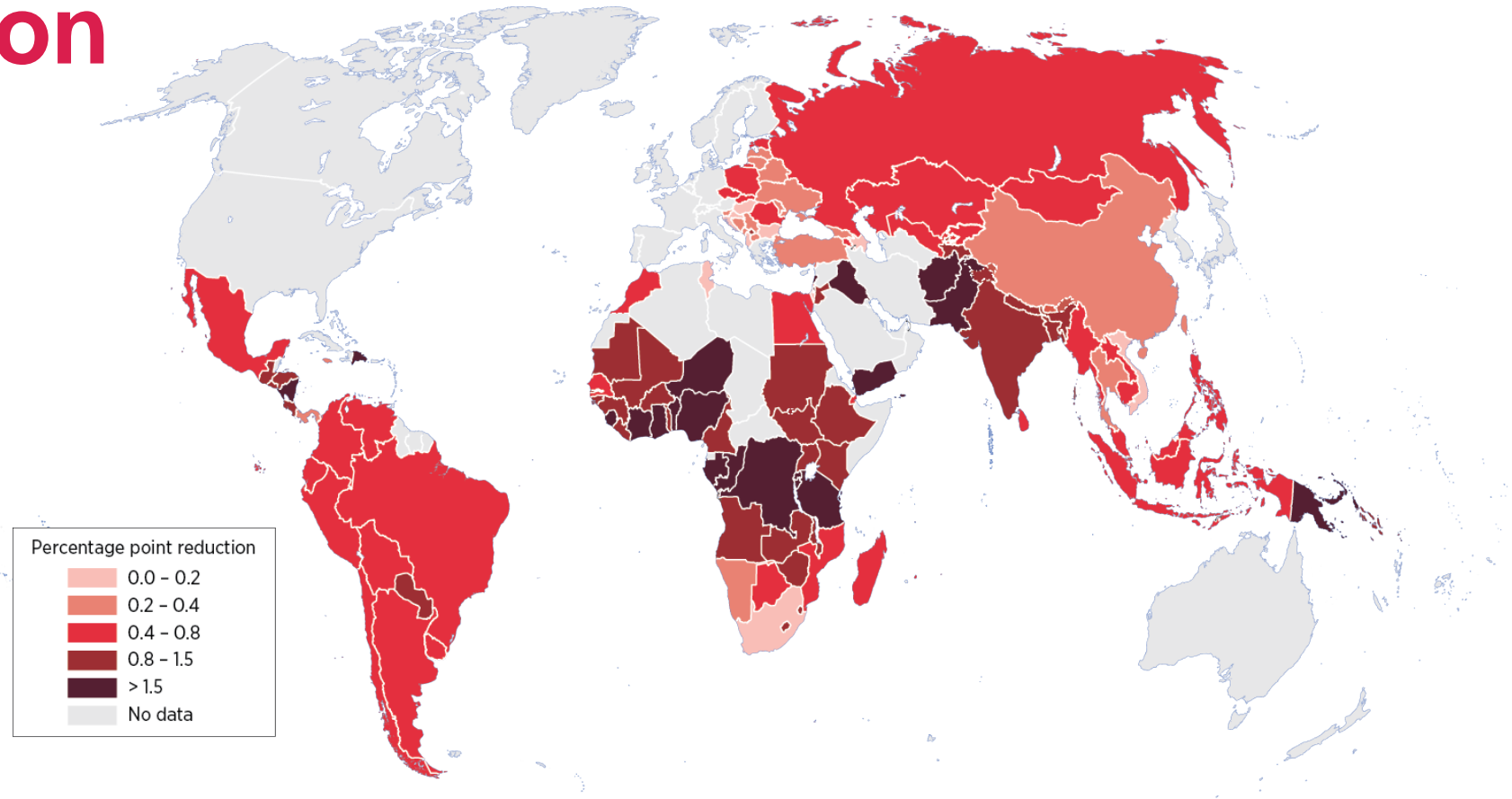
The annual cost of infrastructure disruptions on households and firms in developing countries.

Firms

- Reduced utilization rate (\$151 billion)
- Lost sales (\$82 billion)
- Self-generation costs (\$65 billion)
- Increased inventories
- More expensive localization choices
- Higher barriers for entry of new firms
- Less competition and innovation
- Labor-biased technologies

Household

- Willingness-to-pay (\$90–\$343 billion)
- Health expenditures (\$3–\$6 billion)
- Income impact and gender implications





Diagnosis



Solutions



Recommendations

Investing in more resilient infrastructure is sound, profitable, and urgent



Quality infrastructure

Resilience of infrastructure *users*

Resilient infrastructure makes people better able to cope with and recover from shocks

Resilience of infrastructure *services*

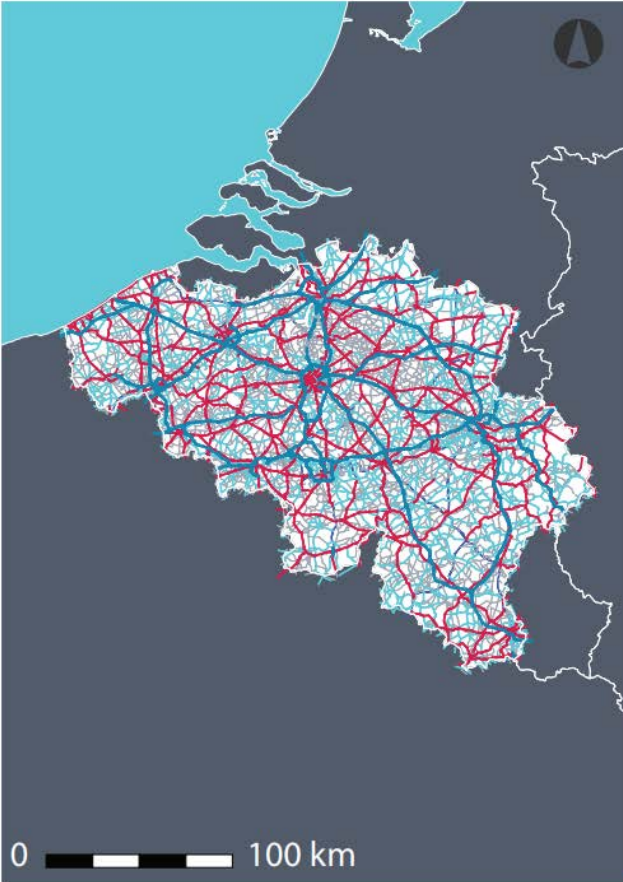
Resilient infrastructure provides more reliable services

Resilience of infrastructure *assets*

Resilient infrastructure is less costly to maintain and repair

Asset and system vulnerabilities can be very different

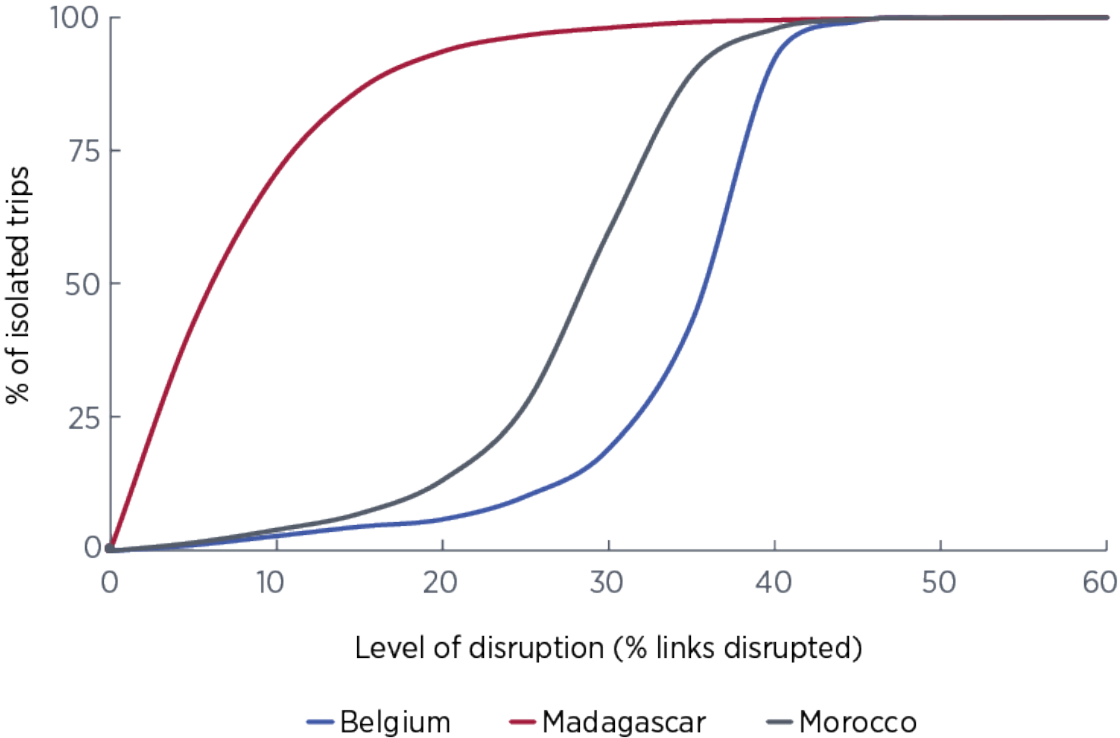
a. Transport network, Belgium



b. Transport network, Madagascar



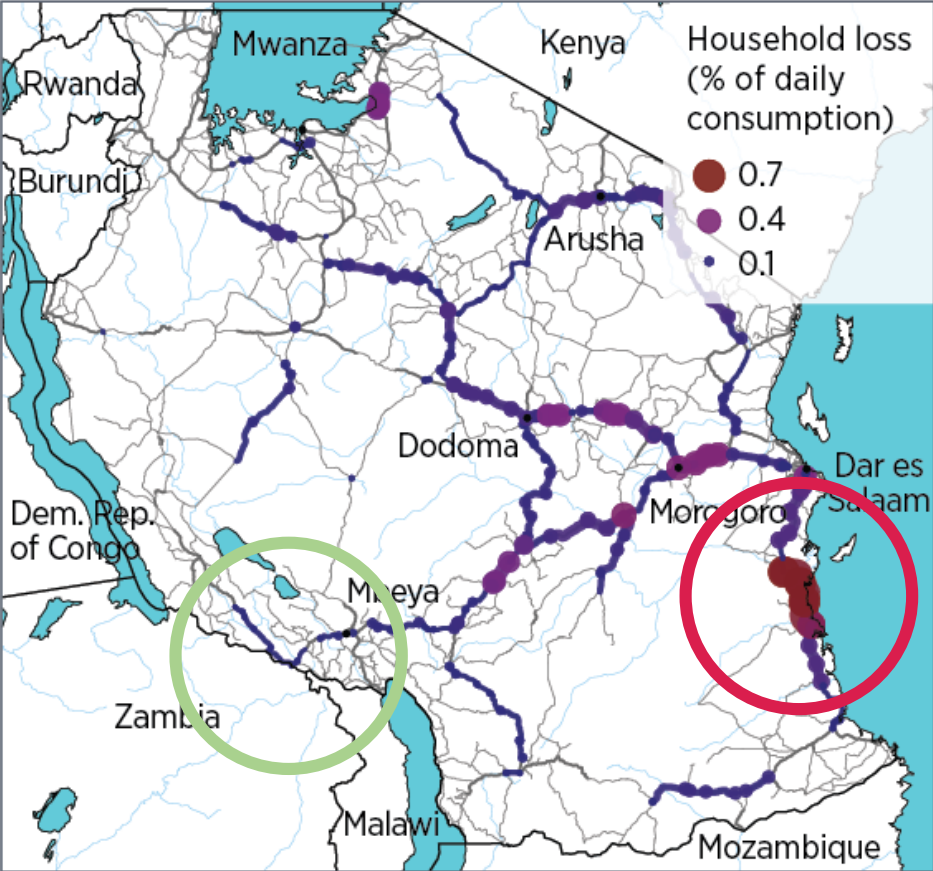
Examples of functionality loss in a transport system as a function of the percentage of links disrupted



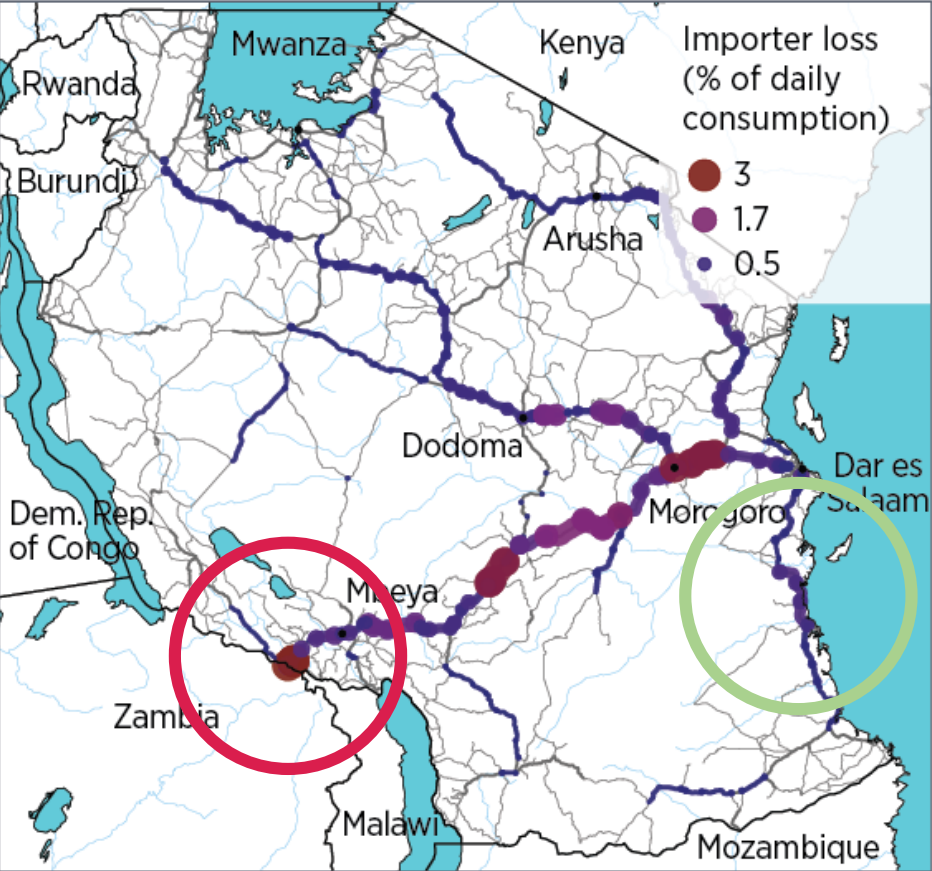
— Motorway — Primary — Secondary — Trunk — Tertiary

Criticality analyses show where strengthening is more important and beneficial

a. Impacts of disruption on households



b. Impacts of disruption on international clients

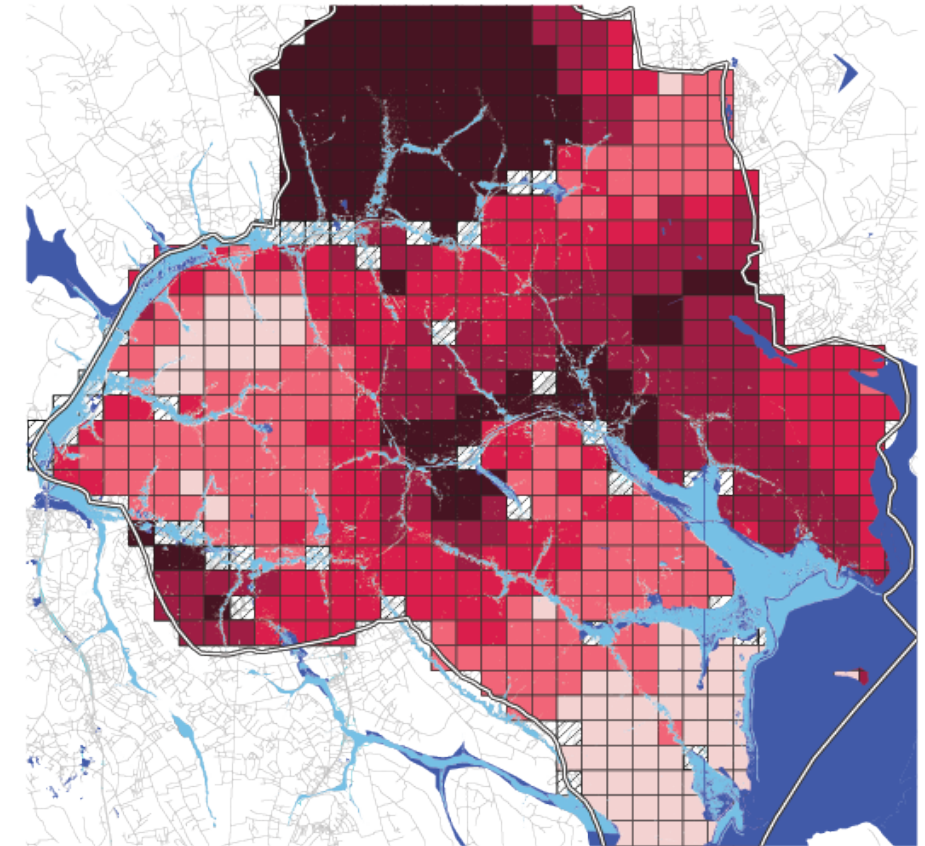


Criticality analyses show where strengthening is more important and beneficial



Credit: Rachit.14. Licence Creative Commons Attribution-Share Alike 4.0 International

Increases in travel times from locations across Inner Kampala to hospitals in a 10-year flood



Increase in travel time (%)

0-27

27-36

36-47

47-70

>70

☒ Trips no longer possible

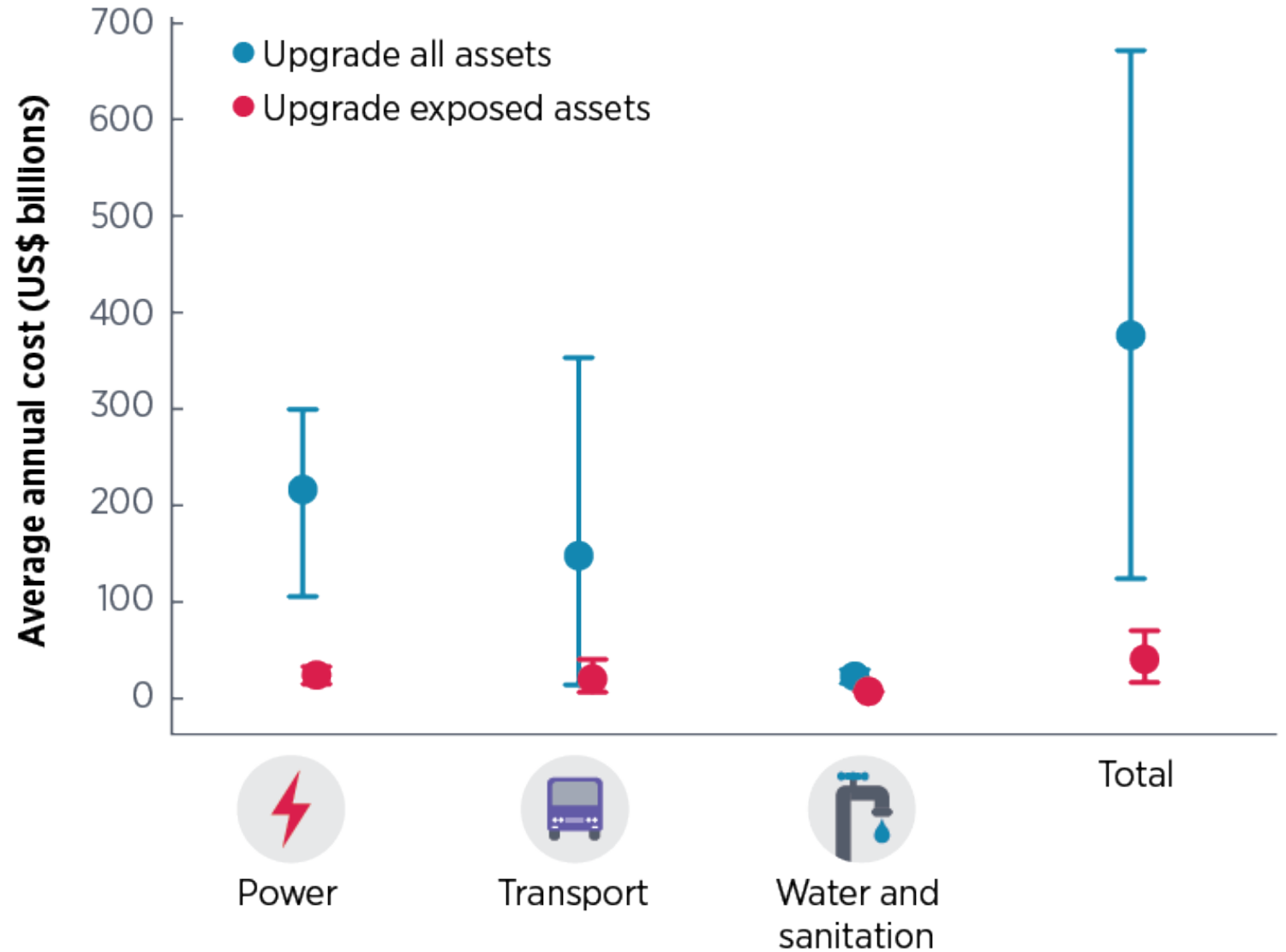
■ 10-year flood extent

■ Bodies of water

□ Area of analysis

— Roads

With the right data, strengthening assets would cost \$11–\$65 billion per year—3 percent of total needs



Altogether: Investing in resilience is sound, profitable, and urgent

\$4

In net benefit for each \$1 invested in infrastructure resilience

\$4.2 trillion

Net benefit from building new infrastructure to higher resilience standards

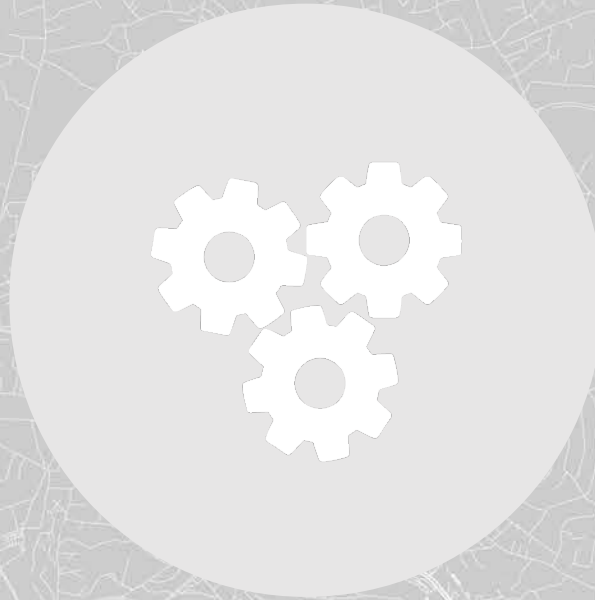
\$100 billion

Cost of delaying action by one year





Diagnosis



Solutions



Recommendations

Good infrastructure management is the necessary basis for resilient infrastructure—but targeted actions are also needed.

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