TPM ResilienceLab

Decision-Making for Urban Resilience
I&W Masterclass

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@tinacomes

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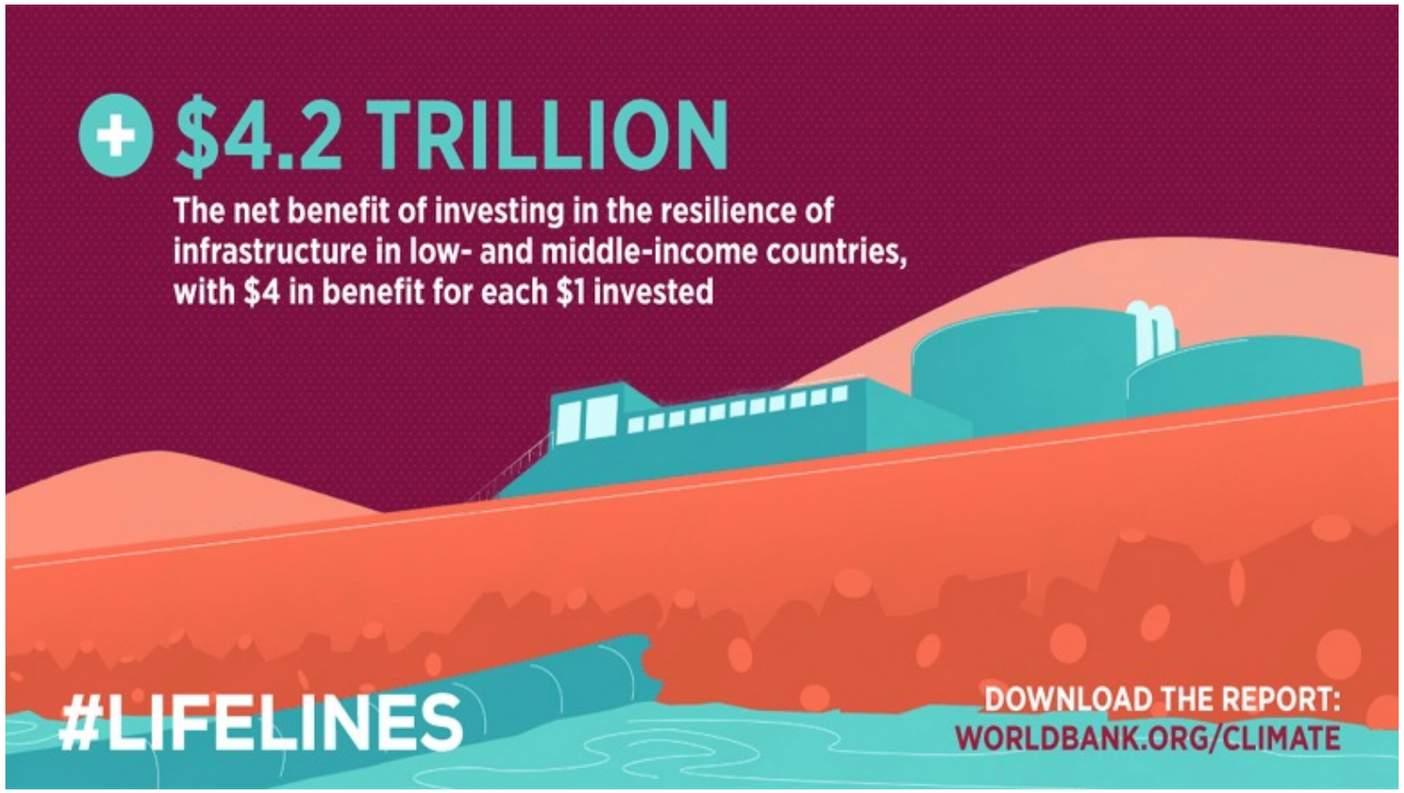

Resilience is the ability of a socio-technical-environmental system to sustain or rapidly recover its key functions – through absorbing, responding to, recovering from, adapting to or reorganizing – in response to chronic stresses and abrupt shocks.

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TPM ResilienceLab

Reference point for interdisciplinary research to promote resilient societies. We are pushing the boundaries of scientific research by acting on the intersection of science, policy and practice.

- Excellent interdisciplinary research and cross-cultural environment
- Provide tools to make a case for policy change and action.

https://www.tudelft.nl/en/tpm/resiliencelab/

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People

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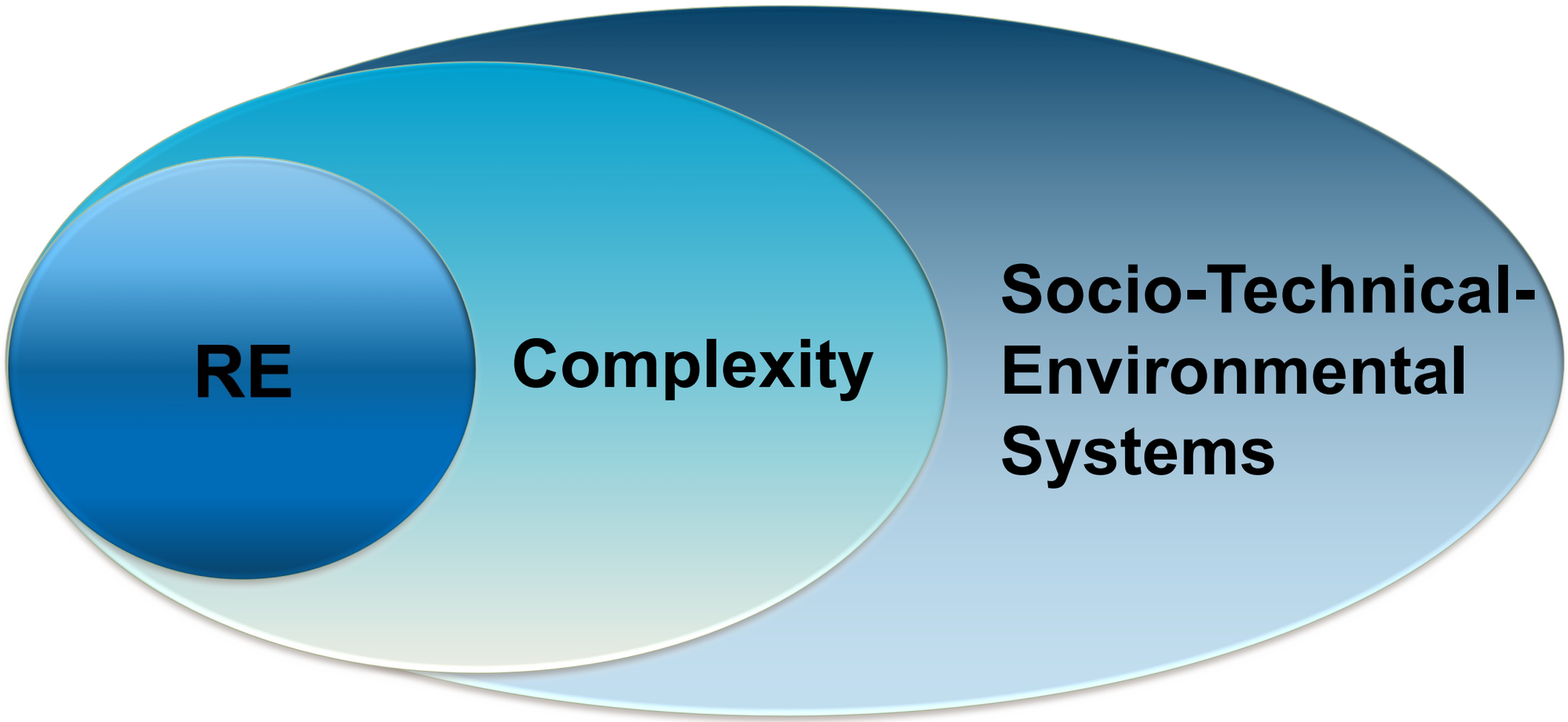
Research Field

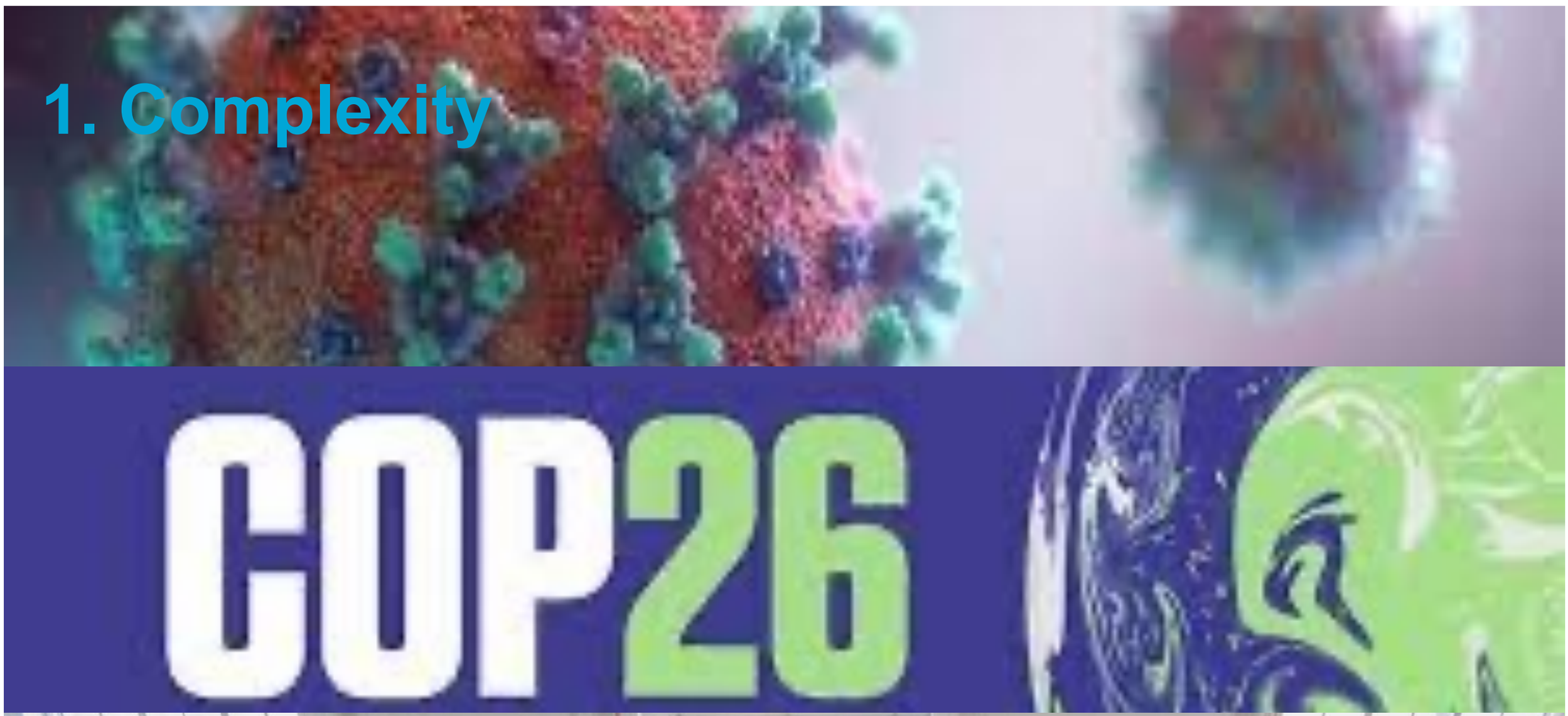


Analytics:
Robustness, Reliability, Rapidity

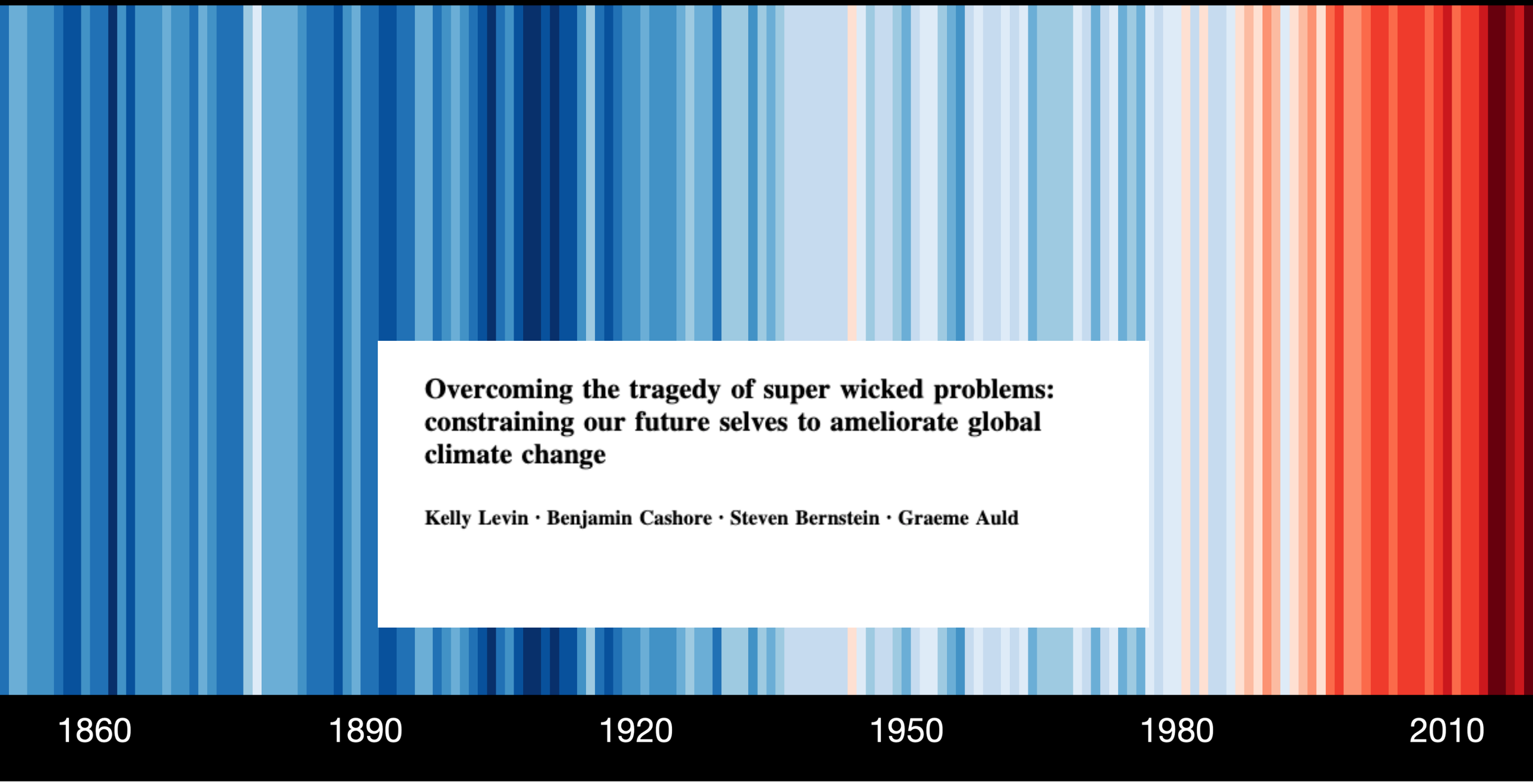
Coordination:
Cascades, self-organization, emergence

Transitions:
Learning, Adaptation, Transformation

1. Complexity



Global temperature change (1850-2019)



Overcoming the tragedy of super wicked problems: constraining our future selves to ameliorate global climate change

Kelly Levin · Benjamin Cashore · Steven Bernstein · Graeme Auld

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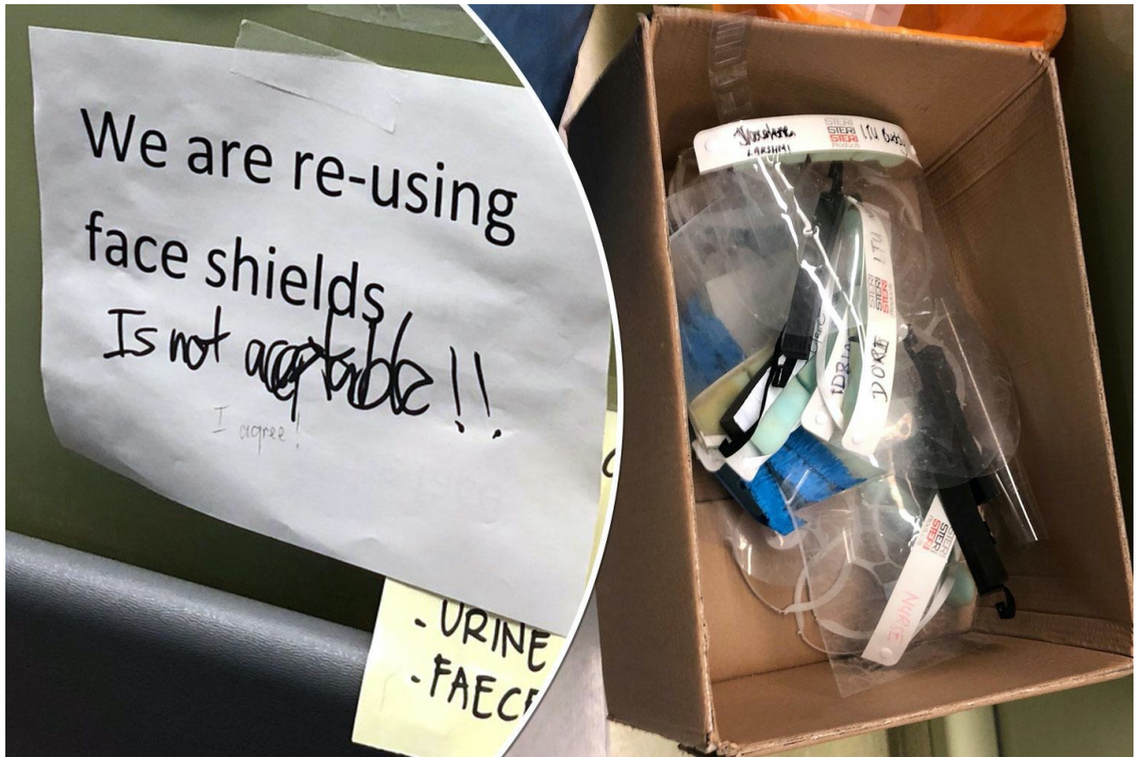
Path-dependency despite urgency



Prof. Gyöngyi Kovacs

Dr. Ioanna Sigala

Mikhail Sirenko

Path-dependency despite urgency

GLOBAL CENTER ON ADAPTATION

The 'new normal':
a world of multiple systemic shocks

Covid-19 has ushered in an era of multiple, intersecting systemic shocks, and one of its casualties has been our capacity to adapt and respond to escalating climate risks. Investment in climate adaptation fell in 2020, even as more than 50 million people were affected by a record number of floods, droughts, wildfires and storms[1]. The pandemic is eroding recent progress in building climate resilience, leaving countries and communities more vulnerable to future shocks. We must make up for lost ground and lost time by accelerating action on climate adaptation and resilience. Climate change did not stop because of Covid-19, and neither should the urgent task of preparing humanity to live with the multiple effects of a warming planet.

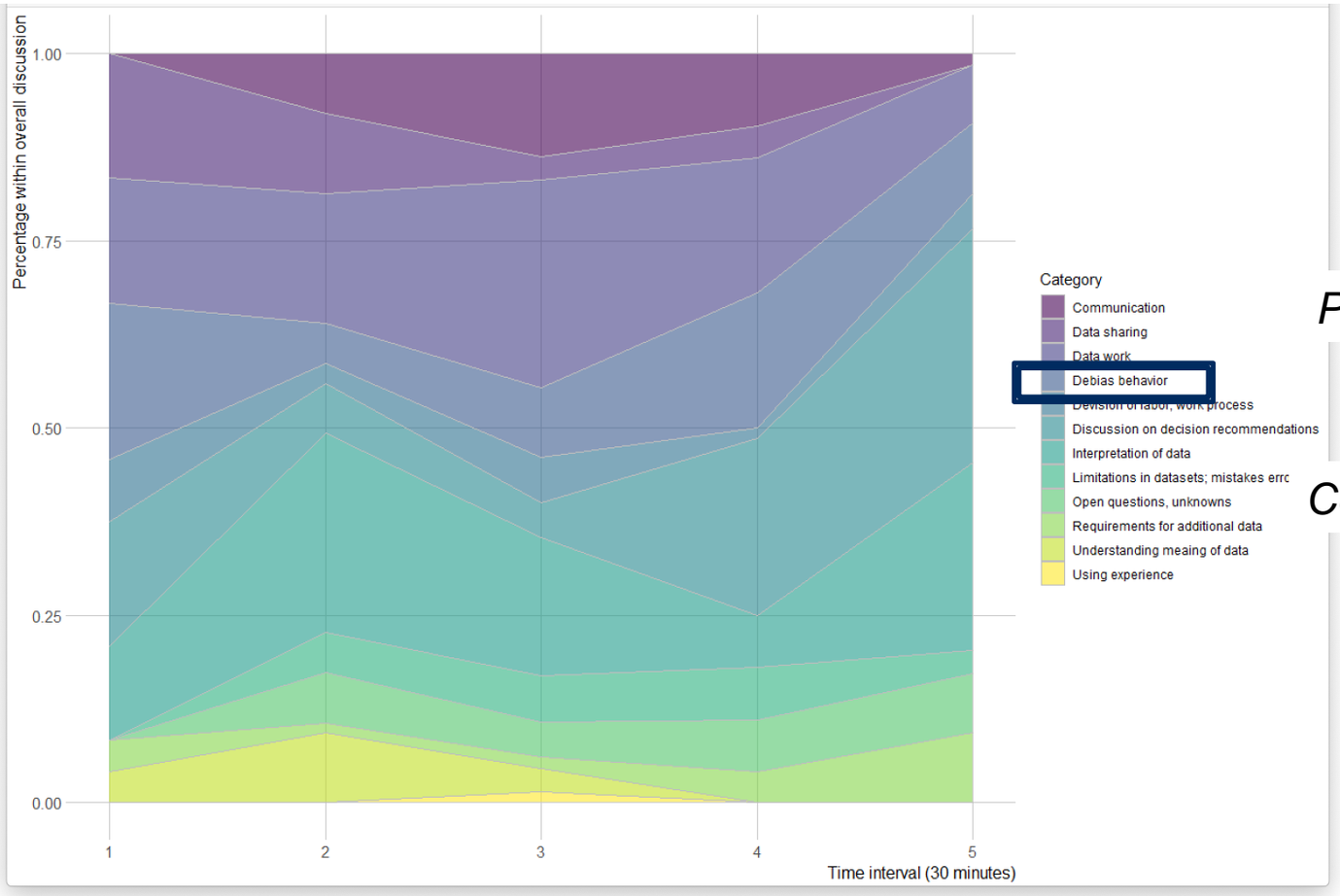
https://gca.org/reports/state-and-trends-in-adaptation-report-2020/

2. Digitalisation & Uncertainty

Experiment: Allocation decisions in pandemics (The Hague, Jan 2020)

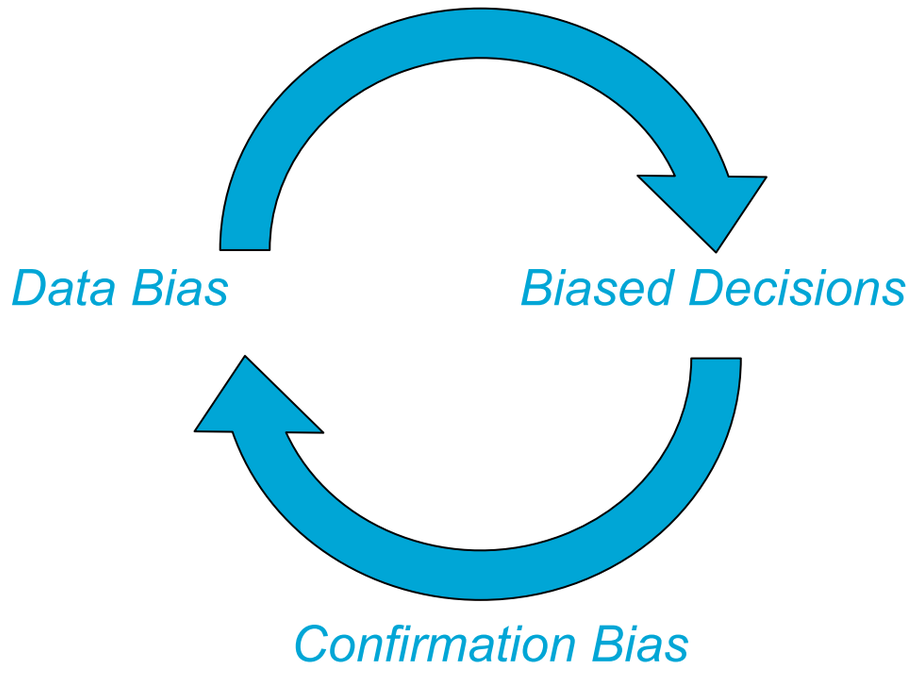
Paulus, D., Fathi, R., Fiedrich, F. *et al.* On the Interplay of Data and Cognitive Bias in Crisis Information Management. *Inf Syst Front* (2022).

Share overall discussion



Process

Content



Paulus, D., Fathi, R., Fiedrich, F. *et al.* On the Interplay of Data and Cognitive Bias in Crisis Information Management. *Inf Syst Front* (2022).

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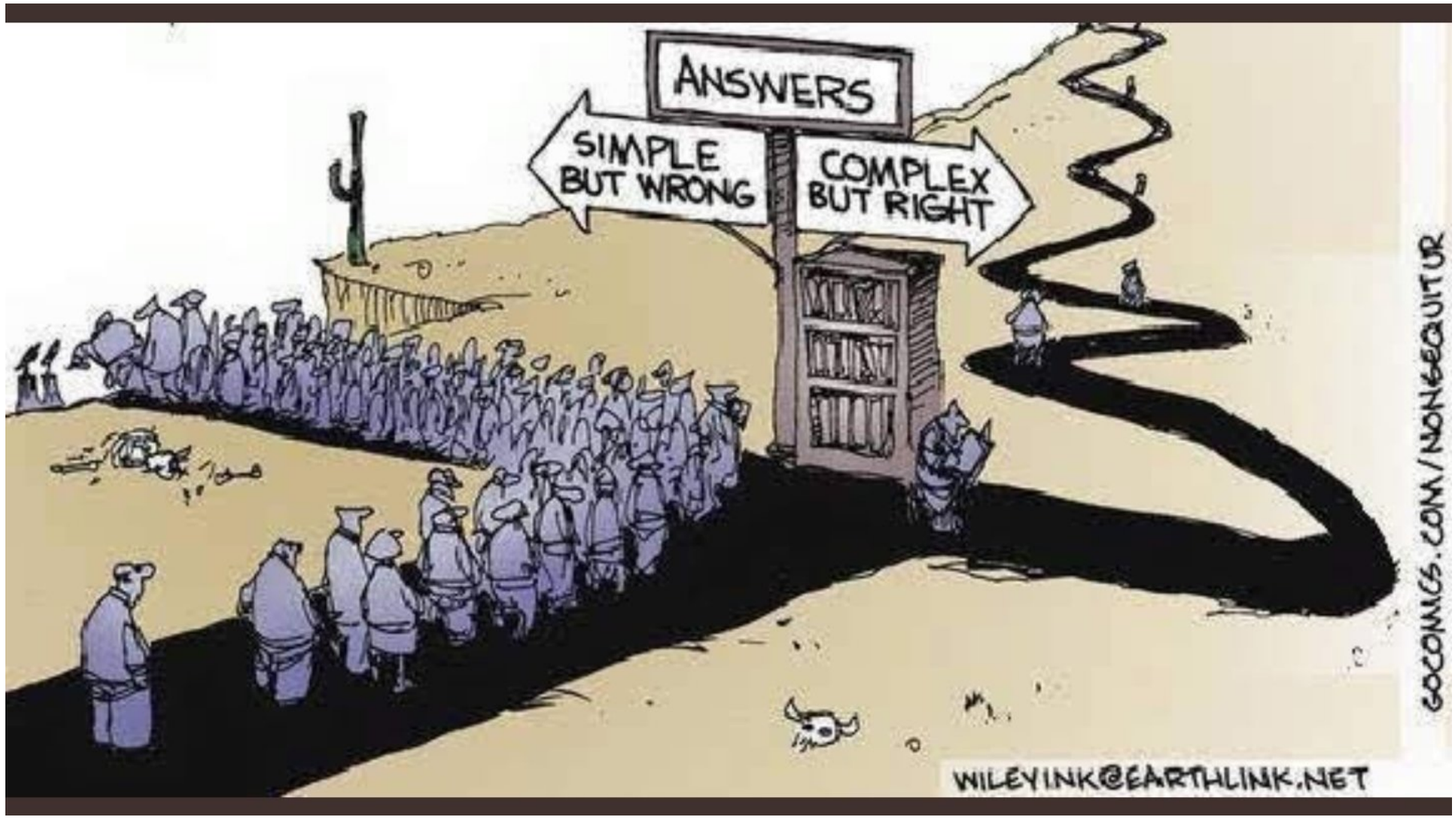
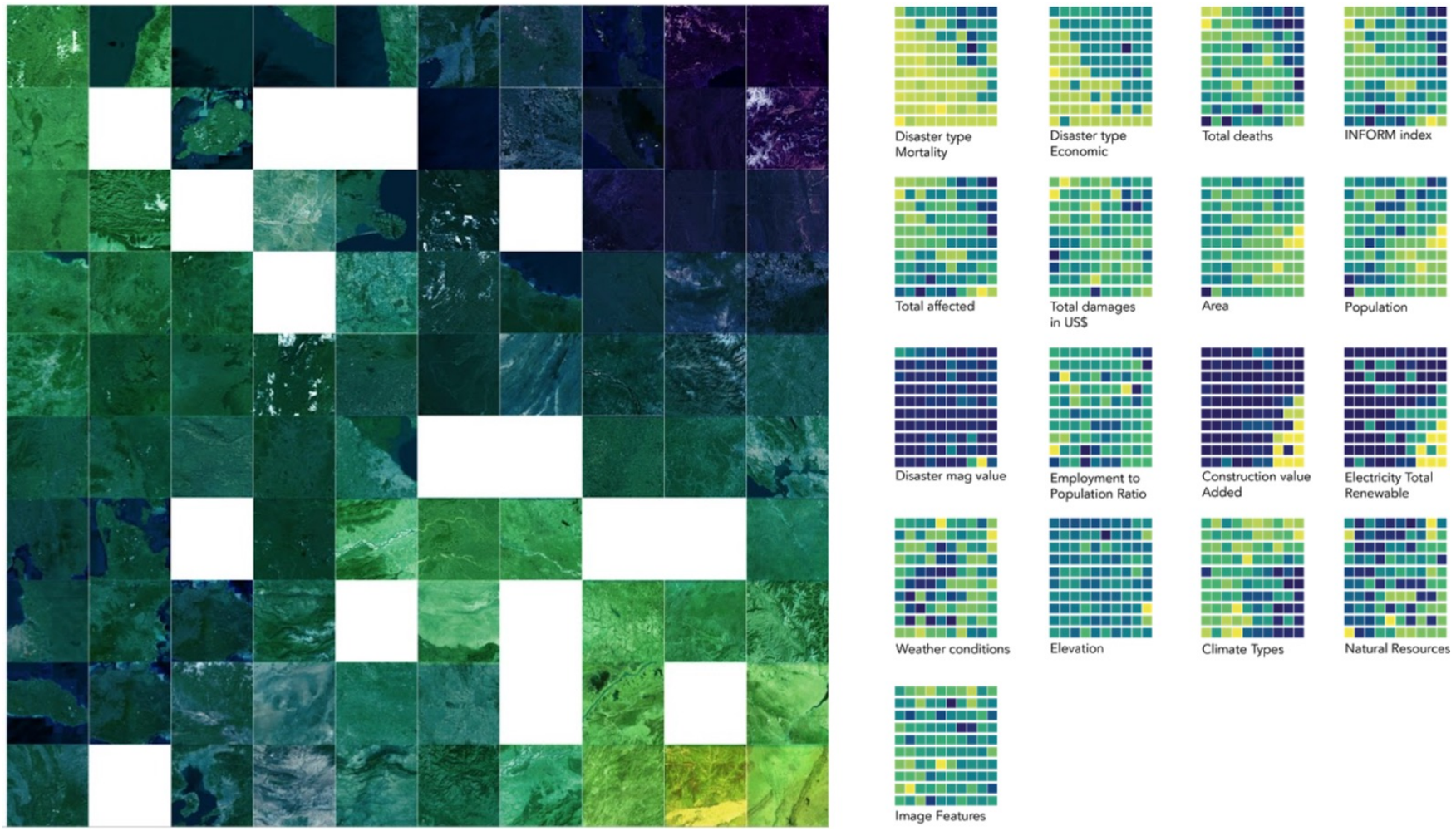
3. Rapid Strategic Decisions

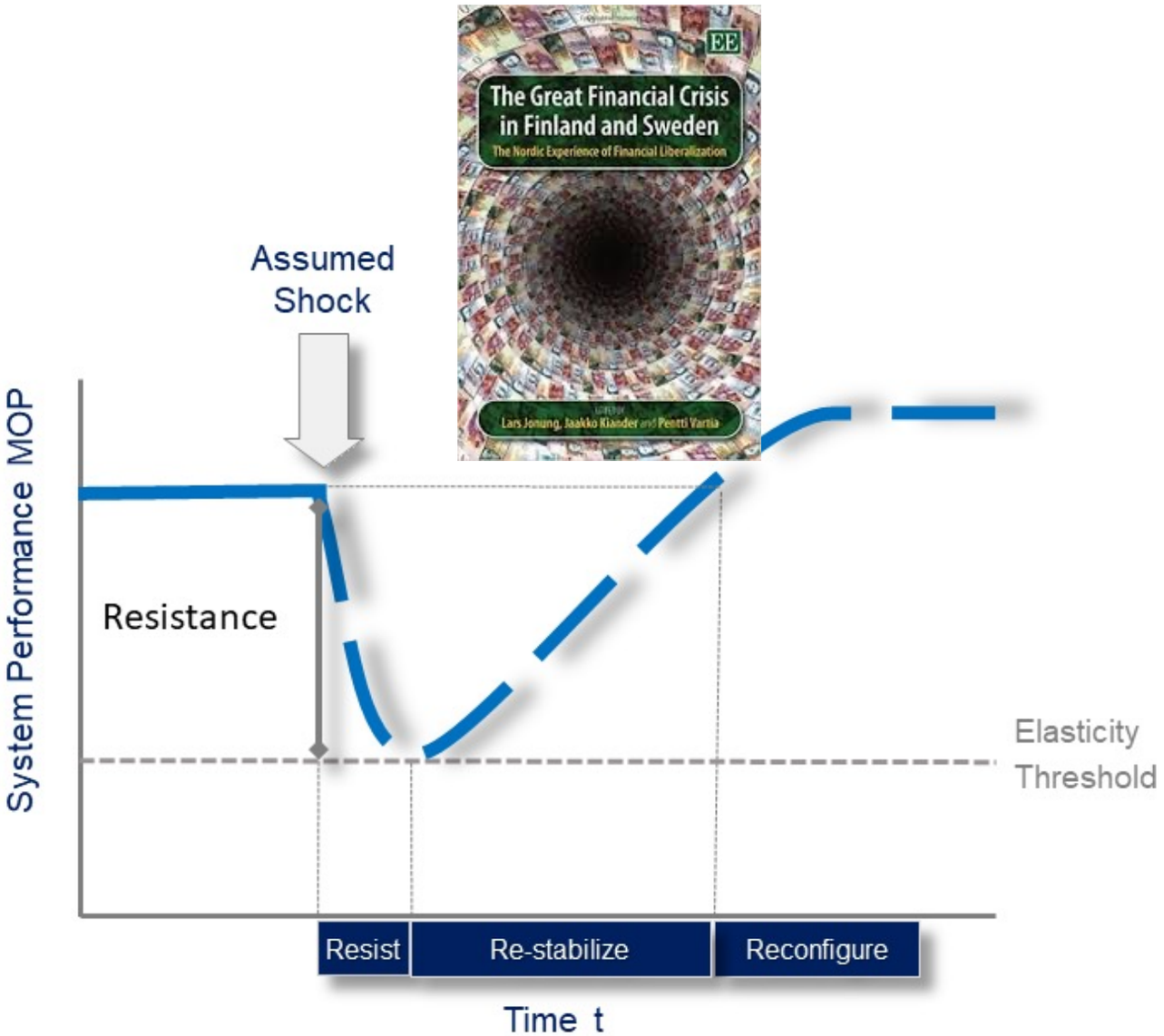


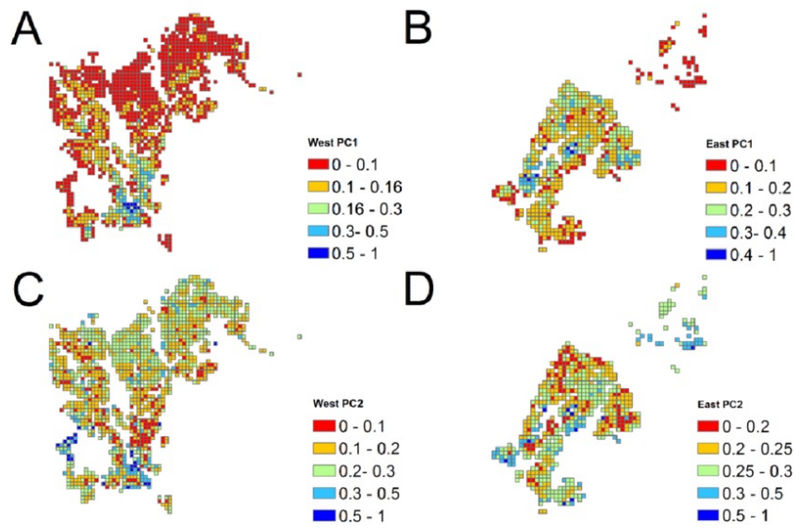
Leveraging data & past experiences



Saldana Ochoa & Comes (2021): A Machine learning approach for rapid disaster response based on multi-modal data. The case of housing & shelter needs

Urban Resilience – uncovering path dependencies





Tracking path-dependencies: Casali, Aydin & Comes (2021) Zooming into socio-economic inequalities: using urban analytics to track vulnerabilities - A case study of Helsinki Differences **persist**

Dr. Ylenia Casali

Dr. Nazli Aydin

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The Future Ground

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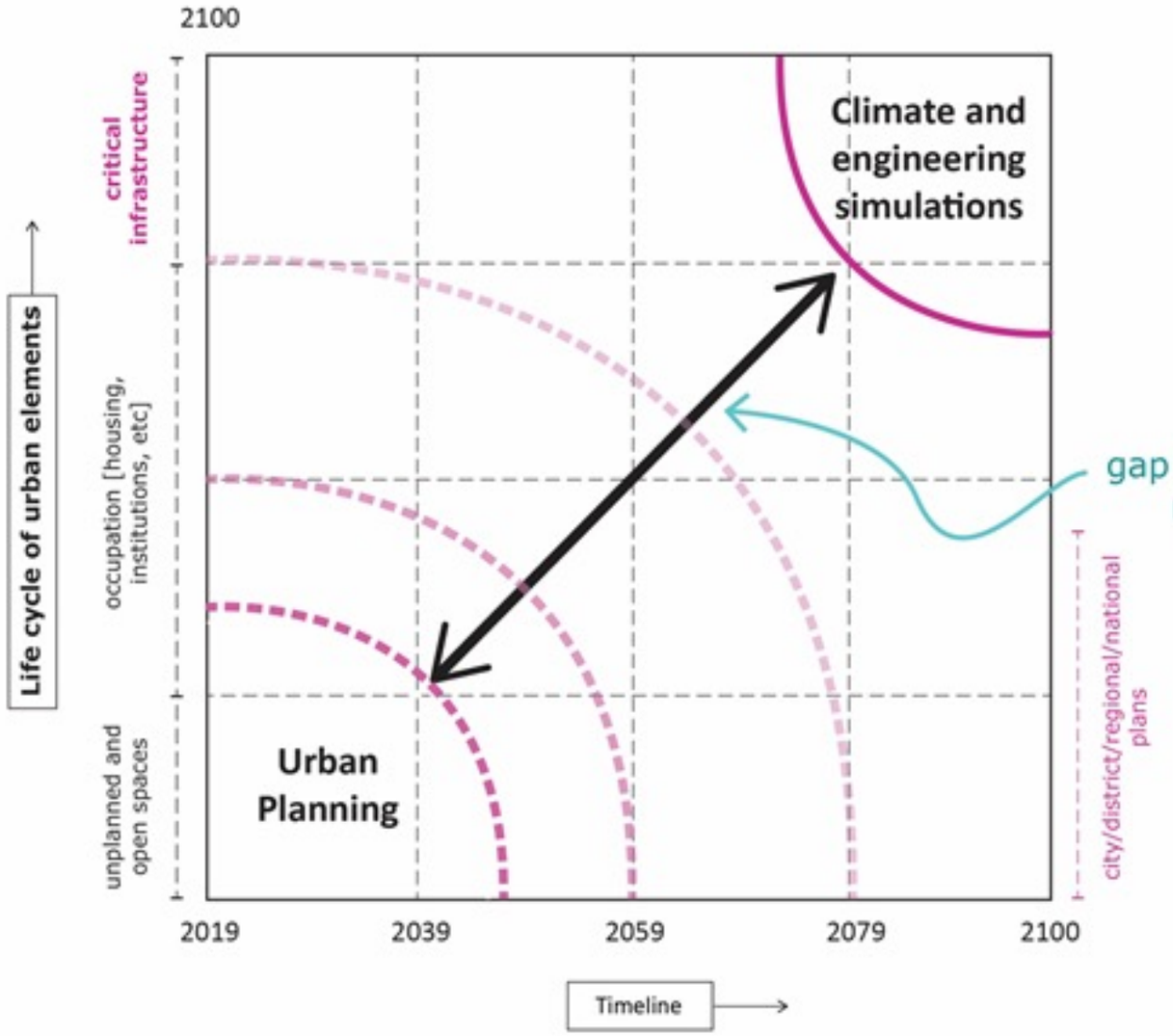
- **Methodology for long-term urban planning under climate uncertainty.**
- Test the impacts of a full range of climate risks on different urban growth scenarios to **identify resilience planning pathways.**
- **Methods: Land use models + Exploratory models + Design thinking.**




Supirya Krishnan


Aarthi Sundharam


Dr. Nazli Aydin

Krishnan, S., Aydin, N. & Comes, T. (submitted) Long-term Urban planning Under Climate Uncertainty. *Cities*

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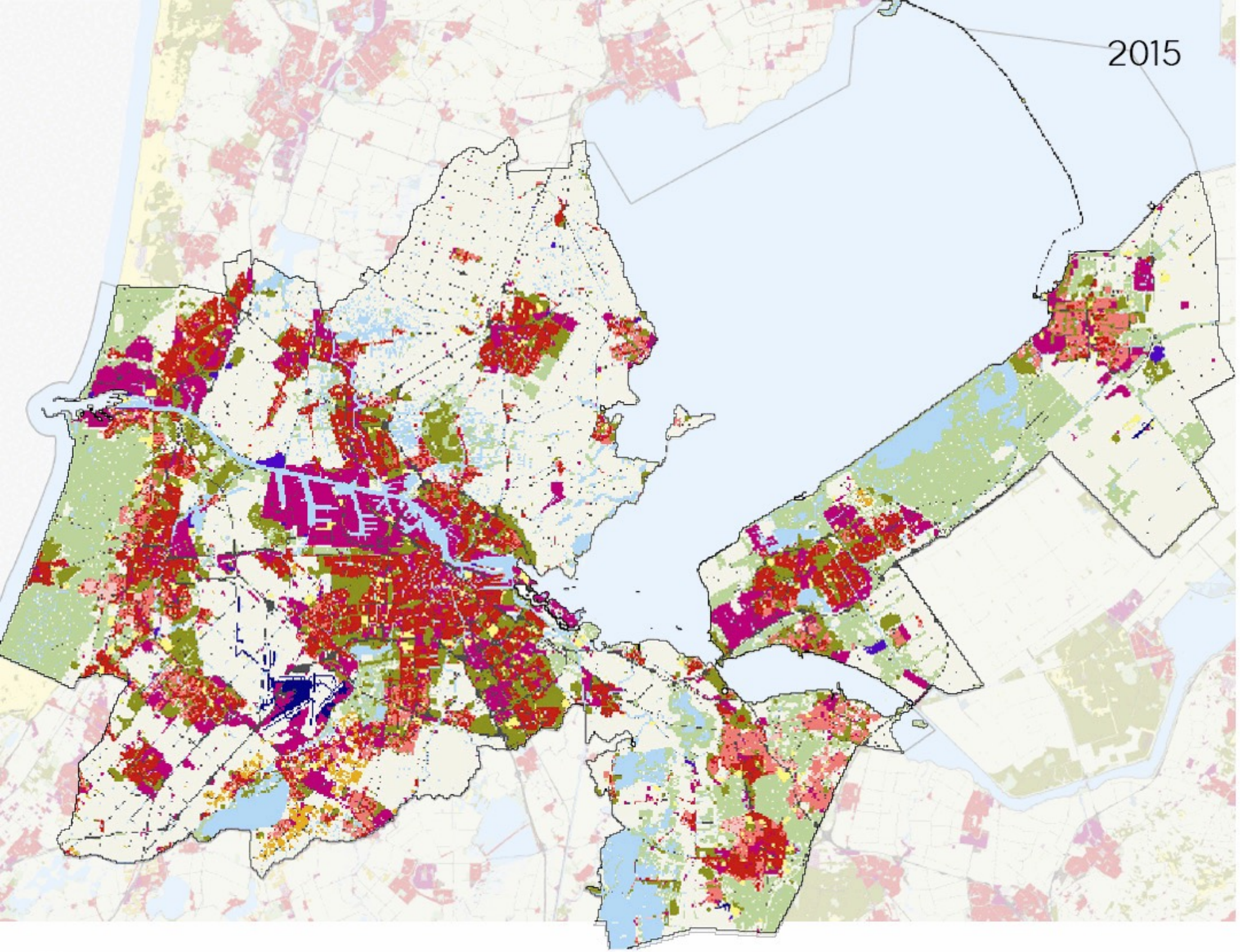

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Vijf miljoen voor onderzoek naar klimaatadaptatie in gebiedsontwikkeling

https://www.gebiedsontwikkeling.nu/artikelen/vijf-miljoen-voor-onderzoek-naar-klimaatadaptatie-in-gebiedsontwikkeling/

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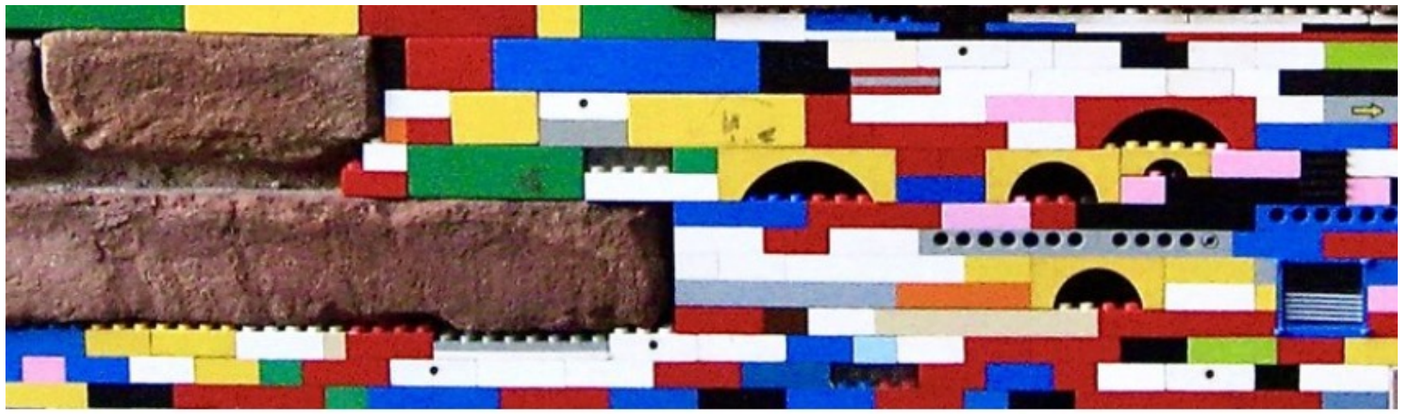
Questions?

Ideas for collaboration?

Contact us!



TPM Resilience Lab

Our world is increasingly complex and uncertain, making us vulnerable to disruptions and cascading failures. The Covid-19 pandemic, climate change, environmental degradation and loss of biodiversity, socio-economic instability, increasing fragmentation and segregation require our societies to adapt and become more resilient. We push scientific boundaries by analysing and solving urgent challenges, such as making our cities climate-resilient, shaping resilient health care systems, organizing collective action initiatives, or improving disaster resilience.

TUDelft

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