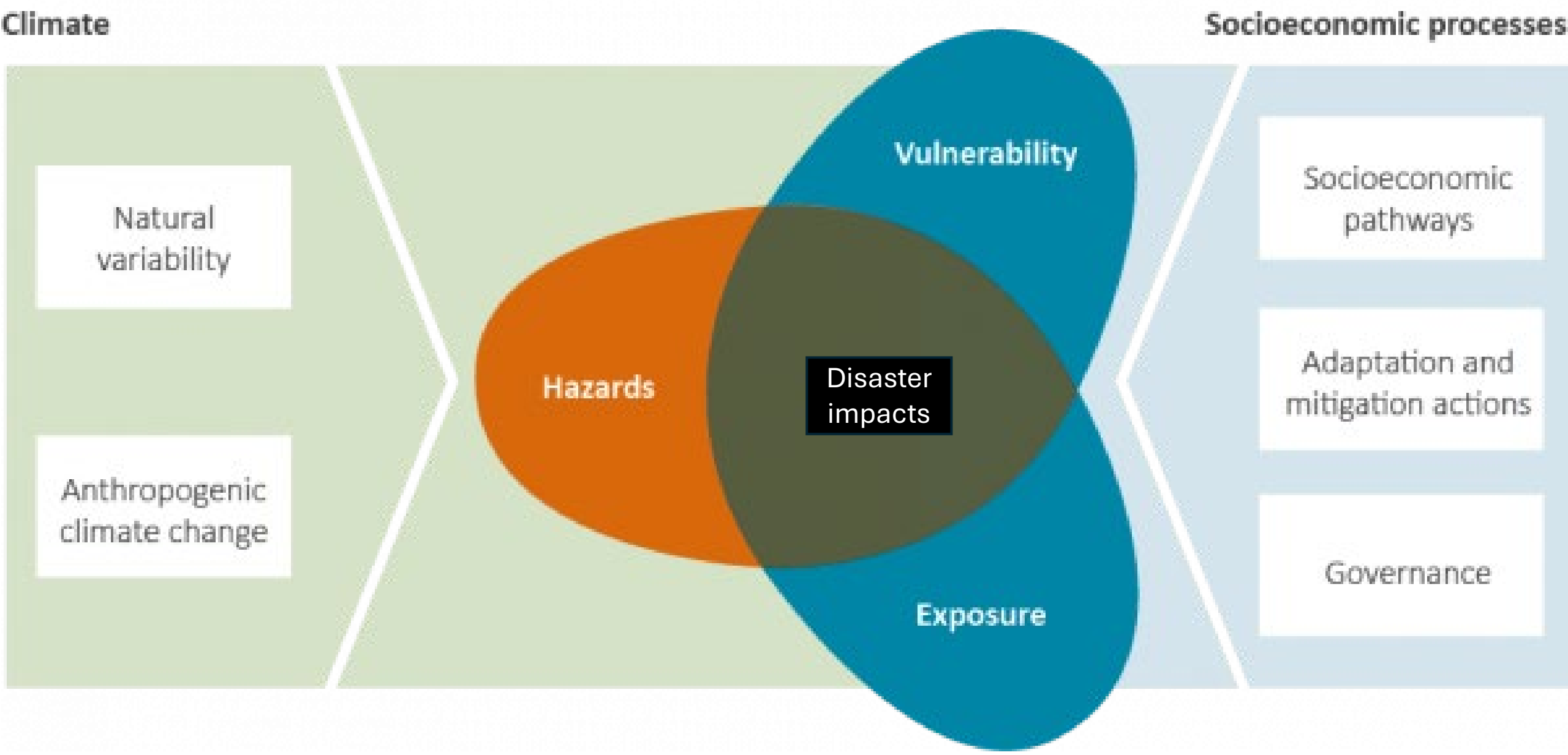
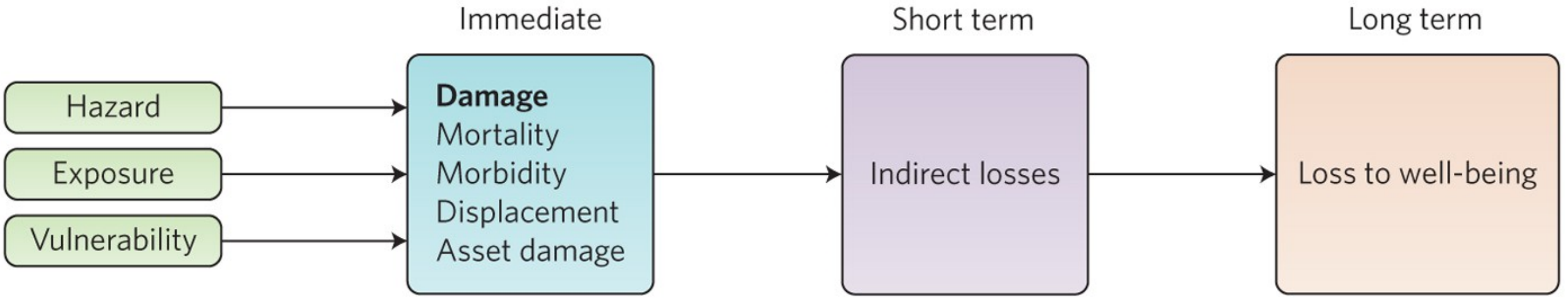
Extreme Event Impact Attribution (EEIA) Workshop

NASEM, April 2025

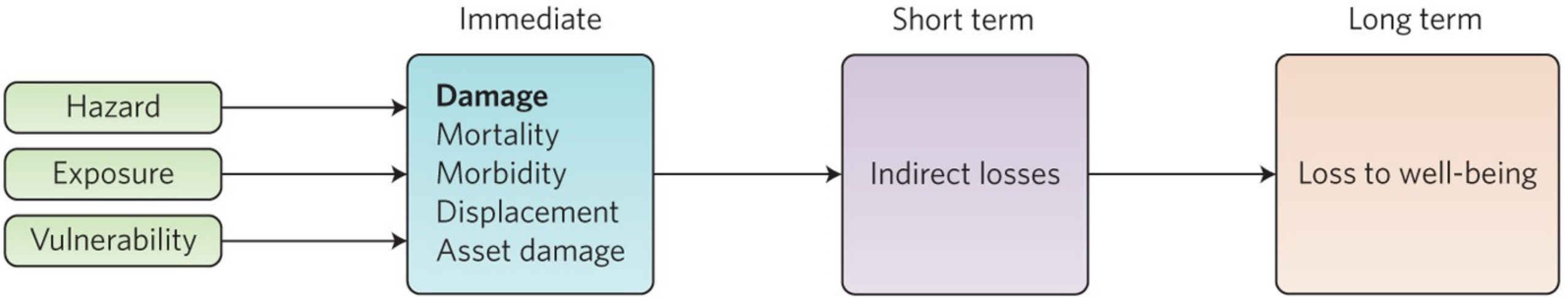
Ilan Noy
Victoria University of Wellington, New Zealand
Gran Sasso Science Institute, Italy


Climate
Socioeconomic processes
Natural variability
Anthropogenic climate change
Vulnerability
Hazards
Disaster impacts
Exposure
Socioeconomic pathways
Adaptation and mitigation actions
Governance

disasters triggered by natural hazards

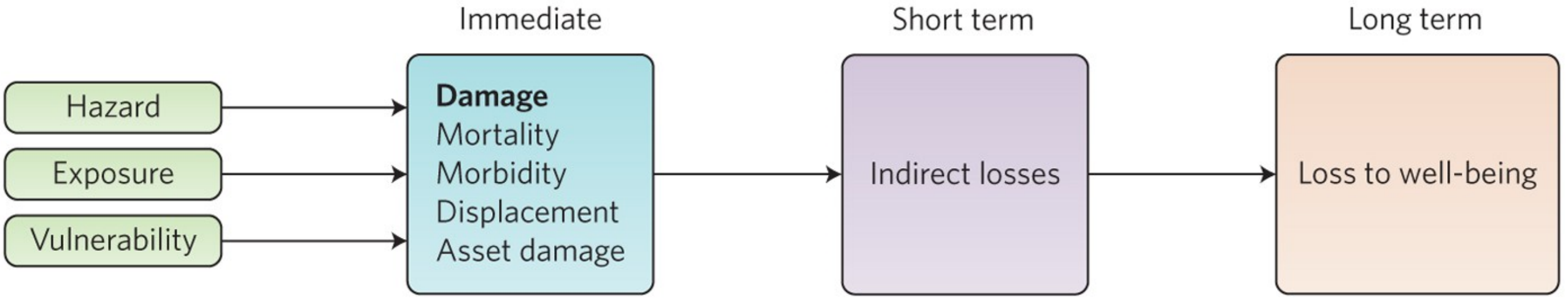


Data on Impacts



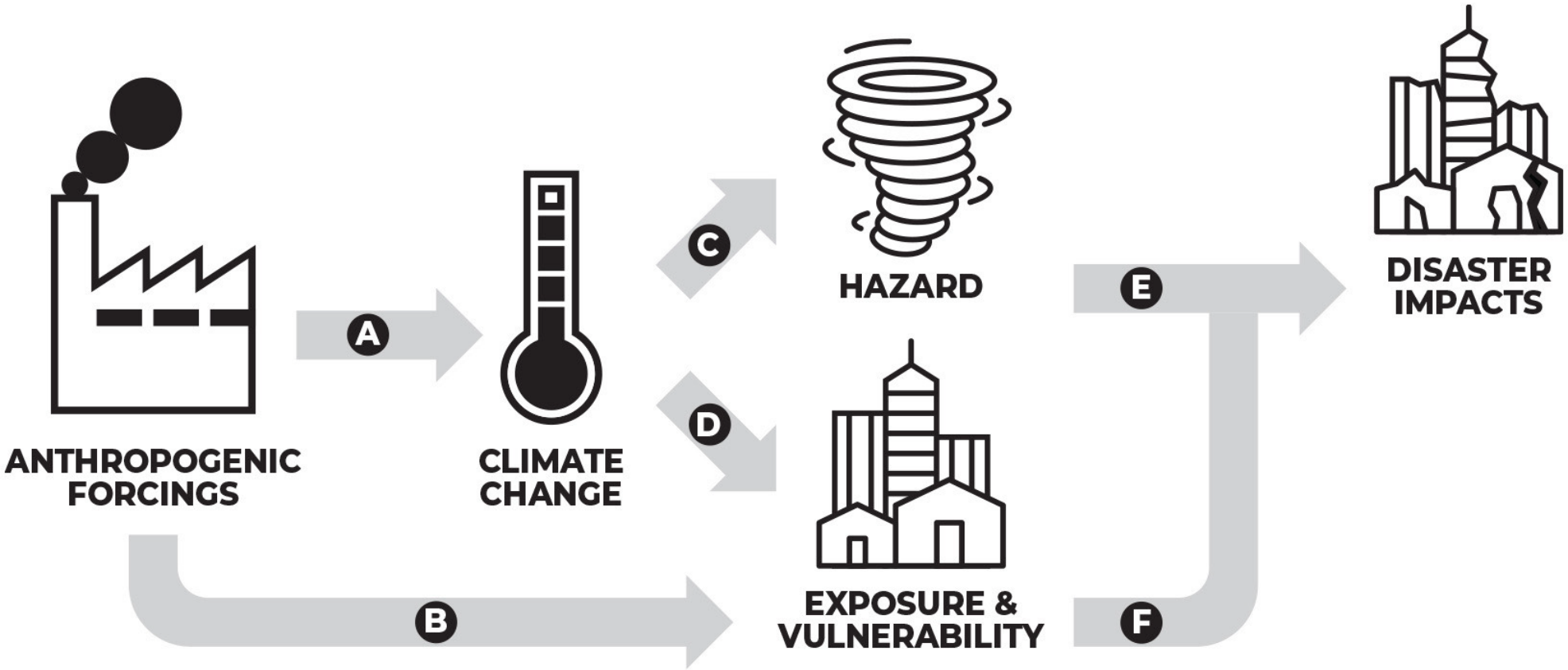
What's missing here?

Data on Impacts for Attribution



What's missing here?
Data accuracy?

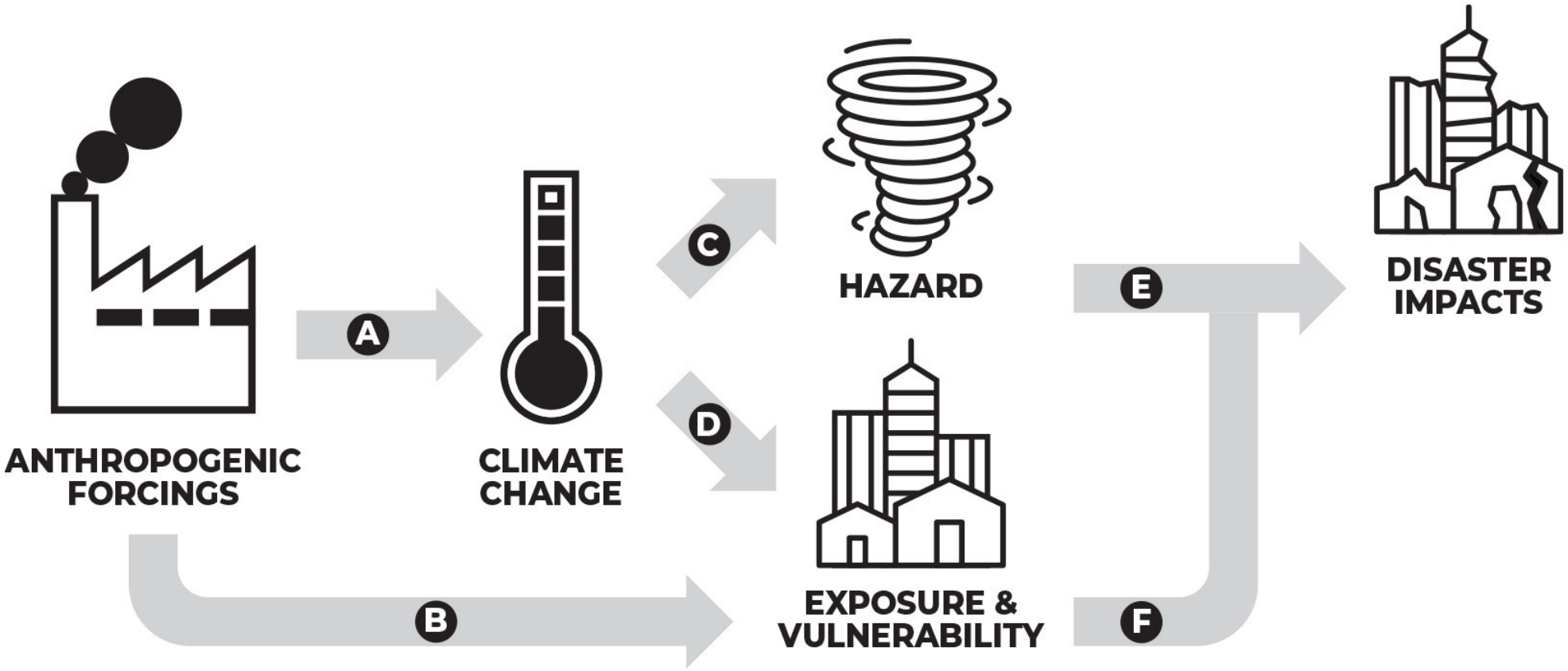
The EEA chain – AC or just C
The EEIA chain – ACE or just CE



Damage Functions - E

- Using EEA frequency measures for EEIA is only possible for many events that are similar.
- Using EEA intensity measures for EEIA requires reliance on damage functions:
  - Cyclone damage functions should be based on rainfall (not wind)
  - Flood damage functions not only on flood depth (also water speed)
  - Even for heatwaves, it is not clear we have robust damage functions
  - Are universal damage functions even plausible?

The EEIA chain – What is the right counterfactual?



Observations about the counterfactual

- EEIA is fundamentally different from EEA.
- EEIA should be viewed as a thought experiment, not as a model of the real world.
- As such, the research team can determine the counterfactual.
- A *ceteris paribus* assumption for BDF is the easiest to defend.

Observations about the climate counterfactual

- The climate counterfactual also requires careful consideration.
- The use-case of the impact attribution will determine what is the appropriate climate counterfactual.