

The transnational climate impacts index 2.0: a new, flow-based quantification

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Background to the TCI Index

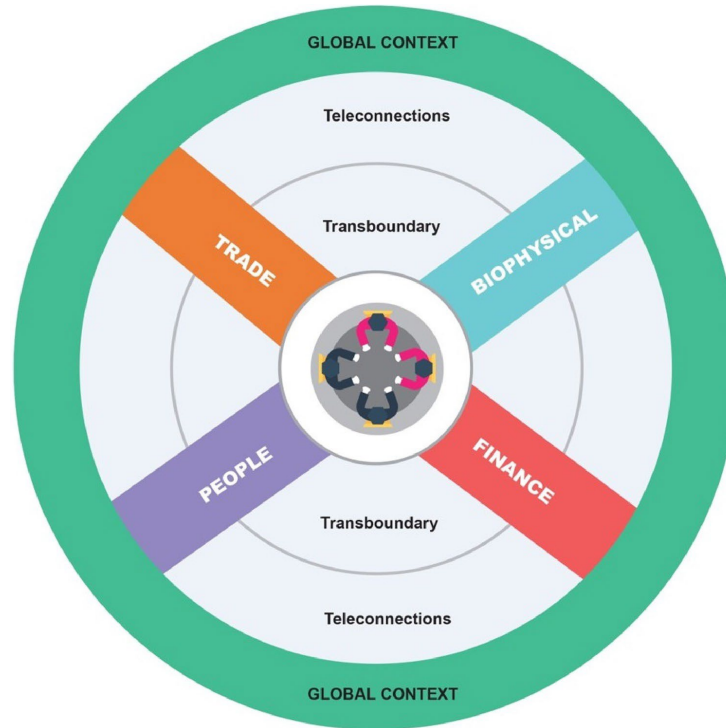


Table 1: Nine country-level indicators of exposure to transnational climate impacts using the pathway framework.

#	Pathway	Indicator
1	Biophysical	Transboundary water dependency
2	Finance	Bilateral climate-weighted foreign direct investment
3	Finance	Remittance flows
4	People	Openness to asylum
5	People	Migration from climate vulnerable countries
6	Trade	Trade openness
7	Trade	Cereal import dependency
8	Trade	Embedded water risk
9	Global context	KOF Globalization Index

Methodological shortcomings

- General critique of composite indices (aggregation)
- Single-country data when TCI's are relational
- ND-GAIN vulnerability index for climate exposure

What could a new index be?

- What purpose would it fill?
 - From awareness-raising to policy-informative
- What data would it use?
 - From static/stock-based (total number/share of X in a country) to flow-based (country-to-country movements of X)

The TCI Index 2.0 – a new flow-based version

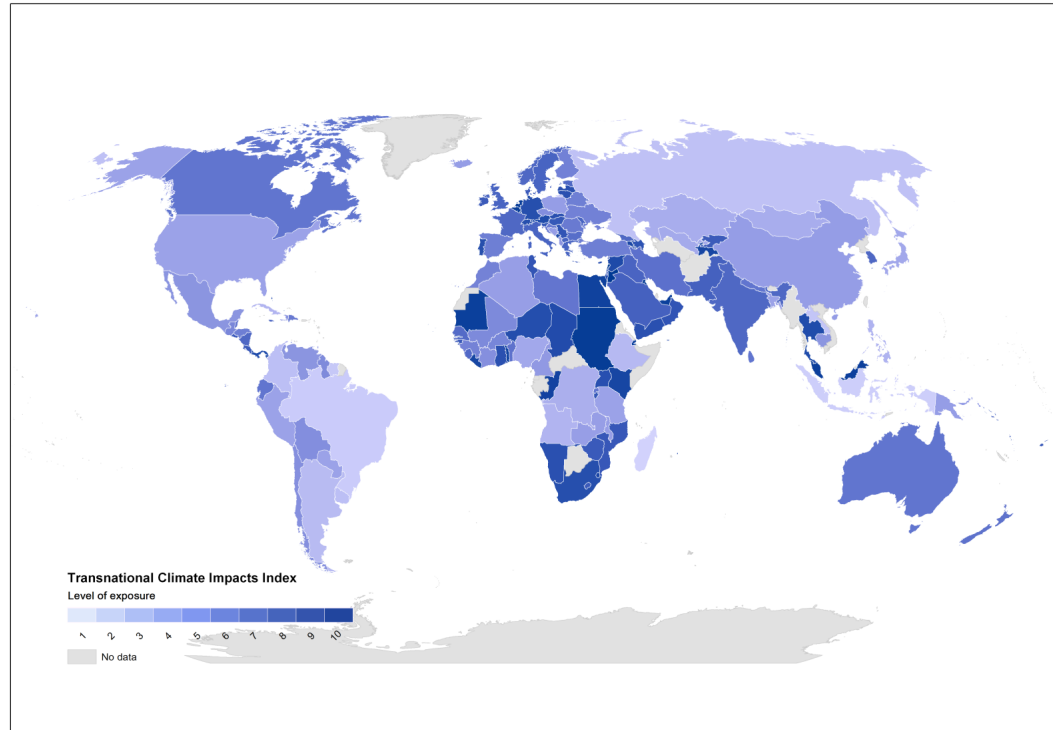
TCI Index 2.0 – indicators

Pathway	Bilateral indicator	Climate exposure (in country of origin)	Number of climate-weighted indicators
Trade	Import-export flows, GTAP 11.0 (maize, rice, wheat, soy)	Slow onset warming on crop production ISIMIP phase 3b for maize, rice, wheat, soy	4
Finance	Remittance (in)flows, KNOMAD	Extreme heat/precipitation/drought CMIP6 model ensembles	3
Finance	Foreign direct investment (out)flows, UNCTAD	Extreme heat/precipitation/drought CMIP6 model ensembles	3
People	Migration flows, UNHCR	Extreme heat/precipitation/drought CMIP6 model ensembles	3
Biophysical	Transboundary water inflows (AQUAstat) to a country from a specific neighbor (computed)	Extreme heat/precipitation/drought CMIP6 model ensembles	3

TCI Index 2.0 – database construction

- Computing a list of all possible country-country relationships (84681)
- Adding climate-weighted indicators for each relationship
- Quantile standardisation for each indicator
- Aggregation: mean across indicators for each relationship
- Aggregation: mean across exposure in relationships for each country

TCI Index 2018

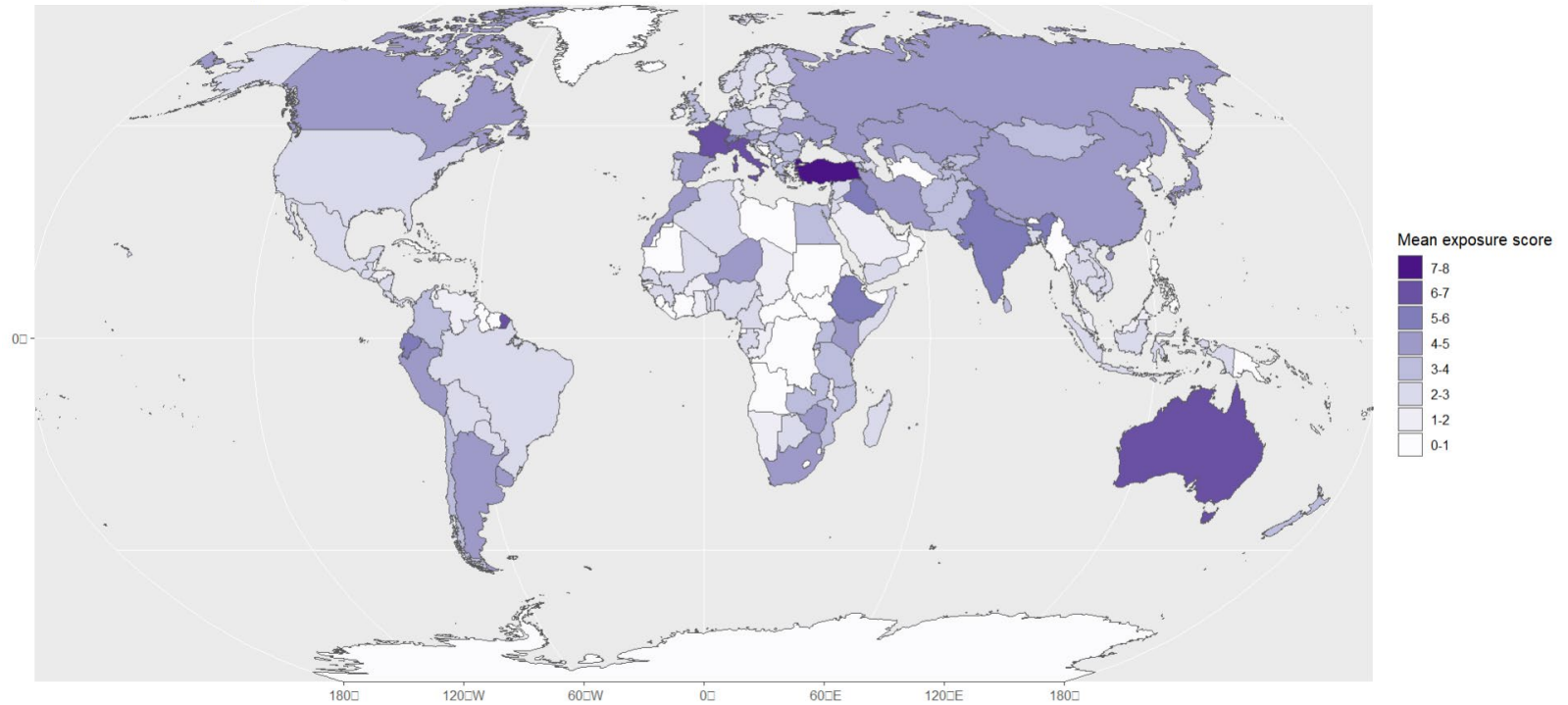


TCI Index

Source: [Benzie et al \(2016\)](#), [Hedlund et al \(2018\)](#)

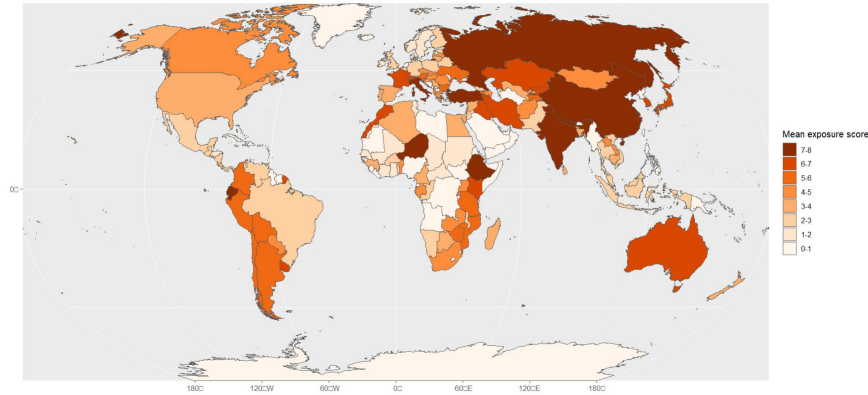
TCI Index 2.0 – test version

The Transnational Climate Impact Index - 2023

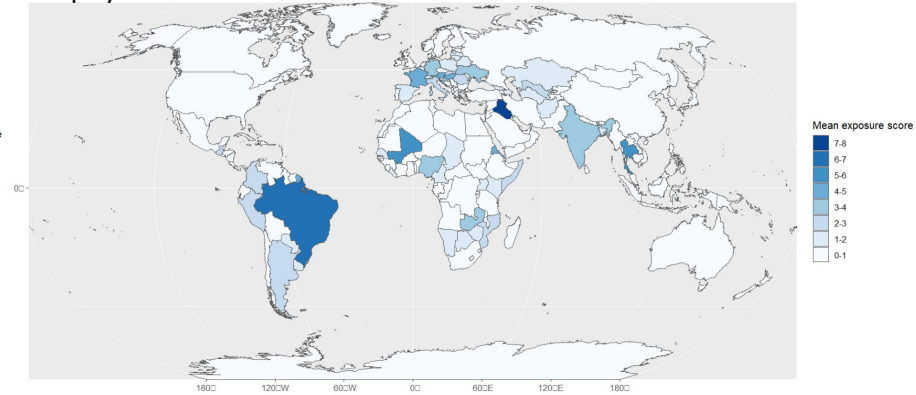


TCI Index 2.0 – test version

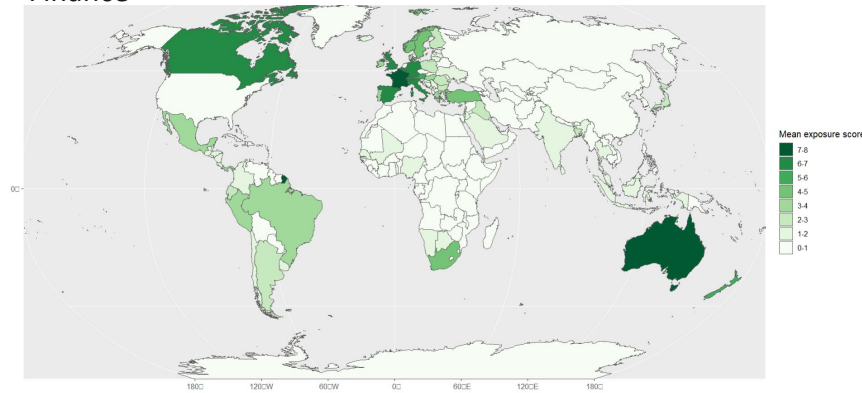
Trade



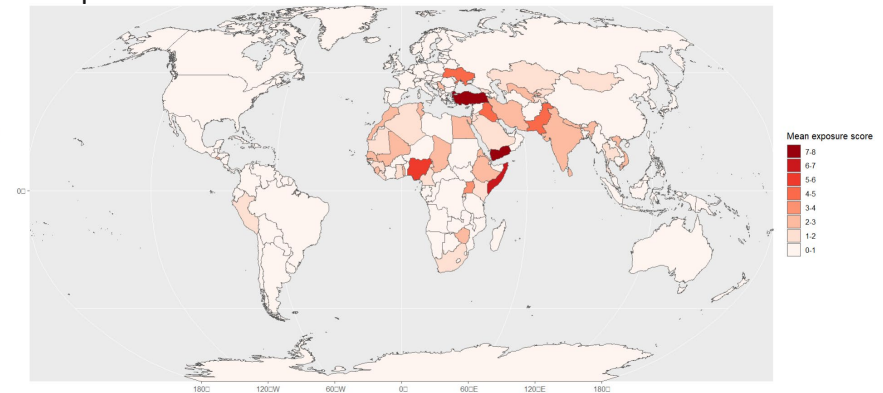
Biophysical



Finance



People



Not final picture - remaining issues

- Finetuning and customisation of climate exposure data to specific indicators
- Improving current indicators (e.g. transboundary water) and adding new (e.g. more trade commodities)
- Aggregation of final results - at all? Fuzzy logic?
- Missing data treatment

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... at least a step towards an *improved* quantification of transnational climate impacts



Thank You