Urban Giants Under Threat: Unveiling Climate Vulnerabilities & Adaptive Strategies in Megacities

GW FEWsLab

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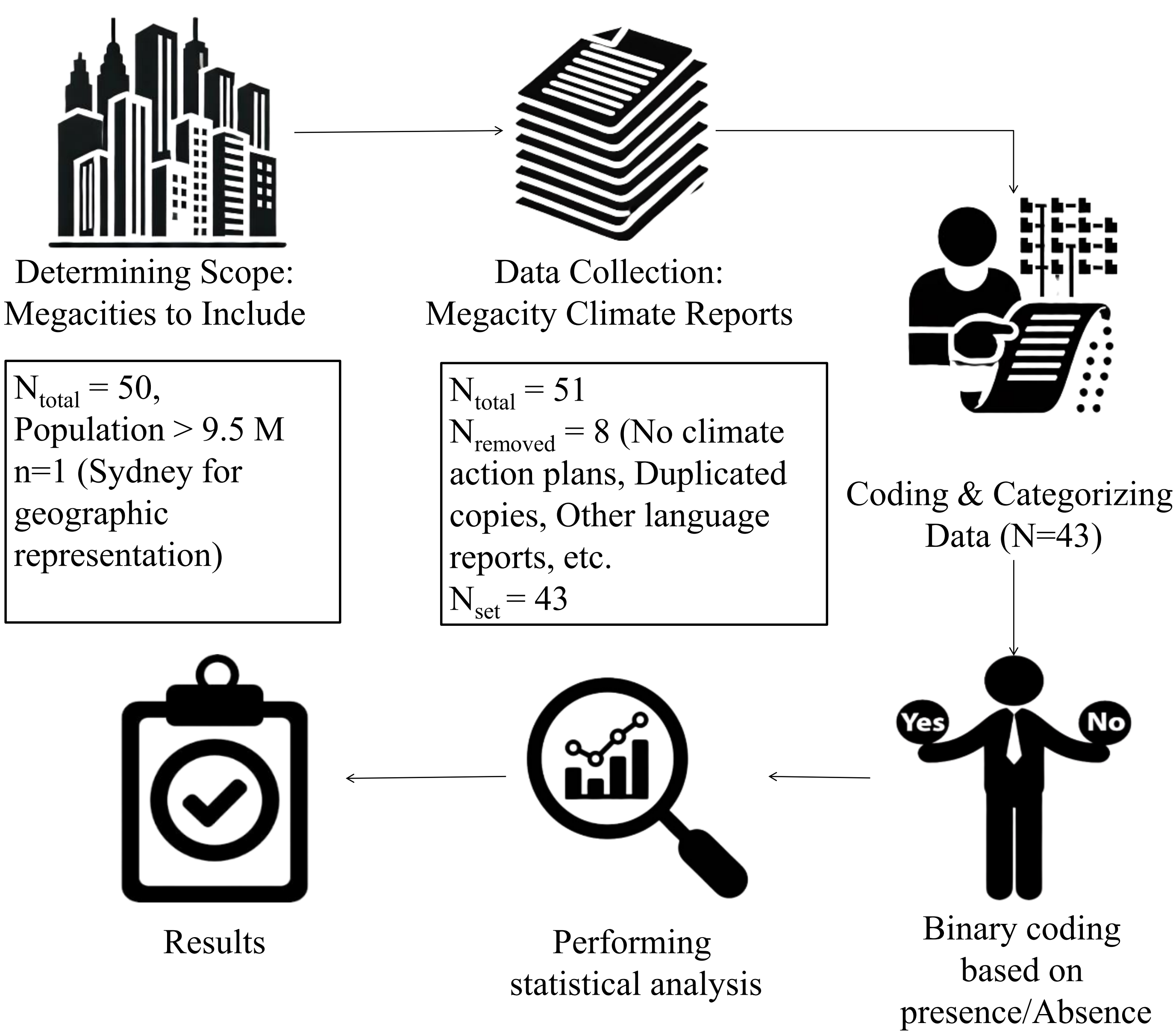
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SCAN ME

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BACKGROUND & MOTIVATION

o Urban areas are already home to **55% of the world's population**, and that figure is expected to grow **to 68% by 2050** [1]. As climate change continues to impact these urban areas, there is a need to assess adaptation, mitigation, and planning behaviors impacting the majority of the world population. [2].

o This project studies adaptation strategies in the megacities, by categorizing climate risks, natural disasters, infrastructure systems, financial sources and stakeholder involvement, providing insights on the relationships and analyzing trends.

METHODOLOGY

Determining Scope: Megacities to Include

N_{total} = 50, Population > 9.5 M n=1 (Sydney for geographic representation)

Data Collection: Megacity Climate Reports

N_{total} = 51 $N_{removed}$ = 8 (No climate action plans, Duplicated copies, Other language reports, etc. N_{set} = 43

Coding & Categorizing Data (N=43)

Binary coding based on presence/Absence

Performing statistical analysis

Results

Research Questions

How do megacities plan to adapt to climate change?

Are there emergent themes across megacity adaptation plans worldwide?

o We analyzed climate action plans from 43 megacities[4], categorizing data across five dimensions—infrastructure, climate risks, natural disasters, financial sources, and stakeholders—using existing [3] frameworks.

o We leveraged binary coding and chi-square tests to understand significant associations and determine trends among megacities.

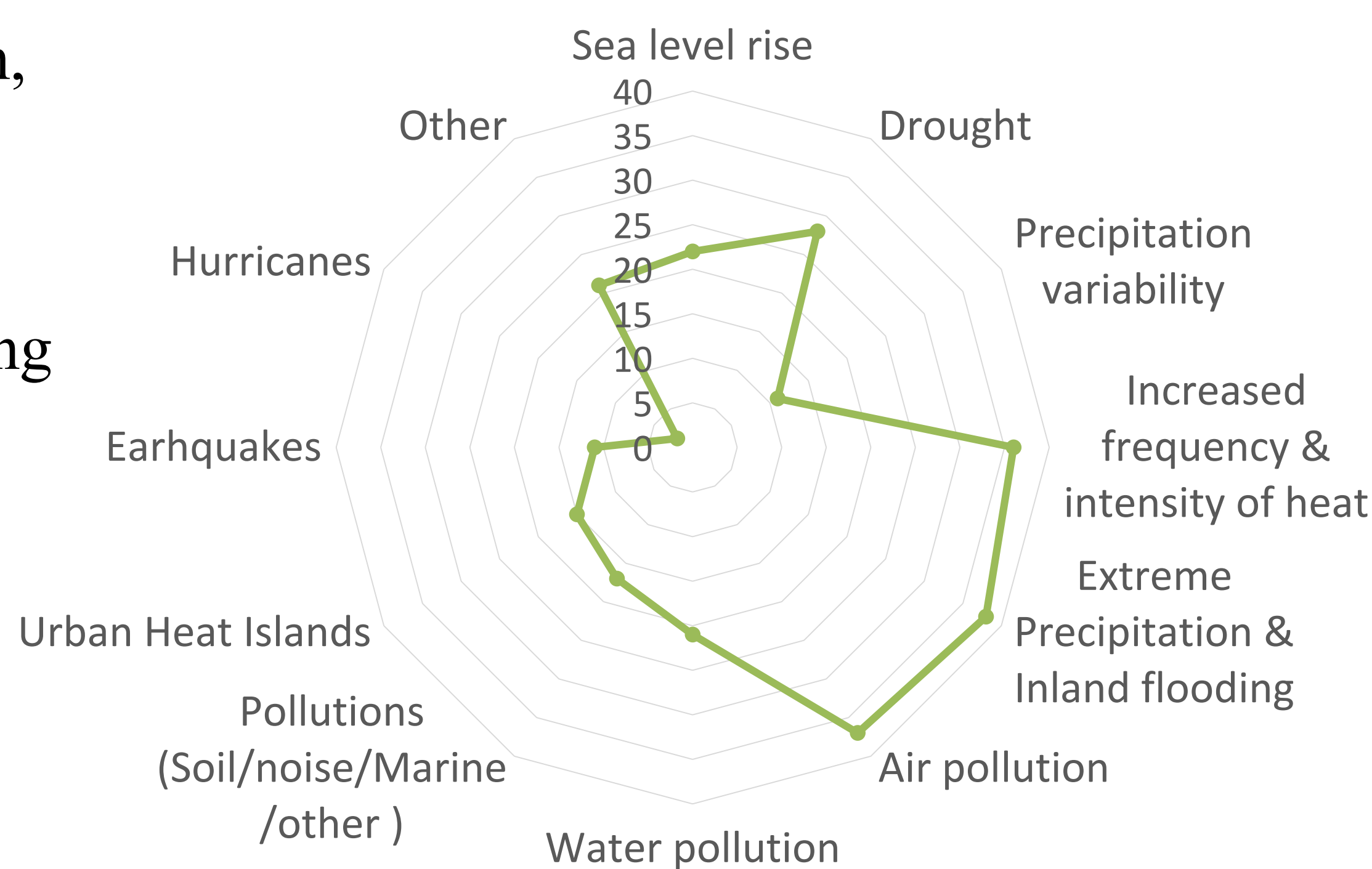### How do megacities plan to adapt to climate change?

Figure 1: Types of climate threats megacities identified. There are varied priorities among cities, emphasizing threats such as extreme precipitation and inland flooding, air pollution, and increased frequency & intensity of heat, which suggests that cities focus their adaptation strategies on the risks perceived as most immediate or severe.

Figure 2: Type of infrastructure system(s) targeted for adaptation. Public transportation and electricity grids were the most frequently targeted infrastructure systems. Megacities had similar distributions across other types, particularly for green infrastructure, building upgrades, waste management, water treatment, and wastewater treatment.
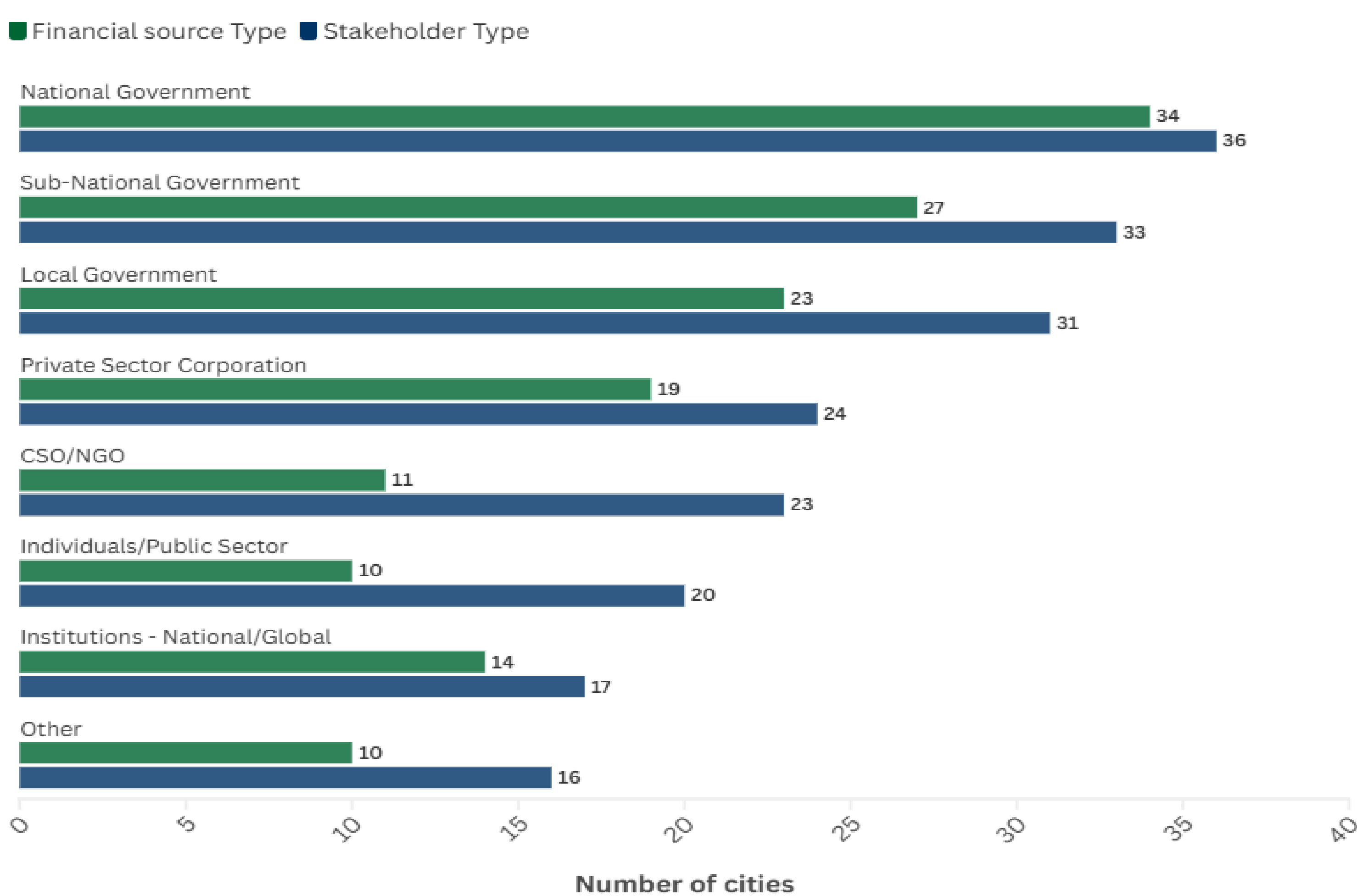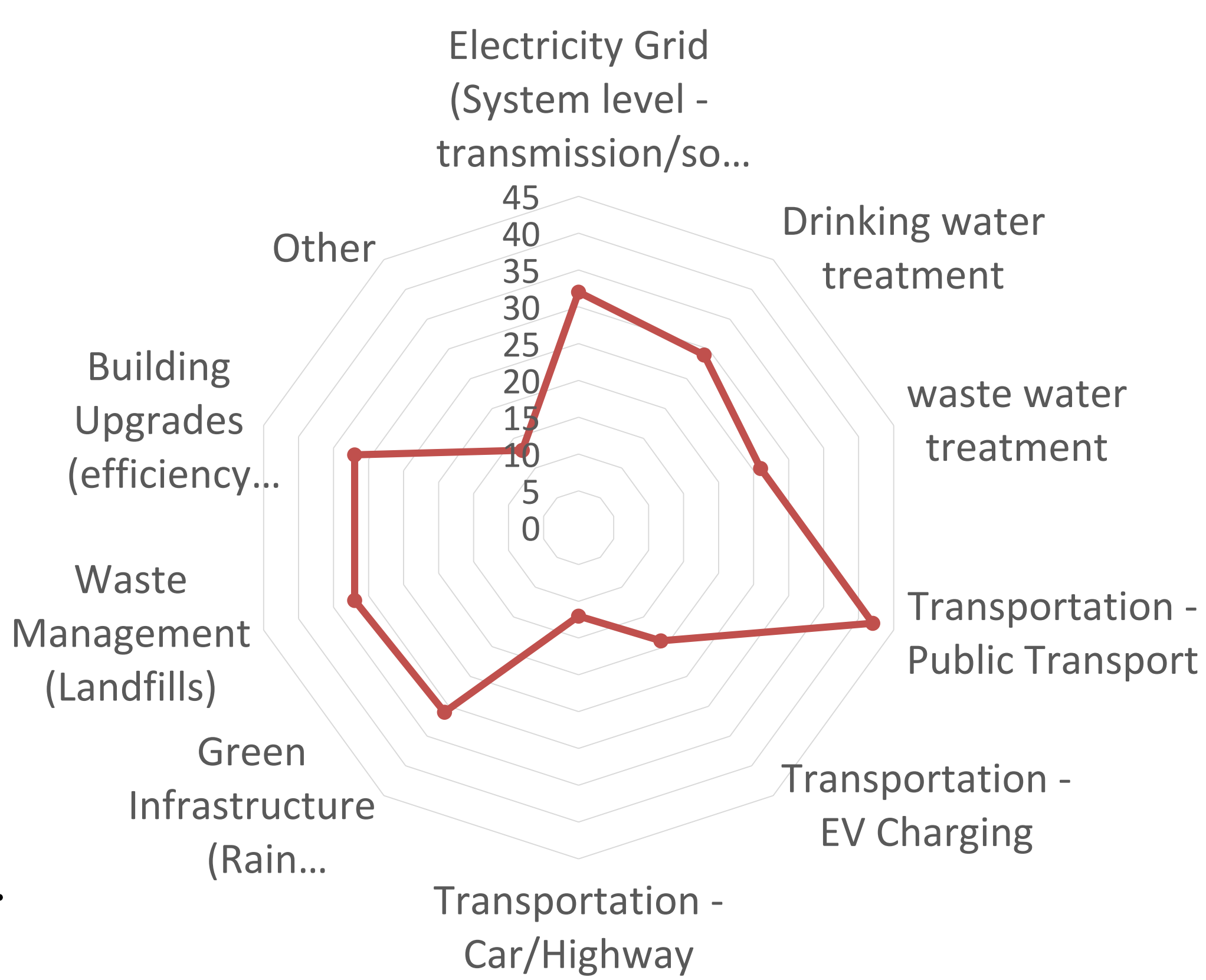

Figure 3: Frequency of stakeholder type and financial sources indicated. The variety of financial sources and stakeholder types indicates a multi-level, collaborative approach to resilience planning, emphasizing the public-private partnerships.

REFERENCES

1 United Nations, (2016).
2 Khamis, Rim, (2018).
3 Berrang-Ford et al., (2021).
4 Brinkhoff, Thomas, (2024).

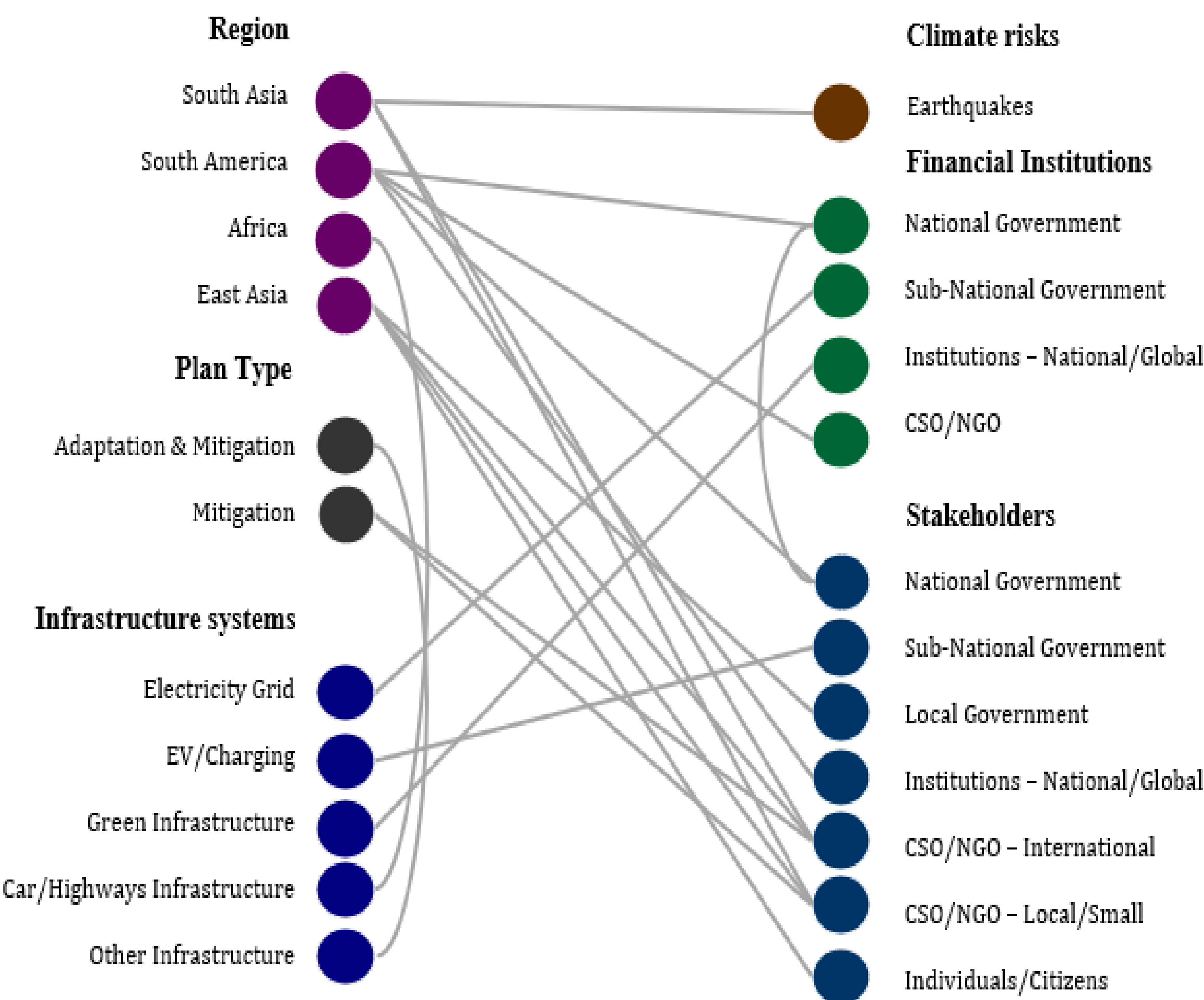### Are there emergent themes across megacity adaptation plans?

Figure 4: Statistically significant variables determined by Chi Squared. The statistical analysis revealed several emergent themes in how cities address climate risks. Key connections are observed between specific infrastructure systems, such as electricity grids and green infrastructure, and the adaptation plans implemented in various regions. The national and subnational governments play a central role in providing financial support across multiple regions, underscoring the importance of government involvement in adaptation initiatives.

CONCLUSIONS

o **RQ - 1:** Megacities are intensively prioritizing adaptation strategies based on immediate and pressing climate risks, utilizing a multi-level, collaborative approach.

o **RQ - 2:** Collaborative efforts with NGOs and local governments enhance adaptation by linking climate risks with key infrastructure investments, including electricity grids, public transport, and green spaces.