

Why did we undertake this study?

Critical infrastructure underpins a functioning society – but what is critical infrastructure, and how is it becoming adaptive to climate change? Critical infrastructure, such as water services, transport networks and hospitals, are vulnerable to the impacts of climate change. The main threats are extreme weather events, changing temperatures, and sea level rise. Although it is the consensus that critical infrastructure systems must adapt to these changes, what comprises ‘critical infrastructure’, how it becomes adaptive, and the implications of this are unclear.

How was it done?

We examined critical infrastructure literature for methods and approaches to adaptation. Over 84 peer-reviewed publications were reviewed to determine how critical infrastructure is conceptualised and how climate change adaptation is being applied to critical infrastructure systems. Each article was analysed against a set of criteria to uncover themes in adaptation approaches.

What did we find?

There is no consistent definition of critical infrastructure and the application of climate change adaptation to critical infrastructure systems is fragmented. Key findings include:

- There are four types of critical infrastructure: physical, ecological, institutional and cultural.
- Critical infrastructure adaptation is conceptualised according to the following themes: worldview, tangibility, threat characterisation, adaptation objective and the roles of actors. These themes were arranged in a typology (Fig. 1).
- The conceptualisation of adaptive critical infrastructure has implications for the expected and realised outcomes of adaptation actions.

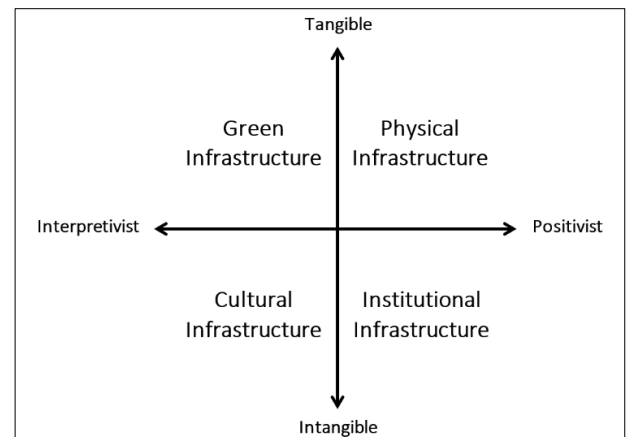


Figure 1: Typology of adaptive critical infrastructure

A definition for adaptive critical infrastructure was developed that incorporates the different types of infrastructure, and the importance of outcomes: *Adaptive critical infrastructure comprises tangible and/or intangible systems that are vital for supporting human life, and necessary to achieve social, cultural, economic and environmental outcomes.*

What are the implications?

The proposed definition presents an outcomes-based approach to classifying adaptive critical infrastructure and encompasses both tangible and intangible systems. The development and prioritisation of relationships (e.g. between physical assets or between people and their environment) can influence the adaptiveness of critical infrastructure. The relationships infrastructure practitioners choose to focus on will direct what climate change adaptation outcomes are achieved.

Want more information?

The full paper is available from (til 29 June 2022): <https://www.sciencedirect.com/science/article/pii/S1462901122001447?dgcid=author>

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Coastal Governance: Embracing Vulnerability and Change

