

Planetary boundaries and environmental tipping points: how these can be used to identify risks in infrastructure, defence, and energy natural resources

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Whilst the planetary boundaries framework, which consists of nine essential Earth systems and identifies a safe operating space for humanity within each of them, and general literature around Earth environmental tipping points are generally well understood, limited work has been done to combine both these areas of research. Furthermore, the risks associated with the crossing of planetary boundaries and reaching environmental tipping points, and the cascading risks that may ensue, on infrastructure, defence and energy natural resources is not understood, and subsequently there has not been an appropriate level of investment in resilience and adaptation across these areas.

This paper firstly presents an updated analysis of the literature regarding the planetary boundaries, and environmental tipping points, before combining the two areas. By combining these two areas, key Earth systems are identified, and subsequently the cascading risks from exceeding limits in these Earth systems are explored as they relate to infrastructure, defence, and energy natural resources. From this analysis, a framework is generated, and key areas for resilience and adaptation building to minimise overall, and cascading risk are identified for the areas of infrastructure, defence, and energy natural resources.