Addressing Pathological Dynamics of Global Environmental Problems

Garry Peterson, Oonsie Biggs, Anne-Sophie Crépin, and Victor Galaz

1Stockholm Resilience Centre (SRC) – Stockholm University, Kraftriket 2B, 114 19 Stockholm, Sweden
2The Beijer Institute of Ecological Economics – Sweden
3Stockholm Resilience Centre – Sweden

Abstract

Human wellbeing has advanced greatly over the past century, but the very processes that have enabled these advances have given rise to growing, seemingly intractable global environmental problems, such as climate change, biodiversity loss, eutrophication and increased antibiotic resistance. These problems pose serious threats to human wellbeing and have persisted despite decades of diverse efforts to address them. In this paper we propose that identifying a set of “pathological dynamics” can help reveal strategies to address these global environmental problems. Rather than analyzing the causal interconnections amongst different global environmental problems, we attempt to identify shared underlying features of different problems and assess how they might be addressed. We look across eight major global environmental problems and attempt to identify generic underlying pathological dynamics that characterize these problems. We then investigate whether understanding these dynamics can help identify relevant combinations of existing strategies from different disciplines that might address these problems where individual strategies have failed.

By combining simple network approaches with expert assessment to map the relationships among pathological dynamics, global environmental problems, and response strategies we can produce a rich but graspable conceptual map of global social-ecological system dynamics. This type of conceptual mapping can serve to identify connections and gaps in our understanding and management of the Anthropocene.

Our analysis reveals that there is substantial overlap in dynamics among global environmental problems, and that a diversity of response strategies can be applied to address all global environmental problems. This suggests that responses to different global environmental problems have a lot to learn from one another, and that there should be more effort to enhance scientific and practical learning across global environmental problems. We start such a comparison by suggesting variety of high potential synergies among problems and response strategies. Communication and collaboration among scientists, practitioners and policy makers working on different global environmental problems could therefore substantially improve our ability to address specific environmental problems. Our analysis suggests further that the main challenge is to create effective environmental governance systems, and requires practical action and more creative solution-oriented science rather than problem defining science. Consequently, we echo the calls of other global

*Speaker
environmental researchers that the key need is for research that identifies and overcomes barriers to implementing strategies to address these pathological dynamics. However, because our analysis is of known global environmental problems, our results don’t suggest that more science and the reduction of environmental pressure are not important to prevent the emergence of new pathological dynamics. Rather, the importance of these strategies for combating the pathological dynamics with the most uncertainty reveals that this is exactly where these strategies should be focused.

**Keywords:** Global environmental problems, pathological dynamics, human well, being, solutions