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**3<sup>rd</sup> International Conference for  
Sustainable Resource Society**  
Water Cycle in the Environment and Society



**Conference proceedings and abstract collection**

**Kristina Leppälä and Ville-Veikko Piispanen, editors**





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University of Eastern Finland



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Author: Amy Fallon, Charles Sturt University

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#### Content:

While hydropower is often promoted as a low-carbon source of renewable energy and tool for climate change mitigation, hydropower infrastructure often disrupts water flows and fragments vital riverine ecosystems, undermining its sustainability. Hydropower is particularly contentious in regions experiencing rapid infrastructural development despite millions of people depending upon healthy rivers for their food and livelihood security, such as Southeast Asia. Resultant trade-offs between social, economic and ecological goals therefore create complex governance challenges with no simple solutions due to multiple (often-conflicting) perspectives and needs. Using a social-ecological-technological systems (SETS) lens, we look at the complex governance challenges associated with hydropower development in contexts where dams are negatively impacting fisheries and livelihoods. Drawing on theories of resilience, interactive governance, and social-ecological systems, a resilience-governance framework (Fallon et al., 2022) is used as a conceptual tool for understanding the multi-scalar systemic impacts of hydropower development across a SETS, as well as the 'goodness of fit' of the existing governance arrangement. We argue that if a governance arrangement is not well-suited to the SETS context, 'rigidity traps' may emerge in some parts of the system, locking it into an unsustainable – and often unjust – trajectory. We apply the framework to a case study in Indonesia, where 99 hydropower dams are currently in existence or under construction, with another 18 planned (Yuen et al., 2023). In Indonesia's Sulawesi Island, recent hydropower dam construction is impacting fish and eel populations. Technical interventions – such as fish passages – are underway to address the situation. However, arising environmental conflicts between local communities and the associated energy company highlight the need for social interventions to ensure both sustainable and equitable outcomes. A systems' approach may improve our understanding of complex SETS undergoing rapid infrastructural change, as well as 'windows of opportunity' for governance interventions for more sustainable and equitable transformations.