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Breaking the failure cycle: Strategy game design to rethink mangrove restoration

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Abstract

Coastal ecosystems like mangroves offer critical ecological and socio-economic services, including storm protection, biodiversity support, and carbon sequestration. In Thailand, however, mangrove restoration efforts often fall into failure cycles due to top-down planning, insufficient stakeholder engagement, and financing mechanisms that prioritise spatial coverage over ecosystem functioning. To address these challenges, this study applies a participatory, strategy game-informed research approach grounded in the PARDI framework (Problems, Actors, Resources, Dynamics, Interactions) to explore the governance dynamics of mangrove restoration. Fieldwork was conducted across two villages in Trat Province, each with distinct relationships to their surrounding mangrove ecosystems – one rooted in fisheries and aquaculture, the other in ecotourism and community-based enterprises. Through facilitated workshops, community members collaboratively mapped local resource flows, stakeholder interactions, and seasonal livelihood calendars. These exercises highlighted key socio-ecological dynamics, including the consequences of monoculture planting, changing access to coastal resources, and the implications of external funding mechanisms. Notably, the approach surfaced nuanced power imbalances between local communities, government agencies, and private actors involved in restoration. The participatory modelling process serves not only as a research method but also as a platform for social learning, enabling stakeholders to co-create and build a shared understanding of restoration trade-offs. Findings from these workshops are now shaping the prototyping of a strategy game designed to simulate stakeholder negotiations and inform more context-sensitive and inclusive policy solutions. This work contributes to broader discussions on governance reform, particularly on ecosystem service valuation and emerging funding mechanisms such as blue carbon financing. By embedding local perspectives into the design of future mangrove restoration initiatives, the research offers a pathway toward more effective, equitable, and sustainable mangrove governance in Southeast Asia.

Keywords: Blue carbon, mangrove restoration, participatory modelling, stakeholder engagement, strategy game