Stockholm Resilience Centre

Brief

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Social-ecological traps: Understanding the interactions between poverty and environmental degradation

PHOTO: H. NHIEM

Brief abstract/summary

Persistent poverty is commonly explained as a trap. Development economists usually consider poverty traps as purely social phenomena, detached from ecosystems. Understanding the social-ecological nature of traps expands the thinking of poverty traps to explicitly consider how ecology feeds into, is shaped by and affects persistent poverty. The social-ecological interactions causing these so-called social-ecological traps can be complicated and change over time. They can also worsen by processes happening at a regional or even global scale. Thinking through social and ecological causes and the different options available to people can help them to navigate out of a social-ecological trap.

Key messages

- Traps result from social and ecological factors interacting at a local scale as well as the effects of factors situated at regional or global scales.
- The way that a trap originates and persists is affected by the social and ecological history of a particular place.
- Adaptation to the conditions of a social-ecological trap can deepen the trap by reducing the range of future options available.
- Transformative change that allows people to escape from a trap requires analysis of the social and ecological dynamics that cause and maintain the trap.

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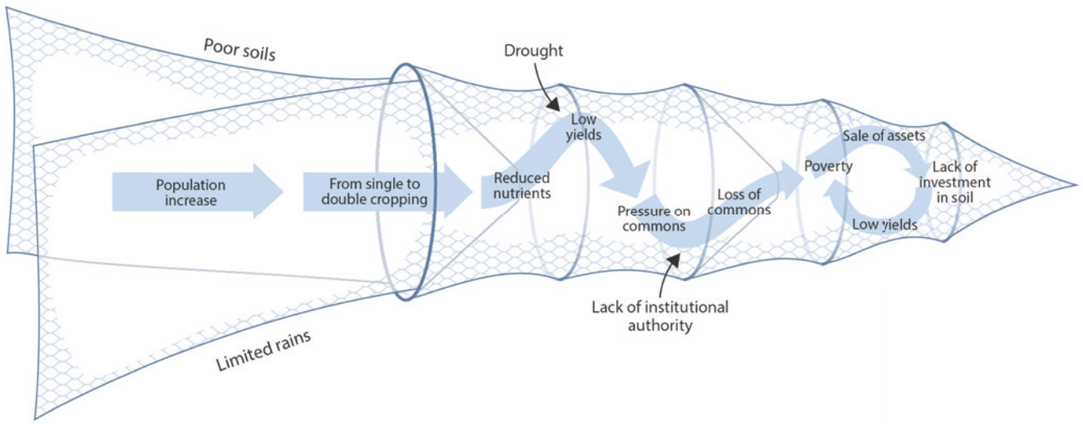

A fyke net is a type of fish trap which illustrates how trap conditions deepen over time. As fish struggle to escape, they are pushed deeper and deeper into the trap by the structure of the trap. In the same way, people struggling to escape from a social-ecological trap are pushed by social and ecological structures deeper into a trapped situation. The figure is overlaid with an example of a social-ecological trap in dryland Tanzania. The arid conditions and poor soil fertility led into the trap, whereby double cropping driven by population increase undermined soil fertility and yields and increased pressure on common resources. Additional pressure from droughts and the disruption of local institutions to manage commons 'funnelled' the system further into a negative self-reinforcing cycle of poverty, loss of assets and land degradation (case description from Enfors 2013, Boonstra and de Boer 2013). Illustration: J. Lokrantz/Azote

From poverty to social ecological traps

The concept of a 'poverty trap' describes a situation where poor people have little economic capital, which limits their economic productivity. Low productivity feeds back on their ability to accumulate capital and improve their productivity, and thus they are trapped in poverty. This understanding has supported the idea that poverty traps can be broken by a big push of external inputs to overcome poverty thresholds. In Sustainability Science the trap metaphor is used more broadly to describe a situation where human activities and natural processes interact to mutually reinforce poverty and ecological degradation[1].

Why is it important for development?

The idea of social-ecological traps can help understand the feedbacks that exist between chronic poverty and ecological degradation, and can highlight the key connections between social and environmental development aspects of the Sustainable Development Goals.

Poverty alleviation strategies that only measure poverty in monetary terms and focus on capital accumulation can have negative impacts on cultural and environmental resources that are important for people's livelihood[2]. Thus 'big push' poverty alleviation strategies aiming to boost financial capital often unintentionally undermine cultural practices or degrade the environment, adding to the persistence of poverty[2].

A resilience approach to social-ecological traps implies transformative strategies based on people's agency to escape social-ecological traps. Such an approach demands the explicit examination of four aspects of social-ecological traps[3]:

1) What are the social-ecological interactions that reinforce human poverty, vulnerability and ecological change. For example, asset-poor farmers may be unable to invest in soil conservation or nutrient management, leading to land degradation and further impoverishment;

1 Enfors, E. 2013. Social–ecological traps and transformations in dryland agro-ecosystems: Using water system innovations to change the trajectory of development. Global Environ. Change 23 (1): 51–60.
Describes the reinforcement of poverty and low productivity in Northeastern Tanzania as a social-ecological trap and evaluates drivers and possible transformative solutions including small-scale water system innovations.

2 Lade. S., Haider, J. et al. 2017. Resilience offers escape from trapped thinking on poverty alleviation. Sci. Adv. 2017;3: e1603043 3 May 2017
Shows how interventions that ignore nature and culture can, in some contexts, reinforce poverty.

3 Haider, L.J., Boonstra, W.J., Peterson, G.D. and Schlüter, M. 2018. Traps and Sustainable Development in Rural Areas: A Review. World Development. doi.org/10.1016/j.worlddev.2017.05.038
Reviews the use of 'traps' across a range of literature and highlights the importance of path-dependency, social-ecological diversity, cross-scale dynamics and external factors to understand traps from a social-ecological perspective.

A family navigates through fish traps and fish pens spread over the surface of Tam Giang lagoon. Photo: Hoang Nhiem

Case Study: Historical development of a social-ecological trap in a Vietnamese lagoon

The Tam Giang lagoon in Vietnam is one of the biggest lagoons of South East Asia. The mixture of fresh- and saltwater supports a richness and abundance of biodiversity, as well as food and income for local people. But fish productivity in the lagoon is dwindling due to a complex interaction between population growth, fisheries and aquaculture development, pollution, and climate change. To cope with lower catches, many fishers put in more gear, and fish farmers make debts to expand and intensify their aquaculture yields. Unfortunately, the increased fishing effort and growing aquaculture only put more pressure on the lagoon ecosystem, leading into a social-ecological trap[5]. Access to global market demand, since Vietnam introduced its 'open door'-policy (doi moi) in the 1980s and 1990s, and increased availability of financial credit, makes it possible to keep (re)building fisheries and aquaculture despite declining productivity[6]. Still, the situation in the Tam Giang lagoon is not a remorseless tragedy. Some fishers and fish farmers try to diversify and reduce their reliance on the lagoon ecosystem, through employment elsewhere or diversifying the fish species they farm or fish[7]. Moreover, several NGO's in collaboration with local villages and authorities have implemented co-management schemes to reduce fishing effort and pollution from aquaculture[8].

5 Armitage, D. and Marschke, M., 2013. Assessing the future of small-scale fishery systems in coastal Vietnam and the implications for policy. *Environmental Science & Policy,* 27, 184–194.

6 Boonstra, W.J. and Nhung, P.T.H., 2012. The Ghosts of Fisheries Management. *Journal of Natural Resources Policy Research*, 4 (1), 1–25.

7 Hanh, T.T.H. and Boonstra, W.J. 2018. Can income diversification resolve social-ecological traps in small-scale fisheries and aquaculture in the Global South? A case study of response diversity in the Tam Giang lagoon, Central Vietnam. *Ecology & Society.* under review.

8 Ho, N.T.T., Ross, H., and Coutts, J., 2016. Evaluation of social and ecological outcomes of fisheries co-management in Tam Giang Lagoon, Vietnam. *Fisheries Research,* 174, 151–159

2) What larger-scale factors contribute to trap dynamics. For example, access to international markets may incentivise people to focus on producing cash crops only, making them vulnerable to sudden price drops in global markets.
3) What range of desires and abilities do people have, and how are these constrained by outside factors such as formal institutions. Diversity in social (e.g. traditional values, practises and mixed livelihoods) and ecological (e.g. traditional crop diversity and habitat diversity) factors can leave people with different options, resilience and strategies to escape social-ecological traps, but this diversity is often ignored and marginalised with development interventions.
4) How have trap conditions evolved over time? Traps can progressively 'deepen' or become more rigid due to the coming together in time of social-ecological feedbacks and outside forces. Decisions and investments at one point in time, for example to clear a mangrove forest for a shrimp farm, can foreclose future opportunities of benefiting from storm protection, fisheries support and forest products in the future. In this way traps are 'path dependent' whereby tomorrow's social-ecological trap evolves as a result of today's events[4].

4 Boonstra, W.J. & F.W. de Boer. 2013. The historical dynamics of social-ecological traps. AMBIO. DOI 10.1007/s13280-013-0419-1

Further reading

Rethinking development aid to avoid traps
Researchers have put together new puzzle pieces in the poverty traps framework, in order to find ways to look at different possible solutions for development. Adding nature and culture, they find, changes everything
Rethink article, May 2017

Haider, L.J. and Lade, S.J. Why thinking beyond money is vital for solving the poverty puzzle. The Conversation. https://theconversation.com/why-thinking-beyond-money-is-vital-for-solving-the-poverty-puzzle-77600

Cumming, G.S. 2017. A review of social dilemmas and social-ecological traps in conservation and natural resource management. Conservation Letters. https://doi.org/10.1111/conl.12376

GRAID insight briefs

This brief is part of a series which introduce key insights from social-ecological resilience research, and how they relate to challenges of development in the Anthropocene.

Human actions increasingly dominate the biosphere, the thin living surface of the earth on which people depend. The complex feedbacks between social and ecological processes and interconnections and between different places can lead to surprising sudden changes, as well as inertia in undesirable states. Awareness of the Anthropocene challenge and the complex behaviours of social-ecological systems highlights the need to embrace uncertainty, explore how stewardship can be supported at different scales, and for transformational change for a sustainable and just development.

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