Tropentag, September 10-12, 2025, hybrid conference

"Reconcile land system changes
with planetary health"

Does sustainable aquaculture certification protect mangroves? Evidence from Vietnam

Uyen Tran[1], Yaghoob Jafari[1], Lisa Biber-Freudenberger[2], Jan Börner[2]

[1] *University of Bonn, Institute for Food and Resource Economics, Germany*
[2] *University of Bonn, Center for Development Research (ZEF), Germany*

Abstract

Mangrove forests are amongst the world's most carbon-rich tropical ecosystems, home to diverse aquatic and terrestrial species, and provide protection and livelihoods for the coastal communities. Aquaculture has long been associated as the predominant driver of mangrove loss, especially in Southeast Asia. Multiple international and national conservation efforts contribute to the recent decline in mangrove loss and some mangrove gains. However, mangrove largely remains under threat, and evidence of the effectiveness of conservation interventions is scarce. Understanding of how interventions – especially those targeting the association between mangrove and aquaculture - unfold at the landscape level is therefore important for biodiversity conservation and aquaculture development.

Here we focus on a market-based conservation intervention – sustainable aquaculture certifications. Aquaculture certifications recognise producers that meet certain social and environmental standards and connect them with international consumers. Theoretically, certified farms act as a win-win business model where mangrove, aquaculture, and sustainable livelihoods can co-occur. They directly affect mangrove extent by engaging with ecologically eligible farms to restore mangrove before certification, and by annual farm monitoring throughout the certification cycle. Indirectly, they can promote mangrove-conscious practices for neighbouring farms, thus forming local environmental stewardship.

We aim to evaluate the impact of sustainable aquaculture certifications on mangrove cover. Vietnam's mangrove belt, situated in the Mekong River Delta, is chosen for its ecological importance and major role in global aquaculture sector. We use a spatial-explicit data set including thirty-year land use change and records of certified farms to assess the difference in mangrove cover in grid cells with and without certified farms. Our empirical method includes matching techniques, difference-in-difference and event-study estimators. We do not find robust evidence for overall effects of certification on mangrove extent. Our analysis however shows that, an increase in the number of certified farms in a given area could slightly avoid mangrove disturbance compared with areas without certified farms. The positive effect occurs in anticipation of the official certification year and remains significant only for the first year into certification cycle. These findings provide insights for future design and upscaling of sustainable aquaculture certifications.

Keywords: Aquaculture, biodiversity conservation, difference-in-difference, event-study, impact evaluation, mangrove, sustainable certification

Contact Address: Uyen Tran, University of Bonn, Institute for Food and Resource Economics, Nußallee 21, 53115 Bonn, Germany, e-mail: uyen.tran@ilr.uni-bonn.de