Socio-economic factors shown to drive mangrove losses and gains

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Mangroves at Minjerribah, Moreton Bay Marine Park, Queensland, Australia. Credit: E. Cunningham

New research into the drivers of mangrove loss over the past 20 years has revealed that most of the degradation can be attributed to socio-economic and biophysical factors, with mangrove cover increasing in

some areas.

The University of Queensland-led study calculated the change in mangrove cover across coastlines around the world over the past two decades, and is the first look into how local economic pressures, national governance, and conservation policies impact mangrove losses and gains, and how this has changed over time.

"Mangrove forests store high amounts of carbon and protect communities from storms, while also supporting fisheries and playing an important role in local economies," researcher Dr. Hagger said.

"To date the main cause of global mangrove loss has been from human land-use impacts associated with conversion to aquaculture ponds, agriculture, and urban development.

"What's most surprising is that, while in most instances of economic growth you'll find habitat loss and degradation, this study found the opposite.

"Travel time to the nearest city, as a proxy for access to markets to sell commodities, such as shrimp, rice, palm oil, remained a strong driver of mangrove loss over the last 20 years.

"But while economic growth, measured as an increase in night-time lights, was a driver of mangrove loss in the first decade, it was no longer associated with increased losses in the last decade, it in fact enabled mangrove expansion.

"This is potentially because of increased wealth and education and improved agricultural productivity, which would ultimately reduce economic pressure."

Researchers believe this information will help guide future mangrove conservation efforts.

"Assessing economic pressures on mangrove change with a country's governance and their support for pro-conservation programs is vital to the development of effective conservation interventions," Dr. Hagger said.

"That's why the information revealed in this study is so important—it provides valuable, and sometimes surprising, insights over a long period of time on both mangrove losses and gains."

Researchers also discovered a strong positive association between community forestry efforts and mangrove gains.

"What we know is that sustainable community-based management of mangrove forests that recognizes local land tenure rights can make a difference," Dr. Hagger said.

"We also found that hotspots of mangrove loss caused by conversion to aquaculture ponds and agriculture often occur in protected areas.

"Community management of forest resources within protected areas could also help improve enforcement of those protected areas.

"Now we have more information to not only support that on the global-scale, but inform our efforts moving forward."

This research was published in *Nature Communications*.

More information: Valerie Hagger et al, Drivers of global mangrove loss and gain in social-ecological systems, *Nature Communications* (2022). DOI: 10.1038/s41467-022-33962-x

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