

Could fish ponds help with Hawai‘i's food sustainability?

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An aerial view of He'eia fishpond. Credit: Keli'i Kotubetey, Paepae o He'eia

Indigenous aquaculture systems in Hawai‘i, known as loko i‘a or fish ponds, can increase the amount of fish and fisheries harvested both inside and outside of the pond. This is the focus of a study published by a team of researchers at the University of Hawai‘i at Mānoa Hawai‘i Institute of Marine Biology (HIMB). Today, aquaculture supplies less than 1% of Hawai‘i's 70 million pounds of locally available seafood, but

revitalization of loko i'a has the potential to significantly increase locally available seafood.

The paper is [published](#) in the journal *Ecosphere*.

According to historical accounts, loko i'a can create surplus fish inside the pond, but their role as a nursery ground seeding surrounding [fish populations](#) has received less attention.

"We have demonstrated the ability of Indigenous aquaculture systems to produce a surplus of fish as well as supplement fisheries in the surrounding estuary," said lead author and marine biology Ph.D. candidate Anne Innes-Gold. "We have heard people voice the idea that historically, loko i'a provided nursery grounds that may have supplemented fish populations in the estuary. Our study is the first that we are aware of to demonstrate this idea in academic literature."

Hawai'i's unique aquaculture system

The Indigenous aquaculture systems found in Hawai'i boast a design found nowhere else in the world, and are among the most productive and diverse of their kind. Loko i'a historically yielded nearly 2 million pounds of fish annually, and *hoa'aina* (land tenants) and *kia'i* (caretakers) initially managed them with a "take what you need" mentality to ensure the resource persisted. Most loko i'a were destroyed in the 20th century, and by 1994 only six of 500 historical loko i'a were still operating.

"As aquaculture continues to provide a growing proportion of our seafood globally, revival of Indigenous [aquaculture](#) systems will be beneficial to sustainably maintain and increase our seafood supply," said Innes-Gold.

Restoration success story

One success story of loko i'a restoration is the He'eia Fishpond, located in Windward O'ahu and stewarded by Native Hawaiian nonprofit, Paepae o He'eia. Their mission is to link Indigenous knowledge with contemporary management to promote cultural sustainability and restore and maintain a loko i'a for the [local community](#). The benefits of restoring loko i'a and related systems can help boost local food production, and provide community members with a space to nourish their bodies and minds, connect with 'āina, practice reciprocity and promote cultural education.

With their foundational work complete, Innes-Gold and her team plan to simulate potential climate change impacts in a loko i'a system.

More information: Anne A. Innes-Gold et al, Restoration of an Indigenous aquaculture system can increase reef fish density and fisheries harvest in Hawai'i, *Ecosphere* (2024). [DOI: 10.1002/ecs2.4797](https://doi.org/10.1002/ecs2.4797)

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