

THE *Current*

August 26, 2022

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Tracking Small-Scale Fishers

Roughly half of all global seafood is caught by artisanal fishers — individuals who operate on small, often subsistence scales, and who generally fish a short distance from the coast. Though diminutive in comparison to larger-scale commercial operations, these enterprises are essential to the food security and livelihoods of their communities, and their sheer number makes artisanal fishers an important sector to monitor and manage, as well as to advocate for, as the global fishing industry continues to grow and climate change causes shifts in their food supply.

“You can’t manage what you can’t measure,” said conservation professional and academic Juan Andrés Silva, formerly a researcher with the [Environmental Markets Lab \(emLab\)](#) in UC Santa Barbara’s Bren School of Environmental Science & Management. “You can call them ‘small-scale,’ but their importance and impact are huge.” Despite this impact, artisanal fishers, he said, are “a very invisible sector,” and one worth trying to get a sense of.

In an effort to do so, Silva and his colleagues embarked on an experiment to gauge how well small-scale fishers would take to adopting vessel tracking technology originally developed for larger oceangoing ships. The researchers partnered with the organization [Global Fishing Watch](#) for this project, and their [results](#) are published in the journal *Ocean & Coastal Management*.

Options for Adoption

As satellite-enabled networks, vessel tracking systems (VTS) were originally

conceived to prevent maritime collisions, but have been deemed useful for other purposes as well, including monitoring fishing activity in sensitive marine areas and looking out for forced labor on the high seas.

“According to the data we have, about 86% of the estimated 2.5 million motorized fishing vessels in the world are under 12 meters. Of those, less than 0.4% use some type of VTS,” said Silva, who conducted research for this study during his time with emLab. “So we’re talking about a massive number of fishing vessels that account for a big part of the global catch that don’t have this technology.

“And they certainly have an important impact because they usually fish closer to the coast where the bulk of biodiversity is and where coastal development happens,” he continued. “So understanding fishing behavior allows for better marine spatial planning and better fisheries management, and can also contribute to increased safety at sea.”

That said, the success of any system for monitoring artisanal fishers depends on the individuals themselves. So, the researchers approached fishers in Mexico and Indonesia to conduct a discrete choice experiment and evaluate under what conditions they would be willing to adopt the technology.



Lead author Silva interviews an artisanal fisher in Mexico.

Photo Credit: COURTESY IMAGE

In their survey, the researchers offered the fishers several packages with different options and features, such as safety, privacy and ownership of data. They asked the fishers how much they would be willing to pay to have the equipment installed on their boats or, alternatively, if they were willing to receive payment in exchange for their participation in the program.

“One thing to keep in mind about small-scale fishers is their incredible diversity,” Silva said. “There was a lot of variability in their attributes, including their levels of education, or previous exposure to technology, much of which would influence their attitudes toward using new equipment on their boats.

“One of the biggest concerns was that it would be a nuisance for them to have extra stuff on their boats,” he added. For instance in Mexico, many fishers who were given a long, orange device they would come to call “the carrot” found it annoying to have to maintain and recharge the gear, even though it would be useful for their safety. In other cases, fishers, unsatisfied with their catch quotas, might reject the VTS because it would inhibit their extralegal fishing efforts to earn more money.

In their sample of 211 fishers — 124 in Indonesia and 87 in Mexico — the majority (67%) were willing to pay to participate in their preferred VTS program, while 13% would participate if the program was free. Meanwhile, 11% would not opt into any program, and 9% would if they were paid to do so.

Overall, the researchers found that safety functionality (particularly for fishers who share space with large vessels) and ownership of their fishing activity data played a large part in fishers’ willingness to accept the new tech. Those who perceived governmental and administrative corruption as their main problem were often willing to pay more to participate in the VTS program, as compared to those whose main problem was illegal, unreported and unregulated fishing, pollution or extreme weather.



Satellite-enabled vessel tracking gear

Photo Credit: COURTESY IMAGE

There are other benefits to fishers using the VTS, according to Silva, particularly for fishing collectives that are more organized and supported.

“For example, there was a case in Baja, Mexico, in which the fishers actually used historical tracking data that, coupled with catch and income data, allowed them to negotiate fair compensation from the government for temporary fishing closures,” he said. “So data could also be a source of empowerment for fishers.”

This study is the first foray into small-scale fishers’ preferences in a VTS program and potential incentives that may encourage their participation. More research would have to be conducted into the highly diverse world of the artisanal fisher to encourage wide adoption, Silva said.

“From a research point of view we never intended to be super exhaustive, and there isn’t a conclusion in this study that applies to the whole world,” he said. “But we do want to gain a good picture of this ‘invisible sector,’ and understanding their motives and behavior allows for better planning and management.”

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