INCENTIVIZING TRANSPARENCY

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EVALUATING DRIVERS FOR TRACKING TECHNOLOGY ADOPTION IN SMALL-SCALE FISHERIES

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ABOUT THE PROJECT

Small-scale fisheries provide livelihoods and food security for millions of people worldwide, while also influencing the health of aquatic ecosystems. They provide 70% of the global catch for domestic human consumption and employ nearly 90% of the world's estimated 120 million fishers.[1] Despite their significance, there is a spatiotemporal data gap that limits our knowledge of small-scale fisheries and hinders their sustainable management. Automatic identification systems (AIS) and vessel monitoring systems (VMS) are effective tracking tools for collecting spatiotemporal data on fishing activity. They can also provide benefits such as improved safety at sea, traceability and transparency, informed marine spatial planning, and accurate measures of ecological impacts. However, less than 0.4% of small-scale fishing vessels are monitored using tracking technologies. The use of vessel tracking technology has seen limited success in small-scale fisheries because there isn't an international body that has mandated its usage with a top-down approach, unlike with industrial fishing. Consequently, there is potential for a bottom-up approach, where fishers participate in a vessel tracking program that is incentive-compatible to their preferences.

RESEARCH QUESTIONS

To evaluate drivers for tracking technology adoption in small-scale fisheries, we examine three questions:

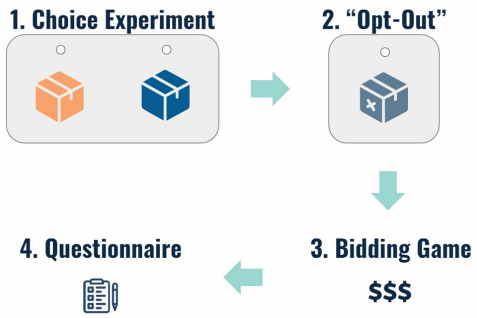
- What are the fishers' preferences on tracking technology design?
- Are fishers willing to pay for a tracking technology, or do they have to be paid?
- Do individual specific factors affect the willingness to pay?

1 PROJECT APPROACH

SURVEY DESIGN

We designed a survey to uncover fisher preferences for a vessel monitoring program that included a dual response choice experiment, bidding game, and questionnaire.

Attribute	# of Levels	Levels
SAFETY FEATURE	2	SOS No SOS
LEVEL OF PRIVACY	2	Anonymous Not Anonymous
DATA OWNERSHIP	4	Fisher Community Industry Government Public Access



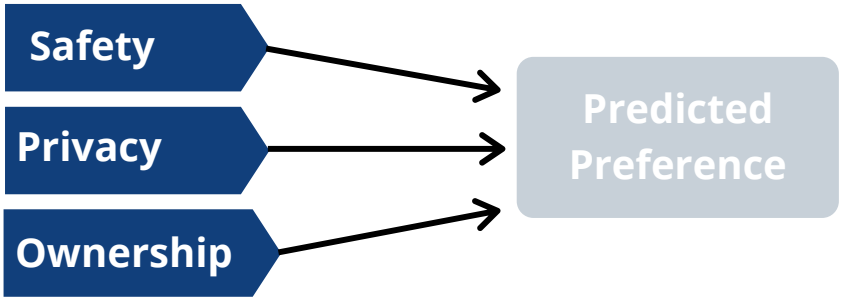
Vessel monitoring programs were designed as packages composed of three attributes: safety, privacy, and data ownership. Each package contained one level from each attribute, creating 16 unique packages. Respondents were first asked to chose their preferred program out of two offered packages, then were given a choice to opt out. Those that kept their package were asked how much they were willing to pay for it and those that opted out were asked how much they wanted to be paid before they would accept. The diagram above, on the right, summarizes this process.

SURVEY IMPLEMENTATION

We implemented our survey to 211 fishers in fishing villages in Indonesia and Mexico.

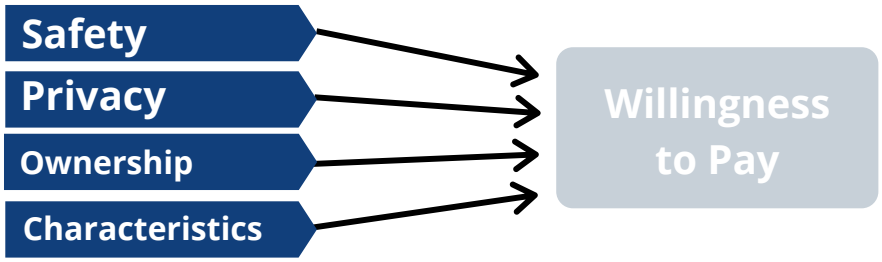
MODEL 1

Our first model considers how the different levels of safety, privacy, and data ownership affect a respondent's predicted preference for a package.



MODEL 2

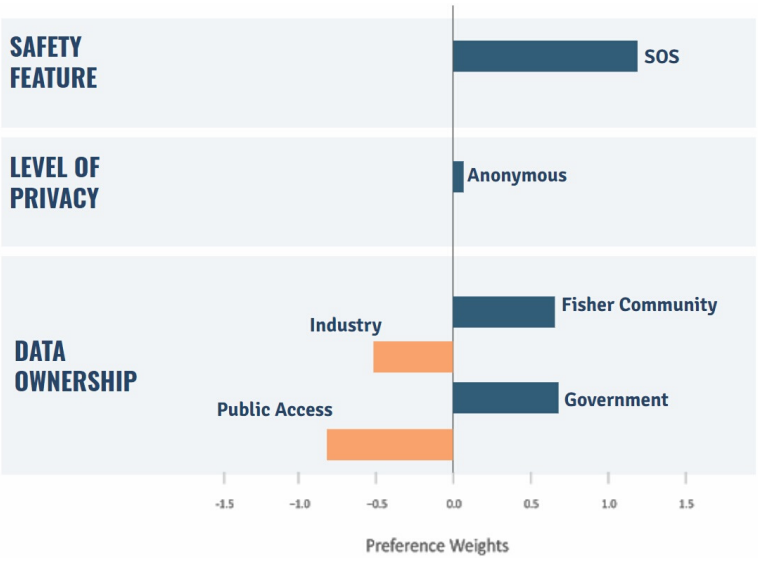
Our second model examines willingness to pay for a vessel tracking program given technology design and individual characteristics such as education level and perceived problems in their fishery.



2 MAIN FINDINGS

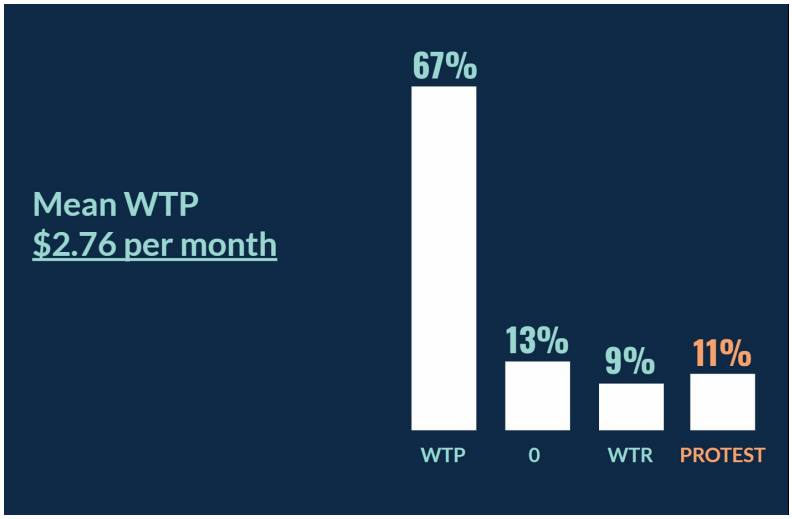
Fisher Preferences

Fishers prefer a vessel tracking device with an SOS safety feature, privacy with published tracking data, and government ownership of the collected data.

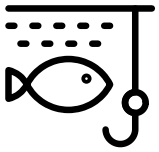


Willingness to Pay

Overall, fishers are willing to pay, on average, $2.76/month to use their chosen vessel tracking program. 67% would pay to participate, 13% would participate if it was free, 9% would participate if paid, and 11% would not participate in a vessel tracking program at any payment.

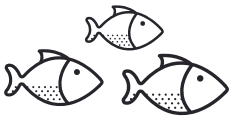


Individual Characteristics



Exposure to fishing technology had a positive effect on willingness to pay.

Having some formal education or university level or higher education increased willingness to pay compared to no education.



Perceptions toward illegal fishing, polluted waters, and extreme weather events decreased willingness to pay compared to corruption.

3 RECOMMENDATIONS

Future Research

Continue to explore preferences for vessel tracking programs among representative samples of small-scale fishers.

Modify our survey and switch to a standard choice experiment to reduce bias associated with pooling data from two choice experiment datasets.

Evaluate more measures and implement more surveys in a variety of villages to help create a more representative dataset that can lead to a more refined model. The new model can expand to include different variables, such as levels of trust, that were not fully analyzed in our model.

Next Steps

Design vessel tracking technology with SOS signal capability to increase the proportion of fishers who will participate in the program.

Consider tailoring payments to the characteristics of each village since individual characteristics drive willingness to pay.

Create and implement a randomized controlled trial to further explore the effects of technology design and individual characteristics.

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More info can be found at www.pangawatch.com or by contacting gp-pangawatch@bren.ucsb.edu

References:

1 Kolding, J., Béné, C., & Bavinck, M. (2014). Small-scale fisheries: Importance, vulnerability and deficient knowledge. In S. M. Garcia, J. Rice, & A. Charles (Eds.), *Governance of Marine Fisheries and Biodiversity Conservation* (pp. 317–331). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118392607.ch22e