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Study: Where Climate Harms Fisheries, Piracy Prospers

Rising temperatures have opposite impacts on piracy in East Africa and the South China Sea

[Boston, MA—April 27, 2023] A study published online this week in the American Meteorological Society journal *Weather, Climate, and Society* (*WCAS*) suggests that **climate change is a key factor driving trends in maritime piracy** off the coast of East Africa and the South China Sea. Rising sea surface temperatures affect regional fisheries differently, leading to changes in the timing and success of pirate attacks.

The study, by Bo Jiang, assistant professor in the Faculty of Social Sciences at the University of Macau, and Gary LaFree, distinguished university professor of criminology and criminal justice of the University of Maryland, College Park, illustrates the complex links between climate change and crime on the seas. The authors found that rising sea surface temperature had opposite effects in two of the world's piracy hotspots: years with warmer seas have negatively impacted East African fisheries, leading to increased piracy, and positively impacted South China Sea fisheries, leading to decreased piracy in those waters.

Piracy in coastal East Africa and the South China Sea poses a major security threat and costs the shipping industry billions of dollars per year. "About 90% of the world's traded goods are transported by sea," notes LaFree. "It's a huge part of international and global commerce." Yet, Jiang says, "Pressing issues such as the connection between … piracy and climate change, have been basically a research vacuum because very few people have the expertise in both of these specialized areas." He called for more interdisciplinary research in the future.

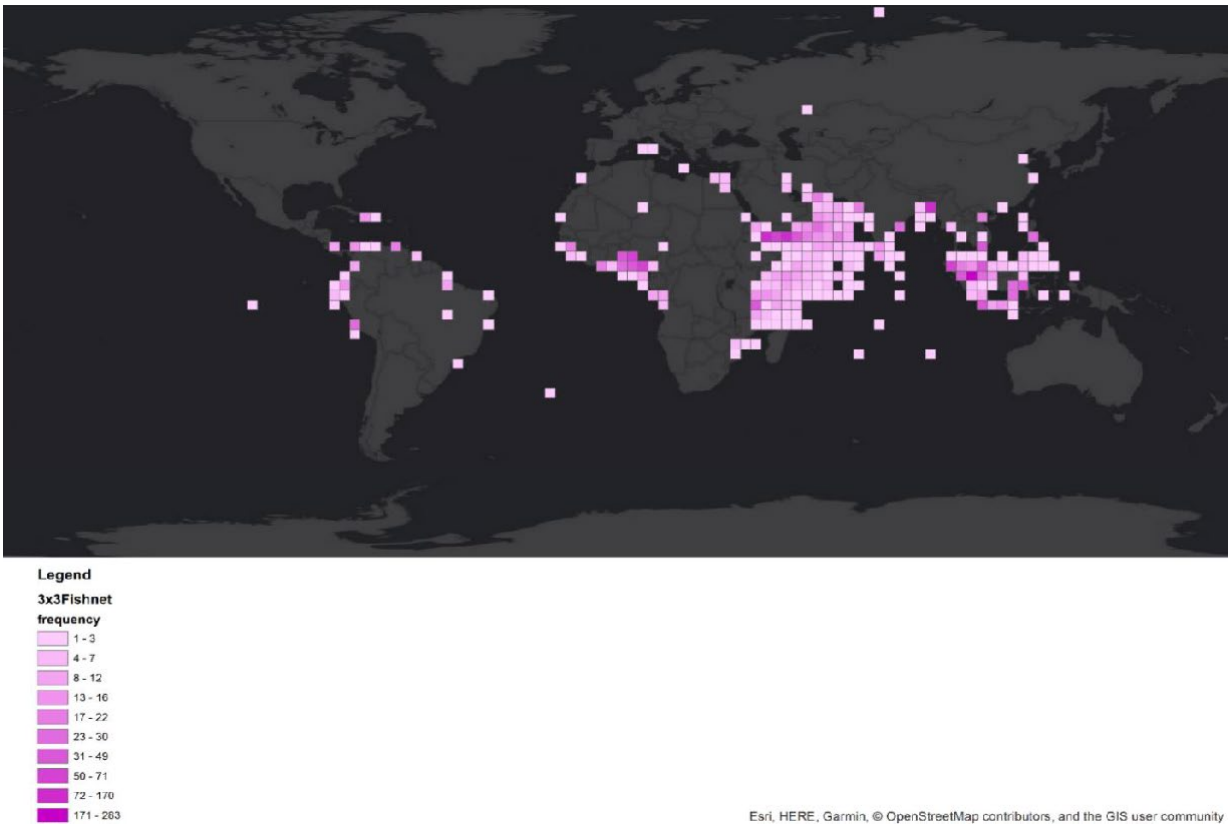

Illustration from Jiang and LaFree's study, showing the frequency distribution of pirate attacks worldwide between 2006 and 2015.

"Part-Time Pirates" and Climate Change

Jiang and LaFree are among the first to establish a firm link between rising sea temperatures, fisheries, and pirate attacks (namely, the time between attacks and the likelihood of each attack's success)—even when controlling for other influences like economic stress, private security guards on board, and local political corruption. The authors examined decades worth of pirate attacks ranging from the late 1990s to the early 2010s to show the significance of the relationship.

"In a timeline of roughly 20 years, we're picking up statistically significant, measurable differences," LaFree says. "I was somewhat surprised by how rapidly those changes are occurring, especially when you think of climate change most likely accelerating in the future." This is likely due in part to how temperature-sensitive fish are, with the slightest change leading them to migrate to more hospitable areas.

Previous studies have shown that fishermen, who already possess the required seafaring skills, may resort to piracy when economic conditions are bad. "I grew up in Singapore," Jiang says, "There are a lot of fishermen in nearby waters who are known as 'standby pirates.'" He adds that this is one of the first criminological studies to look at the economic decisions involved when fishermen turn to piracy and when they desist from it. It provides a direct test of rational choice theory, showing that piracy levels are affected by cost-benefit analysis on the part of local fishermen.

Dangerous Seas

Based on the trends they uncovered, Jiang and LaFree are sounding the alarm about maritime security trends, especially in East Africa. “If our arguments are correct, and sea temperatures continue to rise into the foreseeable future, the struggle against piracy in East Africa will become increasingly difficult,” they write in the *WCAS* paper.

“The big question here is, how do we diversify a fisherman’s income profile?” says Jiang. “For the governments of Somalia and Kenya and coastal states in East Africa, this is a pressing issue that needs to be addressed.”

LaFree adds that, like climate change, “The crime problems facing the world are increasingly global. … Having strong international participation is really going to be critical.” He also notes that the wealth of new insights from satellite technology and big data approaches are revolutionizing fields like criminology. “While the problems we’re facing are getting worse, I think our scientific tools for exploring them and perhaps fashioning solutions are getting better. I see the next 20–30 years as a race between how bad things are going to get in terms of the social problems and how good our technologies for dealing with these social problems are.”

Read the study: Jiang, Bo, and Gary LaFree. 2023. “Climate Change, Fish Production, and Maritime Piracy.” *Weather, Climate, and Society* (*WCAS*). https://doi.org/10.1175/WCAS-D-21-0147.1

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About *Weather, Climate, and Society*

Weather, Climate, and Society (WCAS) (ISSN: 1948-8327; eISSN: 1948-8335) publishes research and reviews that address economics, policy analysis, political science, history, communication, and institutional, social, health, and behavioral scholarship and research relating to weather and climate, including both climate variability and longer-term climate change. Contributions must include evidence-based analysis and substantive discussion of the interactions of weather and climate with society, taking an integrated approach, drawing on both the social and physical sciences.

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