



Can piracy affect fish production – or does fish production have an effect on piracy?

Linking climate change, fish production and piracy

New research on the effects of changes in sea surface temperature on piracy

BY BO JIANG AND GARY LAFREE

According to the UN's Sustainable Development Goal 13, climate change is a major issue facing societies and increasingly accepted as a significant challenge with the potential to reshape future global security.

While past research has consistently found connections between climate change and a host of negative outcomes, including global conflict, degraded livelihood systems, social disorganisation and political instability, there is little empirical evidence on the impact of climate change on maritime piracy.

This research gap is unwarranted because climate change, as measured by sea surface temperature (SST), disproportionately affects fishers whose livelihoods are linked directly to fish output.

Ethnographic evidence from Southeast Asia and East Africa indicates that criminal syndicates engaged in maritime piracy often recruit unemployed fishers and sailors. These fishers are known locally as 'part-time pirates' or 'standby pirates'. These dynamics led us to expect that piracy is often a rational response to financial insecurity as a result of low fish supply. We argue that climate change is likely to have important economic consequences for professions like fishing that depend directly on the environment.

Trends of piracy worldwide

For our research we drew pirate attack data from the International Maritime Organization Global

Information Shipping System database, fish output production data from the Food and Agriculture Organization of the United Nations Global Fishery and Aquaculture Production Statistics, and SST data from the National Oceanic and Atmospheric Administration's Extended Reconstructed Sea Surface Temperature data.

As shown in Figure 1, our research found that: 241 grids had at least one piracy attack; 16 grids (or 6.64%) generated 49.7% of all attacks; and 11 of these 16 grids were located in the South China Sea or West Africa (the remaining five were in the East or West Indian Ocean).

To overcome the reverse causality problem between fish production and pirate attacks (does fish production cause piracy or does piracy affect fish production?), we employed SST as an 'instrument' for fish production to study the impact

Moreover, we were able to demonstrate the effects of fish production on the risk of being pirated in two world regions with high rates of piracy

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of climate change on the time interval between pirate attacks.

Our research found the measure of SST increasing in East Africa and the South China Sea. Despite sea temperatures steadily increasing in both regions, fish production during the research period has gradually declined for East Africa but increased for the South China Sea.

Disaggregating each region into two areas (international water and territorial water), we observe that for East Africa, the relationship between SST and the time interval between piracy attacks remains negative in both international and territorial water. For the South China Sea, we found that increases in SST lead to a longer time between piracy attacks in both international and territorial water.

For East Africa, the hazard of piracy increases when an increase in SST leads to a decrease in fish output. We found that an SST increase that leads to a decrease of fish output by 1 million tons increases the piracy hazard by 240% to 343%.

We found that the change in the hazard of piracy is the largest in international water, followed by territorial water and port areas.

Consistent with our expectations, the hazard of piracy decreases when an increase in SST leads to an increase in fish output. An SST increase that leads to a decrease of fish output by 1 million tons increases the piracy hazard by 1.5% to 2.3%.

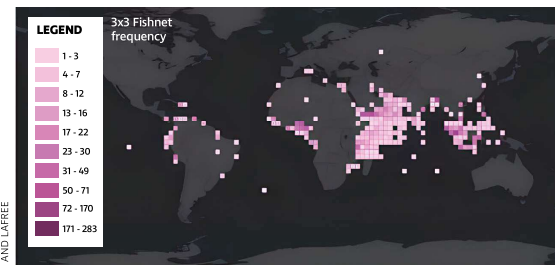


Figure 1: Visualisation of frequency of piracy attacks worldwide in 3 degree by 3 degree grids with at least one piracy attack for 2006-15

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The IMarEST has launched a Global Fisheries Improvements Special Interest Group dedicated to addressing challenges by bringing together experts in fisheries science, crew safety and welfare, vessel design, management and governance. For more information, contact technical@imarest.org

The hazard of piracy experienced the largest changes in port and territorial waters and negligible changes in international waters for the South China Sea.

Next, we examined the effect of changes in SST on whether piracy attacks were successful, i.e. pirates managed to hijack the ship, kidnap the crew, board the vessel or escape with valuables. The results were that an SST increase that leads to decreases of fish output increases the success of piracy attacks in East Africa, whereas an SST increase that leads to increases in fish output is associated with a decrease in the success of piracy attacks.

Policy implications

Our research developed a new approach to studying the dynamic relationship between climate change and maritime piracy. We found that climate change is producing fish production 'winners' and 'losers'. In support of the cost-benefit principle, we found that piracy increases when fish production declines and drops when fish production grows. Moreover,

PIRACY

we were able to demonstrate the effects of fish production on the risk of being pirated in two world regions with high rates of piracy.

Developing nations such as Somalia and Indonesia are especially vulnerable because of relatively high dependence on climate-sensitive sectors like fishing coupled with low income, and weak welfare programmes. To policymakers in vulnerable countries, the question becomes how to develop sustainable solutions to decouple the link between legitimate (fishing) and illegitimate (pirating) activities? Can some of the monetary resources allocated to regional and international efforts to combat piracy be redirected instead towards breaking the connection between fish output and piracy? What feasible ways are there to diversify a fisher's income profile? Achieving greater income diversification may require maritime countries or international agencies to do more to provide subsidies and job training to fishers in times of declining fish production.

One way to realise these outcomes is to redirect part of the income from fishing licences granted to foreign vessels to compensate local fishers. Another is to establish a 'loss and damage' fund from a portion of the proceeds in emissions trading to give subsidies to fishers whose livelihoods have been devastated by climate change.

If a strong empirical link between climate change and maritime piracy is confirmed in future research, it would be possible to develop early-warning models for maritime piracy that predicts piracy risk and allow for rapid social responses that mitigate the negative effects. ■

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