LENFEST OCEAN PROGRAM

A scientific summary
April 2022

SUPPORTING SCIENCE AND COMMUNICATING RESULTS.

RESEARCH ON SOCIO-ECOLOGICAL VULNERABILITY OF CHINA'S FISHERIES TO CLIMATE CHANGE

INTRODUCTION

There is a growing body of evidence that climate change is becoming a major disrupter of China's coastal ecosystems, which may lead to severe social, ecological, and economic impacts if not addressed. It is currently unclear how sensitive China's commercial fisheries are to climate change or whether current management efforts are sufficient to ameliorate impacts on fisheries productivity. To better understand potential vulnerabilities to climate change and equip managers with evidence-based solutions, the Lenfest Ocean Program is supporting Dr. Yong Chen and Dr. Yunzhou Li of Stony Book University to conduct an interdisciplinary research project that will evaluate the risks to China's fishing industry from climate change.

HOW CHINA IS PRIORITIZING CLIMATE CHANGE IMPACTS

Climate change is gaining increasing prominence in China, putting it front and center for the first time in the "Guiding Opinion on Coordinating and Strengthening the Work Related to Climate Change and Environmental Protection" published by the Ministry of Ecology and Environment in January 2021. Shortly thereafter, China released their 14th Five-Year Plan which prioritizes climate change risk assessments and a national initiative toward ecological civilization- a concept analogous to sustainable management.

To inform decisions around new policies, government officials often use scientific information in two ways. The first is through a systematic review of practices or knowledge from other countries who have experienced or are experiencing similar challenges, drawing from lessons learned for policy recommendations. Second, is through expert opinion, or a process that harnesses the judgment and recommendations of experts with knowledge and experience on a particular topic. Unfortunately, there is little information available to date when it comes to integrated socio-ecological assessments and vulnerabilities to climate change. As such, this project aims to fill in key knowledge gaps that can inform fisheries scientists and managers in China.

RESEARCH TEAM

- Yong Chen, Stony Brook University
- Yunzhou Li, Stony Brook University

ADVISORY COMMITTEE

- Kristin Kleisner, Environmental Defense Fund
- Jason Link, National Oceanic and Atmospheric Administration
- Kathy Mills, Gulf of Main Research Institute
- Feiyan Du, South China Sea Fisheries Research Institute, China Academy of Fisheries Sciences
- Yiping Ren, College of Fisheries, Ocean University of China
- Yi Tang, College of Marine Culture and Law, Shanghai Ocean University

RESEARCH APPROACH

Drs. Chen and Li will conduct a national-scale ecological and socioeconomic vulnerability analysis of China's domestic fisheries to climate change addressing three main questions:

1. What are the most sensitive and vulnerable fisheries under climate change in China?
2. Do expert judgement and empirical data-based assessment lead to similar or different conclusions about climate vulnerability in China's fisheries?
3. What are the available and priority adaptation strategies that could be applied to improve climate readiness for targeted fisheries in China?

Considering the importance China places on information learning and expert opinion, researchers took care to integrate both these components into their project. They will convene a small advisory committee with various expertise ranging from fisheries science to management and policy in China and the U.S. With guidance from the advisory team, the project methodology will develop and evolve as it progresses through the following key milestones:

Project scoping and framework development

First, researchers will conduct a comprehensive literature review to identify a collection of attributes and criteria currently being used to measure the biological, social, and economic vulnerability of fisheries to climate change on a global scale. They will analyze this information to understand patterns, trends, and gaps in current climate and fisheries research and use their findings as the basis for developing a project framework and to select metrics for an assessment of China's fisheries.

National-scale social-ecological vulnerability assessment based on empirical data

For the second milestone, researchers will conduct an empirical assessment, using the information gathered in the literature review stage to measure: 1) impacts of climate change on China's waters, 2) biological sensitivity and recovery potential in the face of climate change, and 3) socio-economic sensitivity and adaptive capacity of China's fisheries sector.

National-scale social-ecological vulnerability assessment based on expert knowledge

The research team will also assess expert opinion in the field (e.g., fisheries scientists and managers) through interviews and questionnaires to collect data about their perceptions of social-ecological vulnerability for select commercial fisheries. They will then compare the results from the empirical assessment with the expert knowledge surveys to examine potential gaps between these two knowledge systems.

Case studies of targeted fisheries and identification of fisheries adaptation strategies

Lastly, the research team will work with their Advisory Committee to develop 1-2 case studies of targeted fisheries and identify available adaptation strategies that could be applied to improve climate resilience. In collaboration with the China-based research networks, the Marine Fisheries Partnership and China Fisheries Learning Network, they will conduct semi-structured interviews with fishers from selected case studies to understand stakeholder perceptions of environmental variability, including climate change, and adaptation strategies they have employed to cope with these challenges.

RECOMMENDATIONS FOR MANAGEMENT

The team will share their findings with key stakeholders and policymakers to generate dialogue and accelerate management solutions for climate-ready fisheries in China. They will distill what they have learned into a white paper with a summary of recommendations and guidelines for developing climate-resilient fisheries in China.

CONTACT

For questions, please contact Emily Knight, Lenfest Ocean Program, at eknight@lenfestocean.org. To learn more about this research and stay up to date on our latest projects, follow us on Twitter @lenfestocean or sign up for our newsletter at www.lenfestocean.org.