UC SANTA BARBARA

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The People's Waterways

An estimated 70% of China's rivers and lakes are too polluted for human use, the result of decades of intensifying economic development that have increased the amount of pollution that winds up in the water. Fixing China's water pollution problems is an uphill battle, but citizen monitoring of remediation efforts could lead to consistent improvements in water quality, according to researchers at UC Santa Barbara and Nanjing University.

"China has some of the most polluted waterways in the world," said Mark Buntaine, an associate professor at UC Santa Barbara's Bren School of Environmental Science & Management and the co-lead author of a study published In the Proceedings of the National Academy of Sciences. Rivers and lakes tend to become the destination for industrial wastewater, agricultural effluent and untreated sewage, in addition to large amounts of plastic trash. All that pollution, in turn, threatens the health of hundreds of millions of people.

China has taken steps to reduce the amount of pollution that ends up in its waterways, starting in 2001 with a suite of environmental measures that included reducing the amount of pollution discharged into the air and water. However, according to Buntaine, Bren doctoral student Patrick Hunnicutt and collaborator Bing Zhang from Nanjing University, waterway remediation efforts could be more successful if the public got involved.

"There's a lot of potential for public participation to result in better resource outcomes in China," Buntaine said.

Realigning Incentives

The national effort to improve air and water quality in China comes in the form of targets set by the central government. Its tenth and eleventh Five-Year Plans, for instance, call for 10% reductions in pollutants being discharged over the period of each plan.

“You have a central government that hands down pollution standards, and you have local governments that must implement them,” Buntaine said. “And that’s not all that dissimilar from the way our drinking water is managed in the United States. But when you have a difference between the level of government that sets standards and the levels that actually have to implement them, you can have misaligned incentives.” For instance, according to the study, of the 458 “black and smelly” waterways reported as remediated by local governments, 37, according to the Ministry of Housing and Urban-Rural Development, “no longer met remediation targets.” Independent baseline data collected on other waterways slated for remediation, meanwhile, reveal that 91% of them were not in compliance with the standards.

“That’s the backdrop for this study — you have local governments that have incentives to prioritize economic output and may not have incentives to fully achieve pollution standards,” Buntaine said. Thus, reporting by local governments to the central government may not reflect what’s really going on in the waterways.

“Citizens can help bridge that gap,” he said.

To test the effect of citizen monitoring, the researchers set up a large-scale field experiment in which volunteer teams kept track of half of 160 “black and smelly” rivers for 15 months in Jiangsu province, a heavily industrialized area with some of the most severe water pollution in the country. The researchers worked with a partner nongovernmental organization to disseminate information from the monitoring to “multiple levels of government, the public, or both.”

“All NGOs in China are mandated to register with the central government,” said Hunnicutt. “So, citizens who organize into local groups with the goal of mitigating pollution may end up forming NGOs that are legally recognized by the government.” Establishing such a formal arrangement might make it easier for citizens who want to address the problem of pollution, rather than remaining independent of or in

opposition to the Chinese government for the same purpose, he said.

In addition, the scientists surveyed local officials responsible for the remediation to understand the kind of oversight pressure and public demand they experience, while also surveying residents to gauge the specific effects of the program on attitudes toward remediation. To see whether water quality improved over the same period, the researchers used independent, laboratory-grade measurements of water quality. They also kept track of any connections between water quality improvements and increased housing prices.

The study, Buntaine said, was part of a larger initiative organized by research network Evidence in Governance and Politics that tested the impact of community-based monitoring and information dissemination on environmental outcomes.

In particular, each study involved citizens groups collecting data on local environmental quality twice a month. These data were then disseminated in two experimental treatments, the first of which made the monitoring information available to the public.

“Every three months a set of 10 posters was put up in prominent places near the waterways saying, ‘here’s the water quality in the waterway; here’s how it compares to others. Here’s some contact information that you can use to follow up this information,’” he explained. This treatment, he said, did not result in detectable improvements to water quality. According to the paper, this may be due in part to the fact that the citizens did not have collective authority over their resource management, therefore believing that the water quality problem was for the government to solve. Or, perhaps they were also unwilling to criticize the government or be seen as sympathetic with an NGO that is critical of government performance.

In the second treatment, the aggregated citizen monitoring data was instead put into a quarterly report and shared simultaneously with the local and provincial governments.

“With this treatment, it could be that the local level of government knows that the higher level government can see if they are achieving the remediation targets or not,” Buntaine said. “And what we see is an approximately 19% reduction in pollutant levels where these quarterly reports were shared with multiple levels of government at the same time.”

In addition, they found “suggestive evidence” that property values increased within 500 km of waterways given the government information dissemination treatment.

Information dissemination targeted to different levels of government was successful in China in large part due to the centralized form of government, according to the researchers.

“In China, the central government frequently develops and hands down environmental mandates that local governments have incentives to address,” Hunnicutt explained. “For example, part of the metric the Chinese central government uses to evaluate local governments consists of local environmental quality — this type of direct rating system doesn’t exist in the U.S.” In places like the U.S., where political power is not as concentrated in the central government, jurisdictional issues “may interrupt the link between citizens’ monitoring of local pollution and local governments taking actions to address pollution,” according to Hunnicutt.

This study, according to Buntaine — a political scientist by training who focuses his research on government accountability — is one of the first to directly demonstrate the impacts of citizen monitoring on pollution. It’s an endeavor that, while popular and widespread, didn’t have a strong scientific evidence base to support it.

“This is one of the first studies that clearly shows that citizen participation and monitoring of resources can have a crucial and large impact on achieving natural resource goals,” he said.

About UC Santa Barbara

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