

RESEARCH BRIEF

Resource Scarcity Can Help Improve Local Cooperation.

Empirical Evidence from an Irrigation System in China

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Greater water scarcity not only forces farmers to coordinate better in collective irrigation management, but also fosters people's general willingness to cooperate.

This study examines the effect of long-term resource scarcity on cooperation, measured by both the irrigation management practices and a lab-in-the-field experiment. We find that greater water scarcity not only leads to better irrigation management practices and outcomes, but also fosters a stronger norm of cooperation among villagers. Our findings imply that, when facing the pressure of increasing scarcity, it is possible for local people to cooperate and provide effective collective action in resource management.

As the demand for natural resources has been constantly increasing due to economic development and population growth, the increasing scarcity and the potential depletion of resources have become increasingly serious challenges to people's livelihood in many parts of the world. While sustainable management of resources often requires cooperation among stakeholders, it is natural to ask how resource scarcity affects people's willingness to cooperate, especially when resource scarcity is often related to competition and conflicts. In this study, we directly examine how resource scarcity affects collective action in resource management and the general willingness to cooperate in the context of an irrigation system in China. We use the variations in the ratio of water quota to arable land area across villages to measure the degree of water scarcity. The historical irrigation water quota system was formed in the 1960s. This ensures that our measure of water scarcity isn't determined by other factors that might influence people's current cooperative behavior, but is really determined by water scarcity. We also use survey questions to measure cooperation in irrigation management. Finally, we study people's general inclination to cooperate by using a lab-in-the-field experiment – in this case, a game involving “public goods” (goods or services that everyone can use).

Key Points

- The impact of long-term exposure to resource scarcity on people's cooperative behavior has important implications for sustainable resource management.
- Using historically formed differences in irrigation water scarcity in an irrigation system in China, we find that greater water scarcity not only leads to better irrigation management practices and outcomes but also fosters a stronger norm of cooperation among villagers.
- Our findings imply that, when facing the pressure of increasing scarcity, and when using resources requires collective action, it isn't possible for local people to cooperate and do a good job of resource management.

We find that water scarcity improves irrigation management in terms of both the irrigation-related activities and the outcomes of these activities. People living in more water-scarce villages are more likely to coordinate in crop choices and more likely to keep local canals clean. They also report higher quality of canals. More importantly, we find that the impact of water scarcity goes

beyond irrigation-related activities. People in villages with a higher level of water scarcity also make significantly higher contributions in an experimental game to see how much people are willing to share for the common good. This result suggests that water scarcity also strengthens the norm of cooperation among villagers in rural communities.

Conclusion: Implications of Long-Term Exposure to Resource Scarcity

Long-term exposure to resource scarcity has important implications for local people's behaviors and preferences. Our study adds to evidence that people form their individual preferences and social norms in a specific context – in this case, an irrigation system. A direct policy implication of our study is that the increasing level of resource scarcity may facilitate better cooperation in sustainable resource management. Our findings also imply that policy makers should take the variety of local contexts into consideration. This is particularly pertinent in communities with rural development or projects to manage resources that are shared in common. The crucial element of the success of these projects is farmers' voluntary participation and contribution, which is affected by local norms or cultural attitudes toward cooperation.

ABOUT THIS BRIEF

This research brief is based on "Resource Scarcity and Cooperation: Evidence from an Irrigation System in Western China." EFD Discussion Paper Series 18-11, by Zihan Nie and Xiaojun Yang.

FURTHER READING

Gneezy, U., Leibbrandt, A., and List, J. A. (2016). "Ode to the sea: Workplace organizations and norms of cooperation." *Economic Journal*, 126(595), 1856–1883.

Ito, J. (2012). "Collective action for local commons management in rural Yunnan, China: Empirical evidence and hypotheses using evolutionary game theory." *Land Economics*, 88(1), 181–200.

Prediger, S., Volland, B., and Herrmann, B. (2014). "Resource scarcity and antisocial behavior." *Journal of Public Economics*, 119, 1–9.

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