

The Impact of an Effluent Trading Scheme on Water Quality in Urban India

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Sector(s): Environment, Energy, and Climate Change

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Location: India

Sample: 110 industrial plants

Initiative(s): Urban Services Initiative

Target group: Large enterprises

Outcome of interest: Pollution Climate change mitigation

Intervention type: Natural resource management Water, sanitation, and hygiene Pricing and fees

The goal of environmental regulation is to make individual polluters bear the costs their emissions impose on all. This may be especially hard in developing countries due to poor information, high transactions costs and low regulatory capacity. Emissions markets, which allow polluters to buy and sell rights to pollute, may provide better incentives to clean up, but have not been rigorously tested in a developing-country context. Researchers are studying the impact of India's first cap-and-trade system for wastewater on plants emissions' decisions, water quality and the cost of regulation.

Policy issue

Developing countries today are more polluted than today's rich countries are or ever were in their own development trajectories. An increase in pollution to some extent seems like an inevitable byproduct of growth. Yet high levels of pollution, as seen in measures of particulate matter in air or of oxygen demand in surface water, harm health and productivity, and hinder growth and broader well-being. Developing country policy-makers are aware of these problems but hesitant to address them vigorously, because the command-and-control regulatory tools available are blunt and costly. Thus moving to emissions markets, which can reduce costs by allowing polluters to buy and sell rights to emission, may enable lower cost and more stringent regulations. There has been little research on the effectiveness of such schemes in developing-country contexts. Researchers are studying the impact of India's first cap-and-trade system for wastewater emissions on water quality and polluters' decisions to emit.

Context of the evaluation

According to the UN, almost 70 percent of India's surface water was polluted in 2013.¹ Industrial wastewater, called effluent, is a leading cause of water pollution, but it is particularly difficult to regulate because the Indian manufacturing sector is mainly composed of clusters of small manufacturing units. The fixed costs of treating effluent are prohibitively high for individual plants,

and monitoring many small point sources is difficult for regulators.

Common effluent treatment plants (CETPs) are large treatment facilities designed to address these challenges, collecting effluent from surrounding plants and releasing treated water in surface waterways. Concentrating treatment at one facility lowers costs and allows for easier regulation. Over 150 CETPs operate across India, treating approximately 1 billion liters of effluent every day. However, the introduction of CETPs has not been enough to improve water quality in India. Every CETP facility has a maximum load of effluent that it can treat, determined by its technological capacity; the sum of individual plants' effluent contributions must fall under this cap. But because most CETPs charge plants fixed membership fees that do not vary with the volume or quality of effluent, discharging plants have an incentive to send the CETP as much effluent as they can. The result is that CETPs are often overloaded and cannot treat waste effectively. The problem faced by common treatment plants is therefore a microcosm of the larger environmental commons problem faced by the whole of India.

To address this problem, a state pollution control board is introducing the country's first market-based effluent regulation scheme in a CETP in a state in India. Under this cap-and-trade program, the pollution control board will allocate portions of the CETP's maximum effluent load to individual plants by distributing emission permits for a designated amount. Plants can then trade permits with each other; plants that emit more can purchase permits from those that emit less.



Details of the intervention

Researchers will conduct a randomized evaluation in collaboration with the state pollution control board and the CETP to examine the impact of the cap-and-trade program on water quality and plants' decisions to pollute. The CETP recently expanded

its treatment capacity from 100 million liters per day (MLD) to 150 MLD, but has not yet allocated this capacity to member plants. Researchers will take advantage of a gradual phase-in of this additional capacity to randomly distribute emission permits. A randomly selected group of treatment plants will receive additional permits above a baseline distribution of permits; the comparison group will receive no additional permits.

Initially, the overall emissions cap will be set at 100 MLD, and a baseline level of permits totaling approximately 80 MLD will be distributed to all plants. The capacity above this baseline will be allotted to a random subset of approximately 100 plants in permits in increments of 200 thousand liters per day (kLD.) Over the next fifteen months, the cap will be expanded until it reaches the CETP's full 150 MLD capacity. For every expansion, new permits will continue to be randomly allotted among all member plants, including the original 100, in increments of 200 kLD.

This test of permit allocation is key to the viability of emissions markets in general, since the gains from trade in an efficient market will be realized if and when firms are able to exchange permits. Thus, a study of transactions costs is truly a study of the efficacy of the core idea of emissions trade. Researchers will track permit market transactions and volumes of effluent produced, and will conduct surveys on water pollution abatement measures and water quality. By examining outcome differences between the treatment and comparison groups, they will be able to measure the impact of permit allocation on plants' decisions on how much to pollute, as well as the cost savings and pollution reductions achieved by the cap-and-trade program.

Results and policy lessons

Study ongoing, results forthcoming.

1. UNICEF, "Water in India: Situation and Prospects," 2013, p. 39, <<http://unicef.in>>.