

Creating incentives to control pollution

An innovative program in Indonesia, developed with assistance from World Bank researchers, set out to tap the power of public opinion and financial markets to encourage factories to reduce pollution. The program's success has inspired a similar program in the Philippines and evoked serious interest in Colombia and Mexico.

Environmental agencies in developing countries often face an uphill battle in regulating industrial pollution. While the agencies usually set standards for maximum allowable pollution levels, monitoring and enforcing compliance with these standards can be extremely difficult. BAPEDAL, Indonesia's Environmental Impact Management Agency, faced such a problem in the late 1980s. Having promulgated regulations to counter rapidly increasing pollution from a booming manufacturing sector, the agency found that its limited monitoring and enforcement capacity meant it often had to settle for voluntary agreements, out-of-court settlements, and other ad hoc approaches.

Because none of these approaches was entirely effective, BAPEDAL started experimenting with alternatives. In 1993 Deputy for Pollution Control Nabel Makarim began developing the Program for Pollution Control, Evaluation, and Rating, now known as PROPER. The new program was designed to receive pollution data from factories, analyze and rate their environmental performance, and disseminate the ratings to the public.

Grading factories

The idea behind PROPER was simple: by providing information about pollution in a form that nonspecialists could understand, the initiative sought to tap the growing power of the media and public opinion to promote cleaner industry. Specifically, BAPEDAL hoped that public performance ratings would attract two major allies to the pollution reduction effort: local communities, which would pressure nearby factories with poor ratings to improve; and the financial markets, which might react adversely to firms with low ratings.

By mobilizing these agents, BAPEDAL hoped to strengthen the regulatory "stick" faced by heavy polluters. The program also included a "carrot": by recognizing excellent environmental performance, BAPEDAL hoped to give factories an incentive to be cleaner than the regulations required. The agency decided to focus on water pollution first, since it already had significant data on factories' compliance with water regulations from previous enforcement efforts and from a Clean Rivers Program in which firms agreed to meet specified standards.

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The initiative reflected growing international recognition of public disclosure as a regulatory tool. Commonly known as public performance audits, such programs develop and disclose performance indicators to create incentives for better performance. A well-designed public performance audit can increase the transparency and accountability of public institutions. It can also induce improvements from private agents whose poor performance would otherwise require costly enforcement activity or litigation. Of course, such systems are only as good as the information on which they are based.

Data integrity

From the outset it was clear that PROPER's success would depend on the integrity of its data. If factory ratings were perceived as being unreasonable or inconsistent, the entire initiative could be undermined. BAPEDAL had relatively little experience with collecting, verifying, and analyzing large amounts of data. Thus the agency sought assistance from the environment team in the Environment, Infrastructure, and Agriculture Division of the World Bank's Policy Research Department. Arrangements were made for a team member to work with the PROPER development team in Jakarta.

Over the next several months the PROPER team prepared a data management system for the program. The system incorporated information on each factory's economic activities, emissions control equipment, and in-house pollution monitoring. The system was designed so that field teams could readily organize and quantify the results of on-site inspections and monitoring activities.

In February 1995 the team sent survey questionnaires to about 350 factories. The pilot group that eventually emerged included 187 plants from thirteen provinces and covered each of the fourteen industrial sectors that had effluent discharge standards. The team supplemented the surveys with rigorous on-site inspections.

Using a computerized model developed for this purpose, the team collapsed information on each factory into a single performance rating. They then assigned the plants to one of five categories (table 1).

The color rating system, and the data analysis that underpinned it, met several objectives. First, by collapsing complex data into a single rating, the system made it possible to compare the water pollution performance of very different firms. Second, the final ratings were simple and their implications easily understood by the public. Third, the system clearly distinguished between firms in compliance with the regulations and those not in compliance. Finally, the system created incentives for firms to become cleaner than the regulations require.

Initial impact

BAPEDAL decided to disclose the results in stages, first publicly recognizing the best performers and giving the others a chance to improve before their bad ratings were revealed. This approach gave the business community adequate time to adjust to the new program, thereby increasing the likelihood of improved compliance. Moreover, it generated support from the firms whose good performance was publicly recognized. Finally, and perhaps most critically, it allowed BAPEDAL to gauge the potential for extreme reactions in communities where plants with red and black ratings were located.

The first partial announcement of results, in June 1995, was extensively covered in the national press. Five factories were awarded the green rating (no factories were rated gold). Of the remaining 182 plants, only the distribution of the color ratings was disclosed: 61 were blue, 115 were red, and 6 were black. This announcement was, in itself, a remarkable exercise in self-criticism. By announcing that almost two-thirds of the plants were not in compliance, BAPEDAL was confessing its own previous ineffectiveness to the Indonesian public.

BAPEDAL gave plants rated red or black until December 1995 to improve their performance before their names and ratings were publicly disclosed. Under the threat of public disclosure, ten factories managed to improve their rating to red or blue within six months. Conversations with plant owners and other evidence suggest that the primary force driving these improvements was concern about poten-

For more details on PROPER and on the research the Policy Research Department's Environment, Infrastructure, and Agriculture Division is performing on the economics of industrial pollution...

Table 1. PROPER's five-color rating scheme for pollution

Compliance status	Color rating	Performance criteria
Compliant	Gold	All requirements of the green rating, plus similar pollution control for air and hazardous waste. Polluter achieves high international standards by making extensive use of clean technology, minimizing waste, preventing pollution, recycling, and so on.
	Green	Pollution level is significantly lower than the discharge standard. Polluter also disposes of sludge properly, ensures good housekeeping, keeps accurate pollution records, and maintains the wastewater treatment system.
	Blue	Polluter applies effort sufficient only to meet the standard.
Non-compliant	Red	Polluter makes some effort to control pollution, but not enough to achieve compliance.
	Black	Polluter makes no effort to control pollution, and causes serious environmental damage.

tially strong negative responses from local communities and markets.

In December 1995 full disclosure got under way; information was released gradually to encourage continued media coverage. Disclosure included plants' color ratings, names and locations, managers, and parent companies. A fresh round of ratings, announced in September 1996, revealed additional improvements. The changing status of the 187 factories that initially participated is shown in table 2.

The movement of firms from non-compliance to compliance is impressive. In June 1995, 65 percent of the factories were rated black or red. By September 1996 non-compliant plants accounted for just 47 percent of the total. Moreover, the number of firms in compliance increased by 50 percent during this period. Since it is unlikely that other Indonesian polluters improved at the same rate, this response suggests that PROPER is creating powerful incentives for pollution control. In addition, between June 1995 and December 1995 the number of factories volunteering to participate in PROPER doubled, from 11 to 23. These factories apparently expected rating by BAPEDAL and disclosure of their environmental performance to enhance their market position.

Although reputational incentives were obviously at work, the PROPER team discovered that the program was often the means by which factory owners had first learned about the environmental performance of their plants. Thus PROPER is also performing a valuable educational function, increasing the awareness of owners, managers, and employees and providing guidelines for better performance.

PROPER also has had an important impact on BAPEDAL. The need for accurate ratings has compelled the agency to increase its factory inspections and to improve the quality and reliability of its data collection and verification. The information collected through PROPER also provides BAPEDAL with solid evidence on a factory's compliance status, supporting stronger action in cases where conventional enforcement action is appropriate.

Next steps

PROPER's record in its first two years suggests that firms internalize reputational effects at very different rates. The program has been effective in moving some poor performers toward compliance and in motivating some firms to control pollution beyond the required level and invest in pollution prevention equipment. Many fac-

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Table 2. PROPER's impact

Rating	June 1995 (first announcement)		December 1995 (first full disclosure)		September 1996 (second full disclosure)	
	Number	Share of total (percent)	Number	Share of total (percent)	Number	Share of total (percent)
Gold	0		0		0	
Green	5	3	4	2	5	3
Blue	61	32.5	72	38.5	94	50
Red	115	61.5	108	58	87	46.5
Black	6	3	3	1.5	1	0.5

tories, however, still have red ratings, and there has been no significant increase in green ratings. During the next year collaborative research by BAPEDAL and the environment team of the Bank's Policy Research Department will address several questions: Which characteristics of plants, firms, sectors, markets, and local communities affect plants' responsiveness to public disclosure? By what channels is pressure brought to bear on firms, and what are the effects? How have firms assessed the incremental costs and benefits of improved ratings? What cost has BAPEDAL incurred in implementing PROPER, and how does it compare with the cost of conventional regulation?

Conclusion

This new approach to regulation in Indonesia is showing that local communities, the media, and market forces can be powerful allies in the struggle against industrial pollution. PROPER's ratings are designed to reward good performance and to call public attention to polluters who are not in compliance with the regulations. Armed with this information, local communities can negotiate better environmental arrangements with neighboring factories, firms with good performance can advertise their status and earn market rewards, investors can accurately assess environmental liabilities, and regulators can focus their limited resources on the worst performers. Transparency is also increased because the environmental agency is subject to public scrutiny.

Regulators move
from enforcing
toward empowering

The regulator's role certainly does not vanish in this system. However, it evolves from adopting and policing rules toward empowering other agents through the provision of appropriate information. In circumstances where the agents' interaction cannot produce satisfactory results, the regulator must retain its traditional enforcement role.

Public disclosure appears to be contributing to lower industrial pollution in Indonesia. Encouraged by PROPER's results, BAPEDAL is preparing to rate 2,000 plants by the year 2000. Other countries have also been inspired by this example of public information in action. Drawing on advice from the Bank researchers who helped with the project in Indonesia, the Philippines launched a similar program (called EcoWatch) in April 1997. In addition, Colombia and Mexico are moving rapidly toward developing public disclosure programs.

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David Shaman, and David Wheeler*

Further reading

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