

A Concept Note

on

**Public Disclosures – Using Information to reduce
pollution**

By

Dr. Vinish Kathuria
Associate Professor

Madras School of Economics
Gandhi Mandapam Road
Behind Govt. Centre
Chennai – 600 025
Ph. +91-44-2235 2157

Email: vinish@mse.ac.in

July 24, 2006

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Public Disclosures – Using Information to reduce pollution

1. Introduction - What is public disclosure?

Traditionally, emission standards and punitive action in case of failure to meet these standards have been used to control pollution. These traditional methods are also called as command and control (CAC) policy instruments. However, over time, it was found that these traditional approaches are extremely costly and fail to achieve the desired goals in situations such as a) when there is wide disparity in abatement cost caused by different vintage of machinery; b) polluting sources are widely scattered etc. As a reaction to these shortcomings, the second phase beginning from seventies witnessed the use of market-based approaches, called as market-based instruments (MBI). These include tradable permits, emission charges, deposit refunds etc. In some cases, MBIs have substituted CAC approaches; in others they have complemented them by enhancing flexibility, thereby improving the effectiveness of pollution control (Tietenberg, 1998).

Unfortunately, this second wave of pollution control has not been able to fully solve the pollution problem, especially in developing countries. This is because the market based approaches require presence of certain institutions which developing countries often lack (Kathuria, 2006). Even in the industrialized world, the use of MBI is not widespread; their use is in conjunction with many other instruments.¹ One reason for limited use of MBIs in developing countries is that the system remains overburdened by the sheer number of substances to be controlled. Apart from this, under-staffing and low budget of the regulator complicates the matter and it becomes arduous to regulate all the potentially harmful substances emitted by firms and households. The situation is compounded by the prevailing corruption in developing countries (Kathuria and Sterner, 2006).

The failure of formal regulation and market-based approaches to control pollution has highlighted the significance of informal regulation in the form of ‘public disclosure’ and ‘rating’ for achieving environmental goals in the nineties. In the public disclosure programs regulator publicly provides information about the emission and discharge from a particular unit. On the other hand, rating involves categorizing different firms on the basis of their pollution profile. The reliance on public disclosure and rating has become possible due to information revolution. According to Tietenberg (1998), this formed the beginning of the third phase of pollution control. The increasing role of disclosure strategies seems to stem from two main reasons – a) from the increasing perceived need for more regulatory tools rather than simply relying on formal regulation and fines, and b) declining cost of information collection, aggregation and dissemination (*ibid.*).

Evidence exist that the use of public disclosure in U.S. through Toxic Release Inventory (TRI) data supplemented by voluntary agreement program 33/50, led to a reduction of over 50% on-site emissions, and the emissions to surface water and air reduced by 73% and 58% respectively within a 10 year period (Sterner, 2002). Similarly, in the Philippines public disclosure led to increased compliance by 47% within a year of the process.

Under this backdrop, this concept note looks into what do we mean by ‘public disclosure’ and the economics of ‘public disclosure’ and how can they be used in Indian context. The organization of the note is as follows. Section 2 gives the types of public disclosure, followed by economics of public disclosure in Section 3. Sections 4 to 6 give evidence of use of public disclosures in the context of developed countries, developing countries and India respectively. Whether public

¹ See Kathuria (2006) for evidence of use of a mix of policy instruments to control water pollution in the case of three countries from three different parts of the world – Malaysia, Poland and Columbia.

disclosure complements or substitutes traditional approaches, this is discussed in Section 7. The note ends with Section 8 giving how best we can make use of public disclosure to control pollution in Indian context.

2. Types of Public Disclosure

Though disclosure approaches like labeling are in use extensively in natural resource settings (such as forest certification programs or organic food), their use in pollution control has picked up only recently. Labeling and public disclosure are the approaches that provide signals to investors, consumers, regulators and general public about the relative and absolute levels of emissions of polluters (Grafton *et al.*, 2004). The most widely used signaling devices are those that indicate an appliance or a product has achieved some minimum acceptable level of environmental quality. The examples include energy efficiency rating for refrigerator or chlorine-free paper etc. While labels and awards convey a signal of how environmentally friendly is a product or polluter, disclosure rules normally provide information on how poorly a source or firm is performing.

According to Lopez *et al.* (2004), depending on the way information is conveyed, Information disclosure can be of three types. Type 1 is ‘certification’ – of products, firms, processes or management procedures – by independent agencies. Type 2 is ‘self certification’, without any fixed criteria or any outside independent review. Provision of raw data, without any interpretation or judgment, forms Type 3.

The use of disclosure depends on the setting in which it has arisen (Tietenberg, 1998). Disclosure can be used in household setting (such as dealing with lead paint) or occupational setting (such as when workers are exposed to SPM in thermal power plant or cement plant) or product setting (such as when consumers buy products with pesticide residue) or community setting (such as when residents are subjected to toxic emissions or effluent discharge from a nearby plant).

Channels making Public Disclosure work²

There are different channels through which public disclosure works. Since effectiveness of public disclosure lies in aligning the behaviour of a polluter in the interest of society, this can be done through product market, or capital market or labour market or through legislation or judiciary or insurance market.

For instance, in the *product market* consumers may opt less environmentally damaging products provided information is provided for different choices. Even if consumers are not directly harmed by the pollution, they may choose a green product (such as paying more for chlorine-free paper or farm produce from organic manure). However, product market effects are enhanced when environmental considerations form part of the purchase decisions of large buyers (such as chain stores like wall-mart or the government).

On the other hand, in the *capital market* investors may decide to invest in companies with a more “green” record, either for moral reasons or their belief that environmentally caring firms will incur fewer future clean-up costs and therefore will be more competitive. Similarly, banks may also be more cautious in providing credit to environmentally polluting firms as they can factor pollution-related liability into their lending decisions. Evidence also exists suggesting that “green” firms may have higher rates of return. In developed countries like US, the ability of green investors to make these choices has been facilitated by the rise of several “green” mutual funds where the investment

² This subsection is mainly from Tietenberg (1998)

advisors carefully screen the firms using well-defined criteria (Tietenberg, 1998). Hamilton (1995) using 1989 TRI data has found that polluters that had reported emissions lost on average US \$ 4.1 million in the value of the traded stock the day the news was released. Evidence also suggests that polluters have responded to negative signals and total releases have declined by nearly half over the period 1988 to 1998, although a part of this fall may be due to firms substituting to chemicals not listed on the TRI (Grafton *et al.*, 2004).

In the *labor market* environmentally conscientious employers may find it easier to hire, and to retain employee loyalty. This may not be very relevant in many of the developing countries like India where often large polluters are also significant employment providers.

In the *judicial system* parties directly harmed by the pollution can retrieve compensatory damages by suing polluters (called “tort law” actions) or through public interest litigation. This is because in countries like India, Colombia, Ecuador, Chile etc. right to a clean and safe environment has become a fundamental right for each individual, which can be enforced through judicial action.

Lastly, in the *legislature*, if existing legislation seems inadequate, the information provision may result in community support for additional legislation.

Benefits of public disclosure

Ratings or public disclosure has many benefits for different stakeholders. For instance, equipped with performance ratings, *citizens* are in a much stronger position to negotiate pollution control agreements in neighbouring factories. This is essential because lack of information can distort communities’ perceptions. For example, emissions of heavy metals and toxins that accumulate in organisms’ tissues, but often are not seen or smelt, are likely to escape notice of residents. A fairly recent study (Labunska *et al.*, 1999) has found that despite installation of common effluent treatment plant (CETP), water and sediments at Amlakhadi³ (one of the hot spots of Golden Corridor) contains heavy metals and persistent organic pollutants (POPs), which are not easily detectable.⁴ Even where pollutants are clearly detectable, local communities may be unable to gauge the severity of their long-term impact or identify individual polluters. The Love Canal in US where the impact of dumping toxic waste got detected only after two decades when the dumping had already ceased is a clear example (Sterner, 2002) that communities cannot fathom the severity of long-term impact of any pollutant. Similarly, with ratings, consumers can easily sort out real performers from the false claimant (i.e., green-washers).

As mentioned, with ratings, the *stock market* can more accurately value companies’ environmental performance and banks can factor pollution-related liability into their lending decisions. For consumers, availability of information through outlets such as Internet (as has been employed by PROPER in case of Indonesia or Scorecard in case of USA) may greatly influence their decisions.⁵

The *regulator* may itself benefit from public disclosure. More compliance to environmental standards can boost its credibility with industry, NGOs and the public (Wheeler *et al.*, 2000). Further, the ratings and public disclosure allow communities to check pollution control boards (PCBs) claim against their own daily experience, thereby indirectly affecting the credibility of the

³ The Amlakhadi creek with a length of 14 Kms carries effluents from Ankleshwar, Panoli and Jhagadia Industrial Estates in Gujarat and finally flows into the Narmada river, which meets the Arabian sea.

⁴ See Kathuria (2001) for comparison of results before and after installation of CETP.

⁵ This assumes wide Internet access to users, which may not be true in the present context in many developing countries, but over time with increasing connectivity, this can have far-reaching effect.

agency. Regulators often need appropriate and good data about firms' pollution, but non-compliant firms have a clear incentive to evade such information. However, with ratings, clean firms have an incentive to identify themselves, which makes the task of the regulatory agency not only easy but also more efficient, as it can concentrate on serious polluters. Rewarding good performers also insulates regulators from accusations that they are anti-business. In fact, the impact of public disclosure or ratings can be far reaching. This is because the environmental performance becomes a 'proactive' exercise rather than the 'reactive' efforts unlike in the case with CAC regulations (*ibid.*). Under ratings, meeting standards constitute the bare minimum efforts and to acquire larger rating, the firms may have to go beyond just meeting the norms prescribed by the regulator.

Apart from these, there are few other benefits of public disclosure schemes. First of all, disclosure promotes useful learning across firms. A good rating for a firm among its competitors establishes the feasibility of cleaner production and encourages other firms to invest more in pollution reducing and mitigating equipments. Disclosure also promotes managers' awareness of their own firms' pollution. A survey of Indonesian firms that have participated in PROPER suggests an important impact for information to plant managers and owners about their own plants' emissions and abatement opportunities.⁶ The above discussion thus brings forth the special role of public disclosure for two aspects: a) as a prerequisite for other instruments; and b) an instrument in its own right (Lopez *et al.*, 2004).

3. Economics of Public Disclosure⁷

The economics of public disclosure can be looked from how equilibrium pollution level in a region is determined. The environment is usually characterised by some carrying or absorptive capacity. Any polluting plant essentially uses this absorptive capacity, reflecting a demand for environmental services. Plants can either use this service completely or reduce emissions by adopting some mitigatory methods. Thus, for a cost minimising plant, the environment demand (ED) schedule reflects its marginal abatement cost (MAC). This can be thought as the firm's marginal willingness-to-pay for abatement. The more the plant abates, the less will be its demand for environmental services. On the other hand, it becomes progressively more expensive for the plant to abate at low pollution levels. The regional MAC or ED schedule could be crudely approximated as a sum over all the plant-level schedules, which slopes downward to the right. As the price of environmental services rises, the industry would prefer reducing pollution along this schedule (Hartman *et al.*, 1997).

The ED schedule is generally affected by three major factors, namely, (i) external pressure through the factor market or product market, etc. which in turn is influenced by public disclosure / rating; (ii) economic considerations; and (iii) plant characteristics.⁸ Important plant characteristics like ownership, size, market orientation, human and technical capital, availability of abatement technologies, etc., which have relatively less relevance for the SSIs, has a direct influence on the ED schedule of medium and large units.

With effective formal regulation, environment services always carry a price for a plant. But for most developing countries including India, the price is too little to impact on pollution at a regional level.

⁶ Source: www.truckandbarter.com/mt/archives/transparency_governance/ accessed on July 14, 2006.

⁷ This section takes mainly from Kathuria (2004). The paper can be downloaded from www.sandeeonline.org.

⁸ It is to be noted that all these factors become somewhat irrelevant when the focus is on small scale units (SSIs). Most SSIs, being small and cater to the local market, are indifferent to external pressure.

This is due both to ineffective formal regulation and the concentration-based standards prevailing in these countries. The price could easily be augmented through public disclosure or the people affected act in their own self-interest provided they have information about the pollution discharge. Hartman *et al.* (1997) argue that in regions devoid of formal regulation, communities confront local polluting plants with their own demands for environmental services. This community demand curve reflects three basic factors: the community's ability to a) monitor emissions; b) assess damages (together a & b indicate information costs); and c) bargain in enforcing (local) pollution norms (reflecting transaction costs). These three aspects reflect the community assessment of social marginal damage (MSD) and get summarised in a locally enforceable environmental supply (ES) schedule. Thus, the ES curve reflects the price the communities require industries to pay for different levels of pollution. With increases in damage, communities impose progressively higher costs on polluting plants. This implies that the ES schedule slopes upward to the right. The equilibrium pollution level in a region is determined at the point where the ED and ES schedules intersect (see Figure 1). Programs like public disclosure takes care of the information aspect of the pollution discharge and influence both ES and ED schedule.

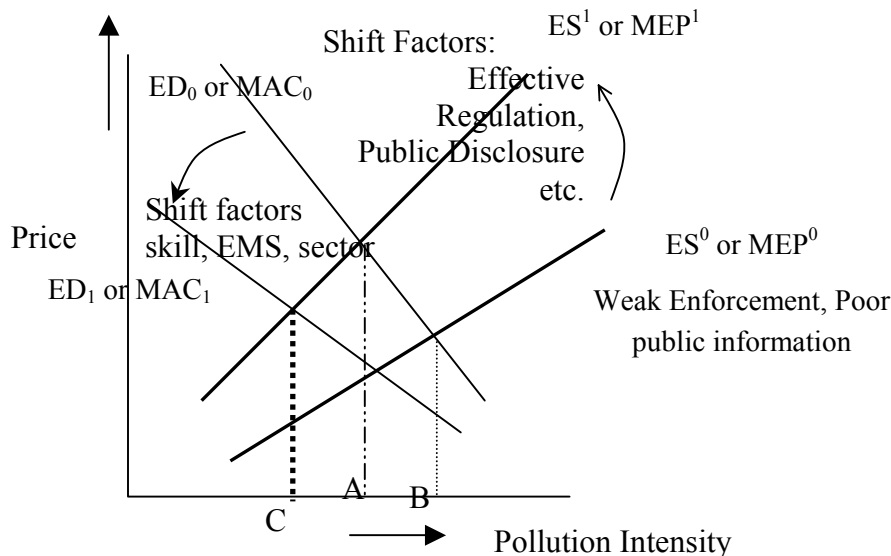


Figure 1. Impact of Informal Regulation on Equilibrium Pollution Level in a region

Source: Adapted from Wheeler *et al.* (2000)

Public disclosure and rating facilitate shifting the ES schedule to the left (i.e., from ES^0 to ES^1), thereby increasing the price of pollution for a unit as shown in Figure 1. Any increase in external pressure or price of environmental services induces the plant to reduce pollution, thereby shifting ED schedule to the left. This ultimately leads to fall in pollution from B to A to C.

4. Public Disclosure in Developed Countries – Evidence

Eco-labeling and ratings have increasingly been used as effective instruments to make production and consumption patterns more environmentally sound. The Nordic countries, for example, have used eco-labeling (the Nordic Swan) since 1989 for their industrial products. Australia has also adopted an energy efficiency star rating system in the late 1980s. The results of these eco-labeling

programs are found to be very encouraging. Since the Rio conference in 1992, public disclosure has found acceptance in the developing world too. These include PROPER of Indonesia, Eco Watch of Philippines etc.

In the context of developed countries, a number of public disclosure programs are in use for the past two decades such as Toxic Release Inventory (TRI) of U.S. started in 1987, National Release Inventory of Canada started in 1993, Pollutant Inventory of U.K. and National Pollutant Inventory of Australia, both of which began in 1998 (Lopez *et al.*, 2004). Two points to be noted that 1) though structure of these programs are different, they share the common principle of information disclosure; and 2) TRI has become the model for disclosure programs of other developed countries.

Toxic Release Inventory (TRI)

Among various public disclosure programs, TRI is the most important in terms of its effectiveness in reducing toxic release. TRI was enacted by the US Congress in January, 1986 as a part of the Environmental Protection and Community Right to Know Act (EPCRA) so as to provide information to the public on releases of toxic substances into the environment. Incidentally most of the substances involved are not subjected to any release standards or regulations. Starting with nearly 300 substances, U.S. EPA modified the list and added 286 chemicals in 1994, leading to total chemicals to over 640 (Sternier, 2002).

TRI states that firms *using* 10,000 pounds or more of a listed chemical in a given calendar year, or firms *importing, processing or manufacturing* 25,000 pounds or more of a listed chemical must furnish a report on each of the chemicals in existence within the plant provided the firm employs 10 or more full time workers. The reports include information such as the name of the company, name of the parent company if it exists, toxic release and frequency of release as well as the medium in which the chemical is released (Tietenberg, 1998).

To complement and reinforce the TRI program, U.S. EPA initiated the 33/50 program. According to which, national goals were set for 17 prioritized toxic chemicals to reduce them by 33% by 1992 and 50% reduction by 1995 as compared to 1988 levels. These reductions were to be achieved voluntarily and compliance was to be measured by the TRI reports. It can clearly be seen that the emphasis of the program is pollution prevention rather than going for end-of-pipe (EOP) treatment. Initially it was decided to include 555 companies having significant chemical release, but later on the program was expanded to 5,000 companies (Sternier, 2002). Nearly 26% companies (\approx 1300) agreed to participate in the program. By 1994, a year before the deadline, they collectively reduced emissions by over 50%, a total of 757 million pounds of pollutants. However, the total release of all the TRI firms also reduced significantly by 42% in 1995 and 45% in 1998. Table 1 gives the total toxic release of TRI firms for different years.

Table 1: TRI data for different years

		1988	1995	1998	Percent decline from 1988
1	Number of facilities	20,470	20,783	19,610	4.2
2	Air emissions	2,183	1,201	921	58
3	Surface water	165	37	45	73
4	Underground injection	162	143	115	29
5	Total on-site releases	2,968	1,688	1,427	52
6	Total Releases	3,396	1,977	1,857	45

Source: U.S. EPA (2000), Sternier (2002)

5. Public Disclosure in Developing Countries – Evidence

A number of public disclosure schemes have worked effectively in developing countries. Notable among these are PROPER in Indonesia and Eco-watch in Philippines. The success of PROPER has led countries like Mexico, Colombia and Papua New Guinea to bring out their own rating system. Table 2 gives a summary of how implementation of public disclosure schemes led to increased compliance in a number of Asian countries. Figure 2 gives the compliance before and after the disclosure scheme was introduced.

Table 2: Impact of Public Disclosure in Asian Countries

	Country	Percent Compliant		Percent Improved
		Before Disclosure	After Disclosure	
1	Indonesia	38 (1995)	60 (1997)	22
2	Philippines	8 (1997)	55 (1998)	47
3	Vietnam	10 (2001)	24 (2002)	14
4	China (Jiangsu)	73 (1999)	83 (2000)	10
5	China (Inner Mangolia)	24 (1999)	60 (2000)	36

Note: Figures in parenthesis are years before and after the disclosure schemes.

Source: Adapted from www.truckandbarter.com/mt/archives/transparency_governance/ accessed on July 14, 2006.

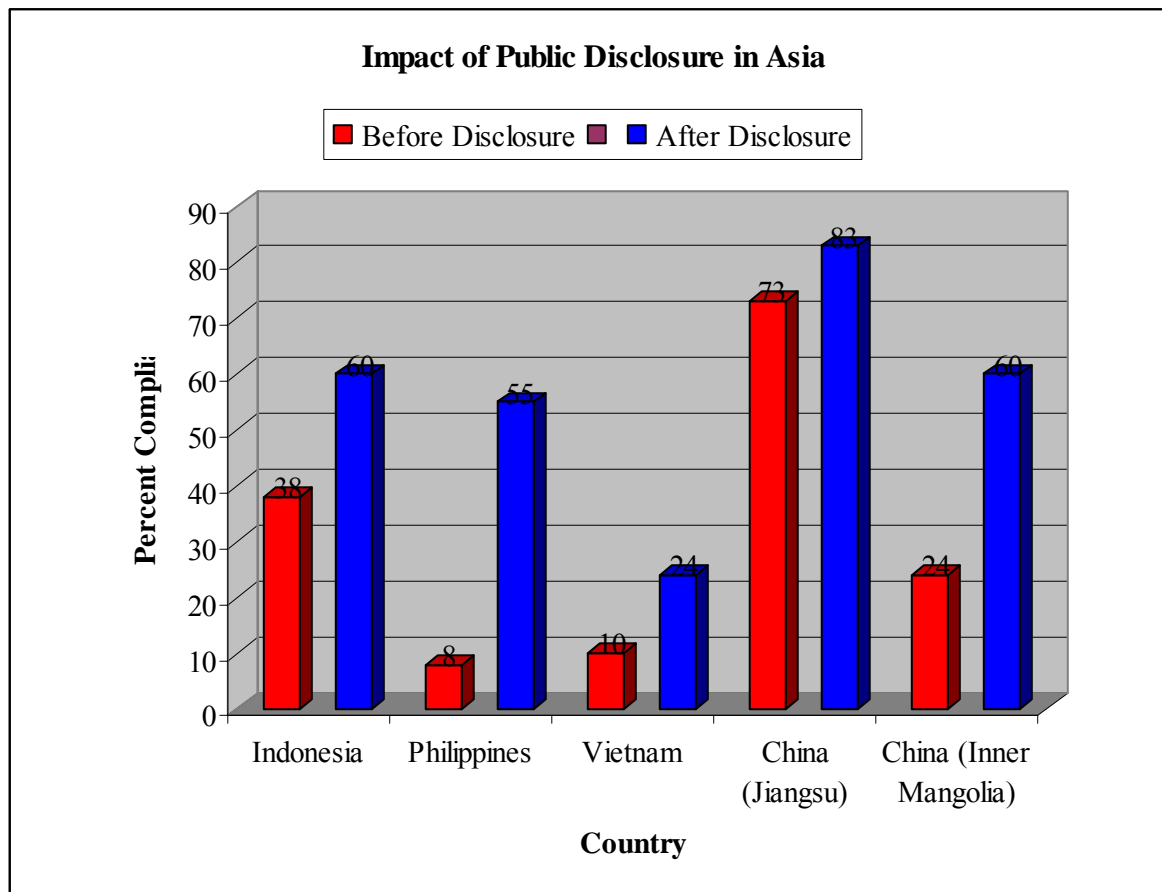


Figure 2: Impact of Public Disclosure Schemes in different Asian Countries

Source: www.truckandbarter.com/mt/archives/transparency_governance/ accessed on July 14, 2006.

PROPER (Programme for Pollution Control Evaluation and Rating) in Indonesia

Indonesia's local environmental agency, BAPEDAL has made effective use of the performance ratings. The BAPEDAL had earlier tried regulations by enforcing penalties, closures and fines, but was not very successful given the political environment in which they were operating. They were also wary of the MBIs like environmental charges. This is because there was an apprehension that charges may tempt individual officers of the agency into corruption (Stern, 2002). Hence, they chose a rating or labeling scheme called PROPER (Programme for Pollution Control Evaluation and Rating), where firms were rated in five different colors depending upon their environmental performance. In the first 18 months, effluents from the firms that were labeled were reduced by 40% as they strove to avoid the shame of being rated as 'Black' or 'Red' firms rather than 'Blue' ('compliant') or even 'Green' (Afsah *et al.* 1997).

Since BAPEDAL was working in a difficult political milieu and their previous record was not very successful, credibility to the scheme was essential. To enhance the credibility with all stakeholders in implementation of PROPER, BAPEDAL developed a careful process for scrutinizing the ratings through three check points: (i) an advisory board, with representatives from academia, industry, other government agencies and environmental NGOs; (ii) the environment minister; and finally (iii) the President. The mood and effect on business community was on the upbeat with the knowledge that the President of Indonesia has approved them. Figure 2 gives the steps undertaken by BAPEDAL in implementing PROPER.

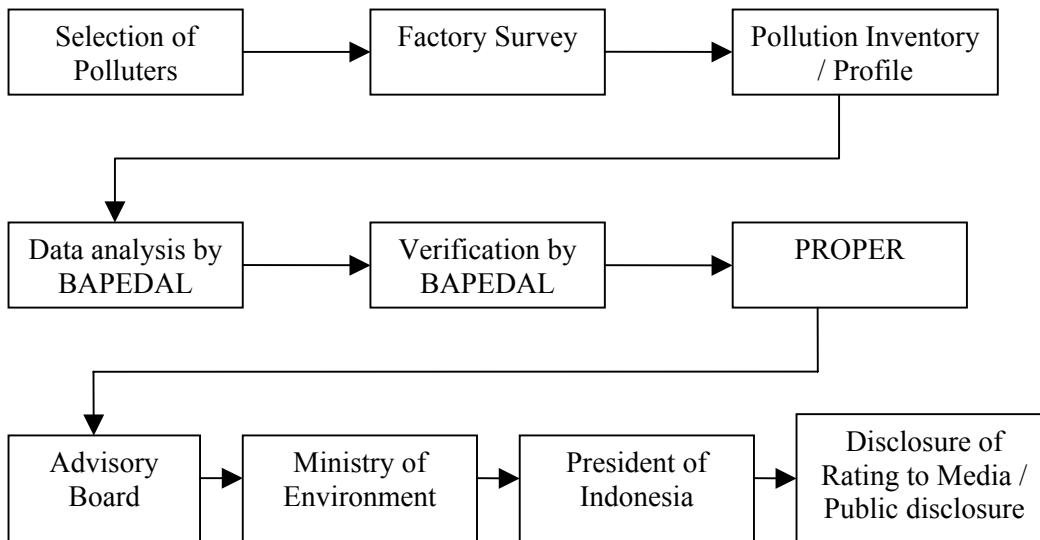


Figure 2: Steps involved in Developing PROPER

Source: Afsah, Shakeb, BAPEDAL as given in Wheeler *et al.* (2000)

Public disclosure anywhere in the world is usually a political act and a media event (e.g., TRI), so BAPEDAL's leaders thought carefully about their strategy before releasing the results. After publicly rewarding the better performers, the BAPEDAL privately notified other plants of their ratings and gave them six months grace period to clean up before making full public disclosure.

Eco-watch in Philippines

Philippines Eco-Watch, which was introduced in 1996 also has the basis similar to that of PROPER. On December 7, 1996, then President Ramos, in presence of the Department of Environment and Natural Resource and the Laguna Lake Development Authority, signed a memorandum of agreement with 23 industry associations (representing some 2,000 companies) and formally launched an eco-labeling campaign - the industrial EcoWatch Project. The project was designed to provide a strong incentive to industries to comply with environmental regulations and to reward those industries whose environmental performance exceeds standard requirements.⁹

The project specifically allows the government to set up an environmental grading system to categorize the environmental performance of these firms using a five-color (gold, blue, green, brown, and black) labeling system, similar to the one used in PROPER. A black label was used for firms with no pollution control or causing serious damages to the environment, blue for firms that meet all environmental standards and required procedures (such as self-reporting of pollution data), and gold for firms that meet environmental standards for three years continuously and conduct at least two environmental programs such as waste reduction and recycling projects.

Eco Watch rating scheme was introduced as the conventional regulations failed to reduce pollution. Under Eco Watch, in the initial evaluation of 52 plants, over 92% (48 plants) were found to be non-compliant i.e., with Red or Black ratings. However, rating led to increased in environmental performance, with the number of compliant plants with Blue rating increased from 8% to 58% in 1998 (Figure 3).

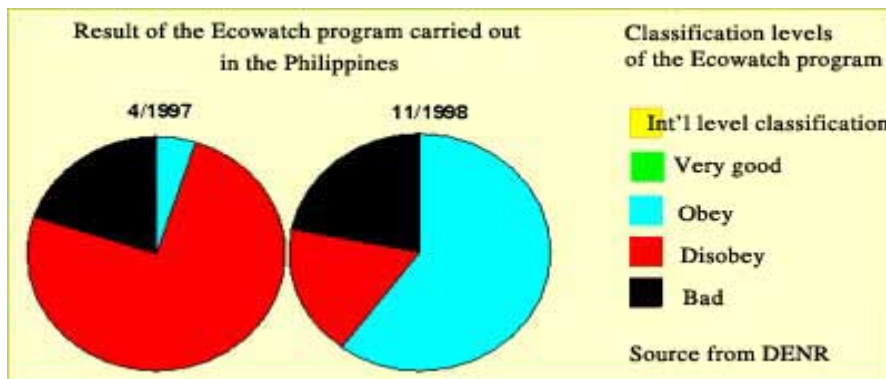


Figure 3: Impact of Ecowatch program in the Philippines

Source: http://www.danang.gov.vn/home/view.asp?id=61&id_tin=9907&kieu=in accessed on July 16, 2006.

The developers of Philippines EcoWatch disclosure programme also pursued a similar political strategy as the one used in PROPER. The President formally announced EcoWatch along with leaders of Philippines Business Association, who encouraged association members to participate in the programme. The president reiterated his support in speeches and public announcements and the programme allowed poorly rated factories a grace period before public disclosure. A critical step in the design of the project was to include the industry representatives in the elaboration of the program from the beginning with the result that the private sector, through the signing of the EcoWatch project agreement, committed to support the implementation of the project.

⁹ Source: World Bank (undated).

Learning from the success of Eco Watch industrial program, Philippines has already initiated Beach Eco-watch program, where beaches in Philippines would be rated according to water quality and suitability for recreation.¹⁰

After Indonesia and the Philippines, China, Thailand, and Mexico, have also made use of public disclosure for environmental management. Of late, Vietnam is also implementing the program. By learning experience from the programs, some cities of Vietnam, including Ho Chi Minh City carried out the publication of two kinds of books, namely “GREEN BOOK” and “BLACK BOOK” since 2001. The books are nothing but dividing the industries into two broad categories, based on their environmental performance.

6. Use of Public Disclosure in India

The first public disclosure scheme that has been used in India is the Green Rating Project (GRP) started by the Centre for Science and Environment (CSE) an environmental NGO.

Green Rating Project (GRP) in India

In late nineties, CSE initiated a GRP. The project aimed to monitor the environmental performance of Indian companies and rate them on the basis of their performance. In the first phase, pulp and paper industry comprising of 31 large firms were selected. The first rating was released in 1999 itself with none of the plants scoring four or five leaf rating of the possible five leaves. The rating however anticipated that plants would change their position over time with firms going down their MAC schedule. The conjecture arises from the fact that before the GRP started, only one company had ‘environment policy’ as part of its operations, but when the companies got associated with the GRP, eight new companies adopted the environment policy. This thus reflects the potent force of ‘reputation’ through disclosure. Another anecdotal evidence from the study reinforces the significance of such kind of disclosures. When the largest paper producing company did not respond to the requisite information, the ‘default’ option of rating it last was considered and this option was communicated to the head of the company. Within a week’s time, the rating agency got the response from the head assuring full co-operation (Down to Earth, 1999). At the end of the rating process, the company secured 3rd position.

In order to give credibility to the project similar to the one given in PROPER scheme of Indonesia and EcoWatch of Philippines, a Project Advisory Panel (PAP) was constituted comprising industry leaders, judges, R&D experts, academicians, environmentalists, journalists and other eminent members of the society. Besides, to evaluate the ecological effect of the technology used by the plants, a three-member Technical Panel from pulp and paper sector was formed to help the rating process. The rating process in Indonesia, Philippines and India thus reveal several similarities in executing the ratings process, the most important of which is lending credibility to the whole exercise.

After the rating of pulp and paper, CSE got involved in the rating of few other polluting sectors – these include chlor-alkali, automobile and cement industry. The rating process is found to have a significant impact on firms. Table 3 summarizes the major impact of the rating process in three of the industries.

¹⁰ Source: World Bank (2004) Beach Eco-watch program Considered, Press Release No. 04/25. http://www.worldbank.org.ph/WBSITE/EXTERNAL/COUNTRIES/EASTASIAPACIFICEXT/PHILIPPINESEXTN/0_contentMDK:20210286~menuPK:332988~pagePK:141137~piPK:141127~theSite PK:332982,00.html accessed on July 16, 2006.

Table 3: Impact of GRP on different Industries

	Industry	Before GRP	After GRP
1	Pulp and Paper Industry	< 10% companies substituted Chlorine with Chlorine Dioxide (an environment friendly substitute)	≈ 90% companies substituted Chlorine with Chlorine dioxide
		Elemental chlorine (Cl) consumption ≈ 75 kg/ton paper	Elemental Cl consumption ≈ 48 kg/ton-paper. First elemental chlorine free plant in India
		No standard for Adsorbable Organic Halides (AOX – a group of potent carcinogens) – depends on consumption of elemental chlorine.	Standard for AOX introduced and monitored for the paper industry – led to shift from elemental chlorine for bleaching and reduced AOX load.
		No standards for colour of the treated effluent from paper manufacturing units.	Andhra Pradesh and Tamil Nadu State PCBs set standards for colour of the treated effluent from paper manufacturing units.
		No water consumption guidelines for the sector	Water consumption guidelines in Paper manufacturing introduced
2	Chlor-Alkali	> 50% mercury consumed in the sector is lost unaccounted, as monitoring EOP emissions in case of mercury not feasible – solution was to regulate mercury input.	Government of India put in place guidelines to regulate input mercury.
		Use of Mercury cell technology – high emission of mercury	Switchover to membrane technology facilitated through: a) Subsidies for the import of membrane technology; b) reduction in customs duty on components of membrane cell technology used in the caustic soda industry from 15 to 5%.
3	Automobile Industry	<i>Greening of Supply-chain management:</i> Companies sourcing raw- material and components from small and medium scale sector, which had neither resources nor intent to control pollution.	Companies like Ford, Mercedes, General Motors, Hero Honda etc. set clear policy on outsourcing, keeping environment performance of the supplier in mind. Ford and General Motors asked suppliers to get ISO 14001.
		Companies transferring old technology to their Indian subsidiaries	Hyundai Motors publicly committed to supply the similar technology to India as it does to Europe or America.
		<i>Rainwater Harvesting:</i> Less or no efforts on rainwater harvesting.	Companies like Hero Motors, General Motors and Eicher Motors started rainwater harvesting within their plants to reduce their water demand on external sources.

Source: <http://www.cseindia.org/programme/industry/grp-impact.htm> accessed on July 16.

An important implication of the GRP is the reaction of capital markets as has been found extensive in developed countries. In India too, the stock prices of companies performing poorly in all the three sectors fell after the rating results were released (Gupta and Goldar, 2004). The results indicate that announcement of weak environmental performance by firms led to negative abnormal returns of up to 43 per cent.

7. Public Disclosure – Complement or substitute to traditional policy making

Whether disclosure strategies complement CAC and MBI or are a substitute for them, they entail a different role for the government – one which seems to offer the possibility of fulfilling the large and growing need for control despite limited budgets and staffs (Tietenberg, 1998).

Different examples indicate that disclosure strategies have sometimes substituted the traditional approaches and sometimes complemented them. In the TRI program, information disclosure appears to be the main driving force, though 33/50 VA program hastened the reduction process. Since participating companies reduced emissions by 50%, the extent of reduction by non-participating companies is also over 30%. This reflects that different programs complement leading to ultimate reduction. There are two issues pertaining to voluntary agreements – a) self-selection – only those firms with easy abatement possibilities, participate in such programs; b) policy works for low-cost abatement as the decline in emissions taper off after first few years.

An important and indirect effect of any public disclosure program is the use of the data by NGOs and other. Sine, local environmental NGOs and media can use the information to pressurize the local industries. Similarly, investors and citizens can use the information to plan the location of investments. An interesting example of the use of the TRI data is by Scorecard, which has used the data to provide detailed maps of the United States, which can be zoomed at the street level so as to give TRI data and other information to be used by local decision-makers.

One of the results of mandated public disclosure has been public pressure for accountability. Even the mere anticipation of public pressure can lead companies to alter their behaviour, as it did in the case of Monsanto. When TRI data was first publicly reported in 1988, Monsanto discovered that it was one of the largest polluters. This discovery led the company to pledge to reduce its toxic air releases by 90% by the end of 1992. Interestingly, the pledge features are quite striking: a) the pledge was voluntary, as the firm was not violating any environmental standard; b) the pledge came from the CEO of the company, thus lending credibility; and c) thirdly, it set a trend for other polluting firm to follow (Field, 1997).

The GRP or PROPER or EcoWatch analysis of environmental performance of industry, based on lifecycle analysis has amply demonstrated that environment management requires a more holistic framework than the one required in CAC regulations.

8. Summing up – making effective use of public disclosure in Indian context

In developing countries where pollution information is often scarce, disclosure can make a firm's emissions more costly. This is because it increases penalties from regulators, local communities, consumer organizations and market agents. In fact, public disclosure and ratings provide a reputation incentive to the companies. This is all the more important in present day global environment where companies have to compete in outside turf also. All companies want a good rating and a clean public image in an economy that is moving towards globalisation. More so when concern about environmental issues among investors and regulatory authorities is on the rise. There is a clear incentive for companies to improve environmental performance and share information, which can be the most powerful force in a democratic country.

Information provision is particularly effective in the case of hot-spots (such as Vapi, Ankleshwar, Tirupur etc.) or new regulation or aim is to attain public health (attaining health for all by 2015 as enumerated in Health Policy Goals). By giving information, the decision would primarily lie in the hands of prospective employee, investor or inhabitants.

To enhance the credibility with all stakeholders in implementation of a rating scheme like PROPER in Indonesia or GRP in India, a careful process for scrutinising the ratings at different checkpoints is required. The checkpoints can be a) an advisory board, with representatives from academia, industry, other government agencies and environmental NGOs; b) the Ministry of Environment and Forestry; and finally c) the President or the Prime minister. The impact on business community to control the pollution could be instant, once they know that the President or Prime minister of the country has approved the rating process.

Since, Public disclosure is often a political act and a media event, a strategy needs to be thought beforehand before releasing the results. Many a times, large polluters may also be large employment providers, it may be in the interest of the economy to give them the grace period before full public disclosure. In Indonesia and Philippines the program allowed poorly rated factories a grace period before public disclosure.

Public disclosure can be used to establish environmental awards for exemplary performance over a range of criteria including waste and emissions reduction and promoting environmental awareness. To the extent that such award provide valuable and positive publicity, they may provide an additional incentive to polluters to further reduce their pollution and may provide a 'demonstration effect' for less environmentally friendly polluters (Grafton *et al.*, 2004).

An important advantage of disclosure mechanism is their relatively low institution costs. This implies that their utility is high in countries like India where relatively less resources are available for monitoring and enforcement. Another advantage of disclosure is that it promotes flexible responses because pollution sources that choose to improve their public image are able to reduce their emissions in the cheapest way available to them (Grafton *et al.*, 2004).

To sum up, public or information disclosure combines conventional environmental monitoring, self-regulation and public pressure using environmental ratings to promote better environmental management, thus form an effective tool to control pollution in a country like India.

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Please send your comments to the Author at yinish@mse.ac.in