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Market-Based Instrument of Pollution Control**

by

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Public Interest Litigation as Indirect Market-Based Instrument of Pollution Control

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Abstract:

Economic or market based instruments for pollution control has been in the policy agenda of the Indian Ministry of Environment and Forests for a decade now. In the meantime, the law of pollution liability endorsed through environmental public interest litigation (PIL), and resultant judicial activism during the late 1980s and 1990s, has performed as indirect market based instruments of pollution management in India. While a purely judicial approach to environmental management can neither be effective or efficient, this paper argues that PIL has played a significant role in India's pollution management system. As a result new environmental legislation have been established, and economic incentives have been created for polluters to increase abatement (to reduce the risk of environmental damage costs). This has ultimately helped in the growth of a new environment market, where foreign investors perceive that PIL and judicial activism is a significant driving force behind the growth of the new market.

Introduction

Economic development is sustainable as long as the true environmental costs of all inputs and products are reflected in the market price. When markets and government policies fail to factor in the true-price of the eco-system, the community can induce the government/ industry to take action and correct for adverse effects in the system. Thus a community can potentially play a significant role in environmental management of an economy, besides the government (regulator) and the industry. In environmentally conscious societies, governments adopt stricter environmental policies when political support is determined by the environmental sensitivity of its policies (based on the voting communities' priorities). Communities can also induce industry to change their behaviour and produce environmentally friendly products in the market (through co-operative or coercive action) and thereby drive the market to incorporate the true environmental costs of the system. Thus community participation in environmental management has gained importance across the globe in order to make economic growth more ecologically sensitive.

In theory, the optimal level of environmental quality can be achieved through different regimes, and three such regimes are popularly considered in the literature. First, following Coase, property-rights of environmental resources can be defined and the economic agents can decide the desired level of pollution (given their true costs and benefits from pollution) through mutual negotiations. As long as the number of players is small and transactions costs negligible, the optimal equilibrium will be achieved.¹ Second, under a command and control (CAC) approach, the regulator can enforce the environmental standards based on the optimal level of pollution (where the social marginal cost equals social marginal benefit of pollution). As long as these standards are enforced, the social optimum can be achieved. Third, the regulator can adopt economic or market-based instruments (MBIs) to abate pollution, and these cover instruments that harness self-interest of economic agents for environmental goal. MBIs include price-related instruments like pollution taxes and permits, as well as indirect economic instruments like law of liability for damages, and environmental information disclosure systems (Paulus 1995). The use of economic instruments triggers the industry into innovating with cheaper ways to cut down on pollution, so that the burden of pollution costs (say, due to effluent fees or tax) is reduced, and encourages firm action that project a more environmentally friendly image in the market (through the information disclosure system).

In most countries across the globe, CAC measures including standards on emissions and effluents from different polluting sources (whether stationary point sources like firms or mobile point sources like vehicles) define the pollution abatement regime. In developed countries, the CAC regime is largely complemented with economic instruments: For example, the US has by far the most extensive use of tradable pollution permits in the world, and in Europe pollution taxes are more in vogue. Even developing countries have utilised economic incentives to induce pollution reduction in industry. Coasian type of bargaining to control industrial pollution has been documented in Asian countries, including Japan and Indonesia, between local inhabitants and plant management (O'Connor 1995, Pargal and Wheeler 1996, Hettige et al 1996). According to a World Bank study, in India, however community pressures (in terms of proxy measures of better-educated and higher income communities) do not seem to induce lower pollution (Pargal, et al 1997), but communities do seem to have a significant effect on the level of inspections.²

This paper illustrates that community pressure in India has played a significant role, quite distinct from those documented in the other Asian countries like Indonesia, through the environmental public interest litigation system and judicial activism. The Indian citizen's constitutional right to a clean healthy life and the liability of pollution damage on polluters have encouraged community

action through environmental public interest litigation (PIL), and subsequently judicial activism. The rise of environmental PIL and judicial activism in the last 15 years have encouraged the development of new and stricter environmental legislation, and also created incentive for the industrial polluters to increase abatement (as a result of both new regulations and threat of community action). The establishment of the law of liability of environmental damages (polluter-pay principle) endorsed by these cases has led to indirect market pressure on polluting agents in India especially during the decade of the 1990s. This in turn has helped in the growth of an environment market (including pollution abatement equipment as well as environmental consulting services) in the country, which has begun attracting foreign investors.

Environmental Management Regime in India

In India, the pollution control regime is almost purely of the CAC nature, supplemented by economic incentives, for example subsidies on catalytic converters/ compressed natural gas for vehicles; benefits for industrial pollution control equipment; and fines and/ or imprisonment for violation of environmental norms. The domestic environmental legislation is well-developed and industrial pollution norms spell out effluent standards by source. Yet, despite the existence of elaborate pollution standards in India, the problem in controlling pollution arises from the poor enforcing of the standards. Attention has been focussed on initial compliance (installation of abatement equipment) rather than continuous compliance of actual effluent concentration (and ensuring the installed equipment is actually operating). In effect, pollution would not reduce after installation because pollution equipment is not running. It is possible for a firm to be compliant by installing abatement equipment but not operating it! Thus Pargal et al (1997) found plant-level pollution is unaffected by formal inspections by state PCBs in India, since firms probably activate the equipment only when inspections are scheduled.

Also, since plant specific standards are in terms of the concentration of effluent and not volume, concentration compliance can be achieved by diluting the pollutant discharge while pollution load increases! Ambient and source standards are set independently, unrelated in terms of the *volume* of pollution generation, thus it is possible for environmental quality to deteriorate despite a high degree of compliance among individual polluters. The fines and penalties for non-compliance are low in India, and the penalty structure is insensitive to the degree of default, since the same penalty is charged for violation of environmental standard irrespective of the size of violation (whether small or large) or the pattern of offence (occasional or repeated violations).

The problem in achieving the optimum arises from the difficulty of enforcing these environmental standards.³ The effective monitoring by the pollution control boards (PCBs) is poor and the lack of comprehensive data/ information on polluting activities of industries exacerbates the problem (since by law, the PCB has the entire burden of proof of any offence by an industrial unit). The PCBs often tolerate non-complying units due to the work overload at the boards, lack of staff, budget, equipment and facilities. About 65% of the members in seventeen state PCBs were found to be technically incompetent to do a job that required high technical skill (*Down to Earth*, July 31st 2001). Since the boards are expected to generate funds through consent fees, and other charges, lack of proper monitoring and implementation in turn translates into inadequate fund generation. Even when cases are filed by the PCBs against erring firms, they remain pending for years in the lower courts.

In the 1990s, the environmental regulation for the Indian industry began to focus on environmental management procedures, incorporating compulsory environmental impact assessment and audit. Environmental audit (under Environmental Protection Rule 14) became effective in 1993, and in 1994, environmental clearance was made mandatory for industrial

activities. In 1994, environmental impact assessment (EIA) was made mandatory for 29 categories (increased to 30 in the year 2000) of developmental activities including industrial project, thermal power plants, mining projects, river valley hydro-electric schemes and infrastructure projects (MoEF Annual Report 2000-01). EIA is designed as a management tool to ensure development options are environmentally sound and sustainable.

The merits of using of economic instruments like industrial pollution taxes were recognised in the 1992 Policy Statement on Pollution Abatement of the Ministry of Environment and Forest, and the implementation of market-based instruments in India are in the pipeline.⁴ The government also issued the National Conservation Strategy and Policy Statement on Environment and Development in 1992 that recognised the role of non-government organisations (NGOs), industries and the public to preserve resources and protect the environment while ensuring developmental activities. Indeed, during the last 15 years, the lack of enforcement of environmental norms and the rapid rise in pollution levels has prompted public interest environmental litigation and the rise of judicial activism in India's environmental management.

Coupled with the increase in public interest litigation, the role of the Indian community in pollution control regime has increased through public hearings in environmental impact assessment procedures for economic activities. Since 1997, development activities including industrial project, thermal power plants, mining projects, river valley hydro-electric schemes, infrastructure projects, etc (30 categories in total) have mandatory public hearings in order to assess the environmental impact completely before been granted clearance by the state. However, the SSIs were exempt from a public hearing in a draft notification in 2001. The current trend in the active participation of Indian citizens in pollution control management will continue to grow. Moreover, this trend perfectly matches with the 1992 national environmental strategy and policy statement, which recognised the important role of the public and non-government organisations in protecting the environment during the process of economic development.

The increase in judicial activism thus has become a significant threat to polluting units in the country. While the formal enforcement remains weak in India, the constitutional right of the polluted agents has become an important instrument of pollution control. Two polluting sectors have been under scrutiny of the judiciary in the last decade: the industrial, and the transport sector, from which the pollution loads have been increasing. Since the judicial activism has been most significant through the Supreme Court (SC) rulings, this paper considers some of the most significant SC case rulings impacting the environmental management in the transport sector and the industrial sectors in India.

Environmental Property Rights: Advantage Indian Citizens

The degradation of living conditions has prompted the Indian society to relieve the conditions through civil action. A good environment is a constitutional right of the Indian citizens under the Right to Life (Article 21), and the protection of the environment is a fundamental duty of each citizen (Article 51A). These provisions have been used especially by the Supreme Court in dealing with environmental cases, and considering *environmental, ecological, air, water pollution, etc. as amounting to violation of Article 21*. This interpretation of the fundamental right to life entitles citizens to invoke the writ jurisdiction of the Supreme Court and the High Courts. There has been a clear movement towards public interest litigation to reduce pollution in India, some of which have had far-reaching consequences. This seemingly pseudo-Coasian approach in India has brought industries and industrial estates to court in lieu of the negotiating table between polluters and victims of the Coase model implemented with reasonable success in Indonesia (O'Connor 1995, World Bank 2000).

Apart from the Indian Constitution, the environmental legislation also has provisions for polluter prosecution. Under section 16 of the Environment Protection Act 1986 (EPA), a company is punishable for an offence. The "cognisance of offence" clause of the EPA (section 19), Air Act (amended 1987) and Water Act (amended 1988) allows any citizen to prosecute a polluting firm provided a notice of at least 60-days is given to the polluter. Citizens have a right to information on polluters from pollution control boards for the purpose of prosecution (section 43 of Air Act, amended 1987, and section 49 of Water Act, amended 1988). For granting compensation for environmental damages, the courts have used provision under the Public Liability Insurance Act (1991) and Factories Act (1995).⁵

Several of the public litigation cases have resulted in polluting units been closed down or re-located away from residential areas, and more importantly ushered in new regulations (in the road transport sector) during the last decade. Increasingly, the polluter pay principle has been evoked by the court, and damages to restore the environment imposed on polluting units. In a recent ruling in March 2002, the Supreme Court clarified:

"Pollution as a civil wrong... a Tort committed against the community as a whole. A person, therefore guilty of causing pollution has to pay damages (compensation) for restoration of the environment and ecology. He has also to pay damages to those who have suffered loss on account of the act of the offender. The powers of this Court under Article 32 are not restricted and it can award damages in a PIL or a Write Petition as has been held in series of decisions. In addition to damages aforesaid, the person guilty of causing pollution can also be held liable to pay exemplary damages so that it may act as a deterrent for others not to cause pollution in any manner."

(Ruling dated 15 March 2002, in Beas River Case of Mehta vs Kamal Nath WP182/1996, reproduced in *Legal and Scientific Resources for Asia*)

The increase in environmental public interest litigation and judicial activism (prompted by individuals as well as by NGOs) during the last 15 years began to be perceived as a significant threat by polluting units across the country. The establishment of the law of liability has created a deterrent effect on pollution by creating an incentive for polluters to limit the risk of environmental damages. Thus while the formal enforcement remains weak in India, the constitutional right of the victims of pollution has become an important instrument of pollution control. In particular, the civil action has helped focus the regulator's attention on important pollution sector like the road transport sector (which is a major source of urban air pollution) and usher in new environmental regulations.

Public Interest Litigation and New Policies for Vehicular Pollution Control

Prior to 1990, India had no environmental standards for vehicles. The new rules for cleaner vehicles on city roads largely followed from Supreme Court rulings in public interest litigation to reduce urban air pollution. While the original petition was filed in 1985 (M.C. Mehta vs Union of India WP 13029/1985), the spurt of rulings followed in the 1990s. Some of the most significant rulings of the Supreme Court for vehicular pollution cases during 1990 through 2001, resulted in mandatory measures to reduce pollution from city road transport. Table 1 lists some of the major SC rulings on vehicular pollution.

In 1990-91, the pollution generated by vehicles and need for action was recognised by the Supreme Court. During the mid-1990s leaded petrol was phased-out first in the five metrocities of Delhi, Mumbai (Bombay), Kolkata (Calcutta), Chennai (Madras) and Bangalore, and then in

the rest of India. In 1999, the older commercial fleet was also phased out in Delhi, and in 2001 a conversion to single fuel mode of natural compressed gas ordered in the city. While the latter measures have been implemented in Delhi, which gained the notoriety of being the most polluted Indian city in the early nineties (and the fourth most polluted city in the world), these measures are bound to spread to other cities in the country.

Thus in effect, environmental standards for vehicles were introduced in India in 1990, and the subsequent notifications made them more stringent in 1992, 1996 and 2000. Euro-I norms were implemented in 2000 through out the country for all categories of vehicles. Bharat Stage-II norms, comparable to Euro-II, for vehicles were implemented in a phased manner starting with the national capital region (including Delhi) in 2000, and extended to other cities like Mumbai, Kolkata and Chennai in 2001.

Another noteworthy aspect of Supreme Court rulings on vehicular pollution is that the health costs of vehicular exhaust have been explicitly recognised. In a recent ruling in May 2002 on vehicular pollution, the SC noted that the adverse health effect statistics, especially the sharp hike in respiratory diseases among children, indicate that the effect of “continuing air pollution” is more “devastating than what was caused by the Bhopal gas tragedy”. The ruling quoted research that has indicated cancer potency of diesel vehicles is more than two times that of petrol vehicles in India. For example, the carcinogenic effect of particulate matter from one new diesel car is equivalent to 24 petrol cars and 84 new CNG cars on the road.⁶ The SC ruled that diesel buses in Delhi be phased out at a rate of 800 diesel buses per month starting from 1st May, 2002, till all the diesel buses are replaced.

-Table 1 here-

Public Interest Litigation and the Enforcement of Industrial Pollution Control

As in other countries, the community in India has also served as the informal regulators given that monitoring (and hence probability of formal detection of pollution violation) is low. In particular, in India public interest environmental litigation has served as a proxy for formal implementation of pollution regulation during the last fifteen years (beginning in mid 1980s), since enforcement of the CAC environmental measures have been poor. The industrial environmental legislation in India has focused on the installation of pollution abatement equipment in the industry (*initial compliance*) and effluent standards, not the flow of effluents over time. Thus it is possible for a firm to compliant by installing abatement equipment but not operating it! Also, since plant specific standards are in terms of the concentration of effluent and not volume, concentration compliance can be achieved by diluting the pollutant discharge while pollution load increases!⁷

Second, only the medium and large-scale industrial units are included in the regulation purview of the pollution control boards (PCBs). While the small-scale industries (SSIs), which are significant polluters (but difficult to monitor) are excluded by the authorities.⁸ According to one estimate, SSIs in India (more than 3 million) contribute to 65% of the total industrial pollution load, and to 40% of industrial production (*Down to Earth July 31st 2001*). Public interest litigation has also targeted the illegal location of SSIs in urban residential areas.

Third, the public reaction has risen since effective formal monitoring and enforcement by the PCBs has been weak (the PCB have the authority to cut-off water and electricity or close down non-compliant plants). Yet, the PCBs often tolerate non-complying units due to the work overload at the boards, lack of staff, budget, equipment and facilities.

Not surprisingly, surrogate environmental enforcement through judicial activism became especially prevalent following public interest litigation. The High courts (e.g. in Delhi, Chennai, Mumbai) as well as the Supreme Court have made significant rulings. The filing of public interest environmental litigation began systematically in the mid-1980s, while the spurt of court rulings were observed in the 1990s. The cases covered effluent pollution from industries into air, water and land.

Table 2 highlights 11 such Supreme Court rulings in urban industrial pollution cases. The rulings in the SC resulted from the writ petitions filed by noted Supreme Court advocate, Mr M.C. Mehta, as well as NGOs. The Delhi land use cases were from the original petition in 1985 (Mehta v. Union of India WP4677/1985). The Bichhri industrial case ruling was in response to a writ petition filed by a non-government organisation ICELA (WP967/1989, plus other petitions WP94/1990, 824/1993 and 76/1994). Similarly the Tamil Nadu tanneries case was filed by an NGO, Vellore Citizens' Welfare Forum (WP914/1991). The Calcutta tanneries ruling in 1996, is part of a set of rulings against leather tanneries resulting from an original writ petition filed in 1985 (Mehta v. Union of India WP 3727/1985) under which tanneries in Kanpur were also closed down in the eighties.

- Table 2 here -

The most noteworthy feature of the SC rulings on industrial pollution is that the Polluter Pay Principle has been adopted formally and the industries have been given the message that the adverse environmental costs of industrial activities have to be internalised. During the Tamil Nadu tannery case in 1996, the precautionary principle and the polluter pay principle were accepted as the *law of the land*, and stated as essential features of sustainable development. Articles 21, 47, 48A and 51A(g) of the Constitution of India have also been quoted by the SC as giving a clear mandate to the state to protect and improve the environment and safeguard the forests and wildlife of the country.

Moreover, through the rulings, the SC has induced the pollution control authority to undertake action like estimating damage cost imposed on the economy by polluting industry and recovering it (notably the Bichhri case in 1996). Much like inducing vehicular environmental norms in India, the SC asked the government to establish Coastal Management Authorities (both at the centre and the state levels), that would develop policies to protect India's coastal ecosystem.

Public Interest Litigation as a Moral Suasion Instrument in Pollution Control

The natural question that follows from the observation of significant number of environmental court cases during the 1990s (and a few post-2000), is how important a role has public interest litigation really played in the pollution management regime in India.

First, the instances of court rulings in both vehicular pollution and industrial pollution discussed above indicates that important legislation was initiated in India, especially in terms of vehicular emission standards that did not exist earlier. Thus the community (as represented by individual or NGO) has helped in bringing about institutional change in terms of sectors covered by environmental legislation, besides being informal regulators.

Second, while in India Coase-style negotiations have not taken place, as in countries like Indonesia (Pargal and Wheeler 1995), the environmental cases have brought polluters to court to

pay for the damages/ social costs imposed on society. Indeed, most of the public interest litigation have typically been those involving large number (of polluters and pollutees). I.e. the pollution cases involved large number of dispersed numbers of polluters (e.g. SSIs in Delhi, or leather tanneries in Calcutta and Kanpur, or mobile polluting sources like vehicles) as well as large number of victims (the urban population), where Coasian negotiations would not have been feasible due to high transaction costs.

Third, the equity issue, which poses a major challenge in any pollution control strategy, has been dealt with quite clearly in the SC rulings. While recognising the hardship of industrial units going out of business a SC ruling against polluting units noted that it is a price that has to be paid for protecting and safeguarding the right of the people living in a healthy environment with minimal disturbance of ecological balance and without avoidable hazard to them, their cattle, homes and agriculture and undue affectation of air water and environment. This reflects in essence of the objective of environmental management programs, that of allocating resources for production and consumption according to their true social costs. The “purpose is to achieve important targets for environmental quality... Where their adverse redistributive impact can be easily addressed, it is surely important to do so, but *environmental measures should not, in general be side-tracked on redistributive grounds.*” (emphasis added, Oates 1994: 129)

Yet, the scope of the judicial approach to achieve the optimal pollution equilibrium with the property rights defined in favour of the victims is limited. In reality even the orders of the Supreme Court have sometimes not been implemented! Indeed, a pure judicial approach to pollution abatement can never be economically efficient or effective¹⁰, since judicial procedures can always be used in stalling remedial action. For example, following the 1996 Supreme Court closure notice, thousands of unregistered illegal industrial units in Delhi (typically small) across residential areas should have closed down by 1997.¹¹ Yet, even three years after the court order, the affected industries succeeded in stalling the process by court appeal. Some industries (including Birla Textile Mills and Swatantra Bharat Mills) appealed that the order violated their fundamental rights based on existing laws, like the Delhi Development Act and the Industrial Disputes Act and the Minimum Wages Act, on the issue of compensation to displaced industry and workers. The industry’s writ petition also questioned the authority of the Supreme Court to declare surrendered land as green areas.¹² This anecdote highlights the inevitable drawback of a judiciary regime of pollution control in an economy: namely, polluting firms can routinely obtain stay orders against closure/shifting decisions of the judiciary and stalling action for years.

The judicial activism, however, has accomplished something else. It has given a clear market signal that the polluting activities of the industry will not be tolerated, and the damage costs are far too large to be ignored by the community. The endorsement of the polluter-pay-principle by the court has made the polluter liable for environmental damage from pollution. In effect, public interest litigation has acted as what the literature terms an indirect market-based instrument (Eskeland and Jimenez 1992) and can be classified as a *suasive instrument* or moral suasion instrument (O’Connor 1995, Sawhney 1997). Typically suasive instruments include environmental education or information that can alter the behavioural pattern of polluters, including public disclosure of information on polluting activities of industries which creates market pressure on manufacturers to adopt environmentally friendly production processes or produce greener products. The court rulings by endorsing the polluter pay principle have given the signal to polluters that they now have to pay up for the environmental and health damages they impose on the society.

As an indirect market based instrument, judicial activism imparts the signal that dumping of wastes into the ecosystem is no longer costless for the polluters. In fact, even when

implementation of judicial orders is stalled in the appeals court by the polluters, it entails costs (in terms of time, lost income, court fees) on the polluters. Besides monetary costs, bigger corporations like to minimise the risk of an environmental litigation, which can damage reputation seriously in the marketplace. To ensure positive publicity, the increase in judicial activism induces larger companies to undertake pollution control measures.

The fact that public interest litigation and environmental judicial activism have had distinct market implication is borne out by the growth of the new environment market in India (includes the market of pollution control equipment as well as environmental consulting services). Indeed, the US Department of Commerce estimated the current size of the environment market in India to be \$4 billion, growing at an annual rate of 15%. (while an Indo-German Chamber of Commerce estimated the market to be almost double the size at \$8 billion). Among the best prospects for foreign investment in India in the year 2002, the US Department of Commerce ranked the sector of pollution control equipment 6th (out of 14 investment sectors) and environmental judicial activism was considered an important factor aiding the growth of the environment market in India. Thus while, direct market-based instruments for pollution control remain in the pipeline, public interest environmental litigation in the last decade have succeeded in transmitting indirect market signals to the industry to internalise the environmental costs and evolve a nascent environment market.

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Table 1 Major Supreme Court Rulings on Vehicular Pollution 1990-2001

<i>Case (year of ruling)</i>	<i>Court Ruling</i>
1. Seriousness of issues (1990)	Rise in vehicle (petrol & diesel) main cause of pollution. Registration of defective vehicles to be suspended effective 1991.
2. Need for strategic action (1991)	Delhi Transport Corporation identified as one of the notorious polluters in the city (plying thousands of polluting buses). Campaign to increase pollution awareness among all automobile owners. Committee on vehicular pollution in Delhi to be constituted by 1991.
3. Lead phase out of all vehicles (1994)	Lead-free petrol to be sold in all outlets of the four cities of Delhi, Bombay, Calcutta and Madras, and catalytic converters for petrol-driven cars made available by April 1995. Order to supply low-lead petrol (maximum lead content of 0.15g/l) in the entire country by December 1996.
5. Government vehicles (1996)	All official government cars are to be fitted with catalytic converters or a CNG kit by August 1996.
6. Ban on old commercial/ transport vehicles (1998)	All commercial and transport vehicles more than 15 years old (totalling 15,511) not permitted to ply in the national capital region of Delhi after December 1998.
7. Buses to use natural gas (2001)	Commercial vehicles in Delhi should convert to single fuel mode of CNG, effective April 2001.
8. Phasing out of diesel buses (2002)	Diesel buses in Delhi be phased out at a rate of 800 diesel buses per month starting from 1st May, 2002, till all the diesel buses are replaced. Fine of Rs. 500/- per bus per day imposed on diesel bus owners operating beyond 31 January 2002. Fine to increase to Rs. 1,000/day after 30 days of operation of the diesel buses with effect from May 6 2002. Director of Delhi Transport to collect the fine and deposit at the SC by the 10th day of every month.

Compiled from legal cases listed in *Legal and Scientific Resources for Asia*

Table 2 Selected Supreme Court Rulings on Polluting Industry, 1992-2002

<i>Case (ruling year)</i>	<i>Court Ruling</i>
1. Delhi stone crushers (June 1992)	Mechanical stone crushers in the union territory of Delhi to be closed, effective August 15, 1992.
2. Bichhri industrial pollution (February 1996)	Sealing of chemical factories in Bichhri. Ministry of Environment and Forest asked to determine damage costs of toxic sludge in soil and water, and recover the cost from the industries to restore the environment. A fine of Rs 50,000 on the industry to pay petitioner ICELA, to encourage other voluntary bodies to bring in public interest litigation.
3. Coastal Zone Case (April 1996)	Pollution caused by industries in coastal regions (of Maharashtra and Goa) to be dealt by respective high courts. Central government suggested to set up state Coastal Management Authorities and also a National Coastal Management Authority.
4. Delhi hazardous industries (July 1996)	168 industries asked to relocate from Delhi to any other industrial estate in the NCR, and stop functioning in Delhi, effective November 30, 1996. Employees in these industrial units to be compensated for the disruption.
5. Tamil Nadu tanneries case (August 1996)	Central government asked to constitute an authority to estimate the damage cost of pollution based on the Precautionary Principle and the Polluter Pay Principle. Tanneries (about 700) not paying these damages are to be closed down. Rs 10,000 fine each on the tanneries to be paid by October 31, 1996. Fine and damage revenue to constitute a Environment Protection Fund, and used for compensating people and rectifying the environment. Effluent treatment plants to be set up by November 30, 1996.
6. Delhi illegal industries (October 1996)	39,000 illegal industrial units operating in residential areas of Delhi ordered to close down.
7. Badkhal lake and Surajkund (October 1996)	No construction to be allowed within the green belt of Badkhal Lake and Surajkund, except a small area for recreational and tourism purposes.
8. Delhi hazardous industries (December 1996)	Industries could not relocate unless they protected the workers and pay according to compensation terms of Industrial Dispute Act (1947) to workers who refuse to relocate, plus 1 year's wages. Industries closing down have to pay workers 6 years wages.
9. Tanneries case: Calcutta (December 1996)	Tanneries in eastern Calcutta ordered to close down and relocate to a new complex by September 1997. Pollution fine of Rs 10,000 imposed on each tannery (total about 550) to be paid by February 1997, for damages to the environment (under a Environment Protection Fund). Workers unable to relocate to be paid 6 years wages as compensation.
10. Delhi brick kilns (August 2000)	Brick kilns in the agricultural land have to change over to fly ash technology or close down.
11. Beas River (March 2002)	Damage cost based on Polluter Pay Principle of Rs 10 lakhs imposed on Span Motels Pvt. Ltd for pollution in the Beas river area by the motel.

Compiled from legal cases listed in *Legal and Scientific Resources for Asia*, and CSE (1999).

Endnotes

¹ How much compensation any party pays depends on the bargaining power of the two.

² The paper however reported that in the sample of 250 Indian plants, 102 plants indicated that abatement had been undertaken in response complaints from neighboring communities, and 51 plants had done so in response to NGO pressure. (Pargal, Mani and Huq 1997: 6).

³ A polluter has an incentive to abide by the environmental standards, only if the marginal cost of offence is greater than the marginal benefit from violation. The marginal cost of offence is determined by the product of the probability of detection times the probability of prosecution (given detection) times probability of conviction (given prosecution) times the fine. (Bowers 1997: 66) As long as the probability of detection and conviction remain low in India, the command and control approach to pollution control will fail to induce potential polluters to abate.

⁴ It should be noted however, that given political and technological constraints sometimes CAC measures are better suited than economic instruments for certain pollution problems (Hahn and Stavins 1992: 465). For example, when pollution is highly localized, with threshold/non-linear damage functions, source-specific standards may be more appropriate. Economic instruments are particularly desirable when pollution is uniformly mixed over large geographical areas.

⁵ The latter has been used to grant compensation to displaced workers during closure of polluting industrial units. Another legislation, the National Environmental Tribunal Act (1995) introduced strict liability and is meant for large-scale accidents and damages involving hazardous wastes and chemicals.

⁶ CPCB (2001) *Parivesh* September issue: 34.

⁷ Ambient and source standards are set independently, unrelated in terms of the *volume* of pollution generation, thus it is possible for environmental quality to deteriorate despite a high degree of compliance among individual polluters. The fines and penalties for non-compliance are low in India, and the penalty structure is faulty since the same penalty is charged for violation of environmental standard irrespective of the size of violation (whether small or large) or the pattern of offence (occasional or repeated violations).

⁸ The SSI sector comprises of a vast number of very small enterprises, many of which are in the informal sector and may not even be registered. For many SSIs even basic data on value added, turnover, employment, and capital stock, is not available, let alone abatement expenditure. Since these units operate on small profit margins, the cost of non-compliance is lower than the cost of compliance (given the regulatory and monitoring structure, as well as corruption). There are fiscal incentives available for the SSIs, which are expected to help these units set up common effluent treatment plants and thereby reduce pollution from this sector.

⁹ Cited in Delhi Land use: Badkhal lake and Surajkund (1996) from a Supreme Court ruling of Rural Litigation and Entitlement Kendra v. State of UP (1986, SCC 517 and 1987 SCR614) that can be said to be the harbinger of the new trend. In the latter case, the SC ordered the limestone quarries in the Mussourie Hills to be closed since it was a hazard to the environment.

¹⁰ Advocate M.C. Mehta, the main mover of the Supreme Court rulings admits that judicial activism is not the answer, rather it is the only tool for citizens when formal enforcement fails. Interview published in *Frontline*, Volume 17, December 9-22, 2001.

¹¹ The closure orders were to be effective January 1997 for 39,000 illegal industrial units, and for 513 hazardous units around the city if they failed to relocate within the allotted time. *Down to Earth* May 15, 1997, page 28.

¹² "Slag in polluting industry ruling" *Economic Times* September 12, 1999, page 1.