

Environmental Conservation in Asian Industry

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INTRODUCTION

The past 20 years have seen a growing awareness of the constraints and costs that the environment can impose on a country's economic and social development. In response to increasing competition for natural resources and pressure on the environment, a variety of instruments and incentives have been developed to reduce the negative environmental impacts of industrial development. These instruments can take on a variety of forms from regulatory (e.g., laws and regulations) to market-based incentives (e.g., charges, fines and tradable permits) to social (e.g., community pressuring a company to cease inappropriate industrial practices).

The selection of environmental instruments frequently depends on the effectiveness of existing policies, the degree of enforcement and available resources, the amount of information made available to the general public and the nature of industrial development in a country. For the most part, attempts at utilizing legislation to reduce industrial pollution and environmental degradation have been inadequate in many Asian nations for a variety of reasons, including societies who are unaccustomed to litigation. Moreover, it is becoming widely accepted that regulatory instruments are ineffective in the absence of enforcement and developed legal systems, areas in which many newly developing Asian countries are seriously lacking. Consequently, providing incentives for private sector initiatives and voluntary environmental protection measures are emerging as more feasible options for governments facing serious budget constraints. The following paper examines existing instruments in Asia and current monitoring and reporting systems, as well as voluntary measures that several businesses have adopted in response to increasing environmental damage and social pressure.

ENVIRONMENTAL INSTRUMENTS IN ASIA

Considering the broad scope of economic, political and social levels of development in Asia, it is not surprising that environmental conservation practices in the region vary widely. Countries such as Singapore and Hong Kong have progressed rapidly and their legal and regulatory institutions have expanded with them. Alternatively, Lao PDR and Myanmar have industrialized at a slower pace and environmental legislation and regulations are relatively rudimentary. Clearly, the amount of environmental degradation depends in large part on the nature of development in a country. Transforming a country from agrarian to industrial, export promotion-based is often the most popular path to economic development adopted by Asian governments. Unfortunately in many cases this path also has the greatest impact on the environment.

In Asia, the government approach for mitigating industry's negative impacts on the environment falls mainly under Command and Control (CAC) regimes. The CAC regime is a regulatory approach mainly consisting of stream and ambient standards established by a government agency as national goals. Industrial firms are expected to comply with emission and effluent standards, which in theory are consistent with the stated stream and ambient standards. Failure to comply can result in fines, imprisonment or closure. In practice, end-of-pipe standards must be established given these goals and the carrying capacities of the airshed and watershed of specific localities.

This CAC approach for minimizing industry's environmental impacts was initially utilized in Western countries and was adopted by many Asian nations during their industrialization phases. But, as is the case with many development strategies, replicating a Western regime in a developing country does not guarantee success and, as a consequence, Asian countries have supplemented their CAC regimes with additional environmental instruments. Regardless, a comprehensive regulatory framework remains necessary for establishing the "rules of the game," as it were, for controlling industrial pollution and environmental degradation. The following section highlights legislation that presently exists in several Asian countries.

REGULATORY FRAMEWORK SUPPORTING ENVIRONMENTAL CONSERVATION

The environment's importance is recognized in a number of Asian Constitutions and has been since the mid-1980s. The Chinese 1982 Constitution states that "the State protects the environment and its natural resources and prevents and eliminates pollution and other hazards to the public." (UNESCAP 1992). Other examples include the Constitutions of India, Indonesia, the Republic of Korea and Thailand, all of which contain provisions supporting environmental protection. Although these provisions do not necessarily translate directly into legislation protecting the environment, they do indicate citizens' fundamental right to a clean environment and illustrate recognition on the part of governing authorities to the environment's importance to a nation's social well-being and sustainable development.

Constitutional considerations aside, fundamental legislation such as air and water quality acts supporting environmental protection exists in many Asian nations and are fairly comprehensive. Reflecting the CAC structures which most Asian countries have adopted with respect to reducing or eliminating industry's environmental impacts, the majority of legislation in place relates to curative or end-of-pipe approaches to pollution control, e.g., fines, charges and setting standards. Almost all Asian countries have basic laws pertaining to environmental protection, such as Malaysia's Environmental Quality Act 1974 and Singapore's Clean Air Act 1971. The degree to which a country has developed its regulatory framework is correlated with the level of development in the nation. Singapore and Taiwan have far more developed environmental frameworks compared to lesser developed countries such as Myanmar and Cambodia. The nature of a country's development is also significant. The Brunei economy is based on oil resources as opposed to industry, therefore legislation and regulations have been mainly focused on human activities, as they pose a greater environmental threat at present. There are exceptions to the relationship between the level of development and effectiveness of regulatory frameworks. China, for instance, has developed extensive legislation relating to water pollution legislation (due in large part to its large industrial sector).

In other cases, nations have extensively developed their regulatory structures to include sector specific laws relating to industrial pollution and environmental quality. In Taiwan, legislation and regulations vary depending on the nature of the pollution: water pollution standards are based on the type of industry, while toxic pollution standards are the same for all industries. Requiring environmental impact assessments (EIAs) are also used to integrate environmental considerations into industrial decision-making and supplement existing frameworks.

Creating a legislative structure supporting environmental conservation is only one step in the process of minimizing the potential for industry to negatively impact its surroundings. The ability of Asian nations to implement their regulations is the next stage. In response, many Asian countries have created environmental institutions such as environment ministries, departments or agencies, for policy formation, implementation and enforcement. China, Hong Kong, Japan, Pakistan, Thailand and Vietnam have all formed separate environmental agencies, whereas China, Bangladesh, Indonesia, the Republic of Korea, Malaysia, the Philippines and Singapore have environmental ministries (the countries mentioned twice have both an agency and ministry devoted to environmental issues). In other countries, a division is formed under a separate ministry or in cooperation with another sector to address environmental concerns. For example, in Myanmar, the Ministries of Mines, Industries and Agriculture have environment divisions, and, in Lao PDR, STENO (the Science, Technology and Environment Organization) has been created under the Prime Minister's office.

It is debatable whether a separate environment ministry or agency is more effective than incorporating environmental divisions into relevant ministries. The number of staff, budgets and political influence in a separate ministry of environment greatly impacts its effectiveness at controlling pollution. Many governments assign greater priority and resources to industry ministries, leaving environmental agencies/ministries to fend for themselves. This being said, including environmental divisions within industry ministries may be more effective at integrating environmental issues into agendas and the decision-making process.

Although for several years the majority of Asian countries have recognized the need to formulate environmental legislation, there are still a number of reasons why the CAC approach has been inadequate at reducing pollution levels and environmental damage caused by the industrial sector. Examples include:

- Lack of resources (financial and human);
- Monitoring and enforcement difficulties (discussed later);
- Lack of authority and overlapping jurisdictions that prevent legislation implementation;

- Fines and charges being too low for polluters to modify behavior;
- Lack of coordination among government agencies;
- Lack of technology.

Two examples will serve to highlight how the above factors can impede the effectiveness of CAC regimes for controlling industrial pollution. In India, the central government establishes emissions standards for industry but state authorities are responsible for enforcement. The result has been regional variance in reporting emissions by plants. In Indonesia, decentralizing standard setting and monitoring has eliminated variance within the provinces, but standards are not uniform across provinces (Hettige et al. 1996).

The main cause for the above issues is often government's failure to prioritize. For instance, formulating extensive legislation supporting clean production processes can be seriously undermined by a coal subsidy. Singapore represents a positive example of the benefits of prioritizing. It has experienced great success reducing industry's environmental impacts by thoroughly integrating environmental policy with industrial policy from the beginning of its industrialization process (and backing the policies with strong enforcement). In addition, the government's commitment and environmental goals are clearly outlined in its Green Plan which was presented at the Rio Summit. Land constraints facing Singaporeans are cited as the main reason why the government decided that national priorities had to be clearly established. Conversely, the Philippine and Thai governments have often been criticized for failing to prioritize policies and goals, leading to confusion and conflicting measures at increasing industry's environmental performance.

Clearly, although formulating environmental legislation has been undertaken in several Asian nations, the enforcement costs associated with its application have exceeded the budgetary capacities of many developing nations. Therefore, even though regulatory frameworks exist throughout Asia, they remain largely unsuccessful. Hindered by an inability to implement legislation and reduce industrial pollution, many countries have begun searching for alternatives that will address the limitations. One alternative that is being applied to control industrial pollution is market-based instruments (MBIs). This fiscal incentive is discussed in the following section.

ECONOMIC INSTRUMENTS

Limited success with CAC regimes in several Asian countries has led to the development of a second approach for controlling industrial pollution: the application of economic or MBIs. MBIs are designed to either endorse positive environmental behavior or to punish harmful activities by providing incentives or disincentives. The ADB (1997b) defines MBIs as "all instruments of environmental policy that—directly or indirectly—use prices to alter incentives and, through them, the environmental outcomes" (ADB 1997b: 12). MBI categories include: property rights, market creation, fiscal instruments, charge systems, financial instruments, liability systems, deposit-refund systems, and guarantee bonds.

A main cause for industrial pollution is that businesses often consider the environmental damage resulting from their activities as an external cost. In response to this view, MBIs attempt to assign a price to natural resources and environmental functions. In some cases, MBIs can create a market for environmental goods, such as a tradable pollution permit. Economic or MBIs are often used to support CAC measures and are attractive to governments as they can be financially self-sufficient (and in some cases generate additional revenue). MBI proponents state that this approach can provide a strong incentive for firms to internalize environmental costs (i.e., polluter pays principle). Also, it enables firms to locate their own methods for achieving environment targets, while freeing resource-strapped governments from the costs of extensive monitoring and enforcement.

In Asia, MBIs are being utilized predominantly on an experimental and small-scale basis. They are primarily applied as end-of-pipe solutions and are designed to support existing regulations. They emerged as a potential option in the region when it became apparent that CAC measures were failing to reduce pollution levels in many countries.

Commonly applied MBIs in Asia include fiscal incentives, such as tax and custom exemptions as well as duties promoting clean technology and discouraging the importation of harmful equipment, substances and/or machinery, e.g., India and Bangladesh (Kumar et al. 1996; Marandya 1996). Several countries, such as Thailand and the Philippines, have targeted MBIs on addressing industrial waste issues. The Thai government provides mandatory wastewater treatment facilities and charges industries for their use. India also supports a similar collective treatment approach and the Philippines experimented with a waste exchange program, albeit an unsuccessful one (ADB 1997c).

Providing financial assistance, such as environmental funds, for industrial firms attempting to "green" their activities and products is also in use in several countries (e.g., Thailand's Industrial Environment Fund 1991 and Indonesia's Pollution Abatement Equipment Loan Project).

Some nations have formally stated that they are interested in the use of MBIs to control environmental damage. In 1992, the Indian Ministry of Environment and Forests (MOEF) issued a statement supporting an increase in the use of fiscal instruments for environmental conservation, stating that MBIs represented a preventative as opposed to curative approach for controlling environmental damage. The MOEF established a task force to consider the feasibility of the MBI approach to pollution control in India. For the most part, India has focused on providing industries with conservation incentives (i.e., government pays the polluter to clean up) rather than a polluter pays approach whereby industries would be subject to environmental taxes and charges (Kumar et al. 1996). Alternatively, the Chinese government has selected environmental taxes and fines, pollution levies and discharge permits as appropriate to China's situation. More important fines for exceeding pollution standards are tiered in China based on the amount discharged, unlike flat rates in India.

Formal environmental conservation instruments in Asia differ greatly across the region. Most are quantity based with standards varying from country to country: policies supporting clean technology are a priority in one country, and damage control a priority in another. The effectiveness of formal regulations in the Asian region suffers from a number of shortcomings. First, efficient enforcement is lacking in several countries. Budget constraints, a lack of qualified staff and resources have all reduced authorities' ability to locate and punish industrial polluters. Enforcement problems have led to increased reliance on the judiciary in India for punishing polluters. Unfortunately, litigation is not socially acceptable (or affordable) in several countries, including Korea. Second, the regulatory frameworks in several nations are outdated or not comprehensible; fines are too small in Thailand. Third, standards are often set based on the concentration of pollutant discharge levels, leading many firms to simply dilute their discharge (e.g., India and China). Fourth, MBIs are focused on generating revenue for authorities instead of encouraging companies to invest in conservation (e.g., India, China and Malaysia). Fifth, governments' failure to prioritize can result in conflicting legislation and regulations (e.g., subsidies for polluting firms or tax exemptions). The Philippines has been an unfortunate victim of this in the past. Lastly, the technological abilities of the country may be inadequate at measuring emissions levels or designed cleaner production and treatment processes.

The final instrument for reducing industry's negative impact on the environment, social instruments, has been steadily emerging in past years. The next section considers the influence communities can exert on polluting industrial firms to convince them to modify their harmful behavior.

SOCIAL INSTRUMENTS

The last instrument that can be utilized to influence industries to improve their environmental performance is social instruments. This refers to the pressure the public can exert on firms whose activities are adversely impacting their lives. Depending on the level of public participation, local communities can provide strong incentives for industrial firms to abide by the law and meet (and occasionally surpass) the standards established by the State.

Faced with budget and personnel constraints, many governments recognize the benefits associated with supporting communities in the role of environmental watchdog. The Malaysian government has stated that it wishes to support action programs that are devoted to building environmental consciousness at all levels and that increase the general public's environmental awareness. To achieve this end, the government supports programs aimed at integrating environmental education into the public school curriculum. Indonesia's National Pollution Control Agency (BAPEDAL) has gone one step further and is actively promoting community involvement. BAPEDAL implemented an innovative program in 1995 called the Program for Pollution Control, Evaluation and Rating (PROPER). The program is designed to collect survey data from factories on a voluntary basis, rate their environmental performance on a five-level scale and release the information to the media and local communities in a simple, comprehensive format. It is believed that poor environmental performances will result in a higher risk rating for financing and that public pressure would provide low rating factories with an incentive to clean up their act. The program was successful in that the majority of firms with ratings in the lowest two levels were inspired to modify their activities and improve their standing. PROPER's results encouraged the Philippines to create its own version of the program, EcoWatch, which was implemented in April 1997. The Philippines program expanded its rating system further to include municipal water and wastewater services (Afsah et al. 1997).

In countries where government-sponsored programs are non-existent, EIAs provide an avenue for increasing community involvement in environmental conservation. Public hearings and consultations can serve to inform and

educate local communities regarding the environmental impacts a nearby firm can have on their environment. A number of Asian countries have implemented measures that require EIAs for industrial activities. The Philippines system has been in place since 1978 and requires EIAs for heavy industry projects, resource extraction and large-scale infrastructure works. Public hearings can be held depending on the size of the project and the natural resources involved (Smith, Van der Wansem 1995). The public release of EIA findings is also beneficial for providing valuable information regarding an industry's impacts, as is the timing for releasing findings. The EIA process in Thailand ensures that information is made available to the public prior to final decisions, which gives them an opportunity to take action.

A final social instrument that can be used to encourage environmentally conscious behavior on the part of firms is recognition awards. In Malaysia, the Langkawi Award is available to organizations (and individuals) who excel in their environmental efforts. This recognition can translate into financial gains for a firm by lowering its risk rating in the marketplace and increasing consumer support (Tan and Tan 1995).

Communities' level of involvement and ability to influence polluting firms depends on a number of factors. A study by Hettige et al. (1996) found a community's ability to pressure firms into modifying unsound environmental behavior depends in large part on the communities' education levels, literacy rates, resources, influence over government officials and the number of local members employed by the polluting firm. Communities in Bangladesh, India and Indonesia were found to exert considerable pressure on local pulp and paper plants. Firms who were targeted either installed pollution abatement equipment or supplied the communities with goods in kind, such as blankets, food or community buildings.

NGO presence can also influence the level of involvement and effectiveness of community pressure. The Philippines and Indonesia have a strong network of NGOs, whose activities are backed with policy support, who are able to increase the likelihood of firms complying with national standards. NGOs are able to educate, organize and inform communities of industry's activities.

The public's right to information also plays a critical role in the effectiveness of social instruments. There are no freedom of information acts in Malaysia and the government often cites the Official Secrets Act as a reason why it fails to fully disclose information. Although the Department of the Environment (DOE) has publicly disclosed some of its monitoring reports on air, noise and water quality and opened its library to the public, full disclosure of information is not persuasive in all government departments. The Nuclear Energy Unit has been accused of withholding information pertaining to a plant suspected of disposing hazardous waste in rivers in Merah (Singh 1995). One reason why government information may not be publicly disclosed is a hostile relationship (perceived or otherwise) between highly centralized government agencies and local communities. In other cases, the information which is released is not done so in a timely manner and/or is not presented in a comprehensive format which communities can understand.

If and when information becomes available, in countries such as the Philippines and India, it is providing communities with an additional avenue for addressing industrial damage: the judiciary. As stated previously, faced with limited resources many government agencies are often unaware and/or unable to enforce violations of environmental standards. In some cases, it is the local communities who enforce compliance with the use of legal instruments. After discovering that the activities of nearby industrial developers were reducing fish catches and quality of life, a Filipino fishing community decided to enforce the laws itself through legal action. The community applied for a Cease and Desist order from a Filipino court which stated that the developers must comply with national effluent and emissions standards or face immediate fines or closure. The judiciary in India has also been effective at enforcing environmental regulations and shutting down firms who fail to comply with environmental standards. The latter case is the ultimate CAC solution to firms who fail to meet environmental requirements.

CURRENT MONITORING AND REPORTING SYSTEM

Monitoring activities and systems in Asia reflect the variance among legislation, skilled personnel, budgets and environmental institutions in the region. Backed by ample resources and expertise, several countries have highly developed and efficient monitoring systems in place to evaluate firms' activities. For instance, Singapore's monitoring system is fairly sophisticated and comprises 12 air monitoring stations (five in industrial locations). The main environmental protection agency, the Pollution Control Department (PCD), regularly inspects larger polluting firms. In addition, companies are required to continuously self-monitor their pollution levels and maintain records of the results (Tyabji 1993). Similarly, Taiwan's Environmental Protection Administration (TEPA) has an extensive air and water monitoring system comprised of 66 automated air quality stations. TEPA has also created a database for 11 industrial groups and three state-owned enterprises that is capable of forecasting future discharges.

India, although less developed economically compared to Singapore and Taiwan, has a fairly extensive monitoring system included in its National Ambient Air Quality Monitoring Program (NAAQ). Established in 1984, it covered 290 stations in 99 cities by 1996 and monitors firms 24 hours a day on alternate days. In Indonesia, pollution monitoring systems are more decentralized, and provincial planning agencies known as BAPEDAL have been formed at the provincial level to assist with pollution control and monitoring. Under the PROPER program, plants are required to self-monitor their emissions and on-site inspections are employed. Both India and Indonesia have been successful at reducing pollution emissions and some plants are operating at world environmental standards. A main reason for their performance has been successful community pressure and concern over their reputations (Hettige et al. 1996).

In Thailand, major factories are required to monitor their emissions and discharges and report them to the government. Pollution control and monitoring in the country's 23 industrial estates (which includes 1,200 factories in 12 provinces) are the responsibility of the Industrial Estate Authority of Thailand (IEAT). On-site laboratories are located in the estates which take water samples twice per month to determine if they meet standards set by the Ministry of Science, Technology and Environment (Roht-Arriaza 1997; Kasemsri 1996).

Expensive monitoring costs has led to many governments targeting their pollution reduction efforts. The Malaysian Department of Environment has decided to direct its attention on larger firms in the most polluting industries (i.e., 42 percent of firms in the palm oil and 33 percent in the rubber industries are covered). This approach has been successful at controlling effluent discharge in these industries and 80 percent of firms are in compliance. The remaining industries are self-monitored with a system in place for local communities to lodge complaints regarding polluting firms (Markandya 1996).

Similar to Malaysia, the Filipino government selected a more decentralized approach to pollution control and focuses its monitoring efforts on the higher polluting industries. The DENR (Department of Environment and Natural Resources) has created Regional Community Advisory and Monitoring Committees and the Dirty Dozen Scheme targets higher polluting industries in each region. The latter initiative partners regional offices with local communities in monitoring firms' environmental performance. Communities, with assistance from the regional offices, serve polluting firms with Cease and Desist orders. Threatened with closure many firms opt to install less polluting equipment (Smith et al. 1995; Markandya 1996).

The previous paragraphs have highlighted several approaches to overcoming constraints to efficient and effective monitoring of industrial pollution. The following section examines a number of private initiatives that currently exist in Asia. The section illustrates that, in a number of cases, the private sector has recognized that the environment can no longer be considered an externality and has voluntarily improved its environmental performance.

VOLUNTARY ACTIVITIES IN THE PRIVATE SECTOR

In discussion thus far it would appear that the industrial private sector prefers to ignore all environmental constraints and avoid meeting pollution standards. In this scenario, the government assumes the role of an enforcer and industrial firms as environmental outlaws. A lack of resources has often meant that the government is fighting a losing battle. This is not always the case. In some countries, the industrial private sector has decided to meet national standards voluntarily without government influence, and on occasion surpasses national standards to meet world levels. In several Asian countries, the private sector has begun to realize that there are benefits to be gained from environmentally conscious behavior. As a result of the growing awareness of environmental constraints (and other factors), a number of businesses have begun undertaking voluntary efforts to improve their environmental performance. Firms believe their initiatives will be rewarded by increased competitiveness, lower litigation costs and good public relations. This reflects both a growing awareness of environmental issues on the global level as well as within the Asian region. A survey of English-language newspapers and magazines recently found that media coverage of air and water pollution problems in the region had increased from a factor of 2 to 2.5 in the past 10 years (i.e., 140 articles in 1986 to 350 by 1996). Reflecting the increasing public awareness of harmful effects, many firms are undertaking voluntary measures to improve their image. These measures are essentially business initiatives, environmental certification and eco-labeling.

BUSINESS INITIATIVES

Businesses are motivated to voluntarily modify behavior for a number of reasons: to lower litigation costs, improve risk ratings for loans, address increasing community pressure and improve/maintain international competitiveness. Industrial firms in India began voluntary initiatives for yet another reason: the recognition that environmental

conditions were constraining business. A scarcity of water and other input materials forced Harihar Polyfibres in Karnataka and Madras Refineries in Tamilnadu to change production processes and increase conservation efforts (Kumar 1996). In addition, several Indian firms have formulated environmental policies, installed environmental systems and conducted environmental audits.

Firms undertake voluntary environmental activities individually, as a group or in cooperation with a government agency. For example, several firms operating in Malaysia formed the Business Council for Sustainable Development Malaysia (BCSDM) following the Rio Summit. The Council supports a number of its members' initiatives, such as private provision of treatment facilities, formulation of company environmental strategies, awareness building in local schools through camps and essay contests (a Shell and BP initiative) and sharing information freely regarding clean technology processes. Companies such as Motorola Semiconductors in Malaysia have discovered that environmental efforts can make good business sense. Recycling water instead of storing it until it is treated was found to be more cost-effective (Kiat and Tamin 1995). The Agricultural Bank of China is working in cooperation with the Chinese National Environmental Protection Agency to assess firms' environmental risks. This followed a loss of US\$19 million in loans due to plant closures resulting from a failure to comply with environmental standards.

Environmental reporting and auditing is another method that firms are employing voluntarily. Many companies have begun publishing annual reports on their environmental performance, for example, the Philippine food, beverage and agribusiness company, San Miguel Corporation and Tokyo Electric Power of Japan. The reports vary widely from company to company but do provide information on areas such as the amount of water consumed, recycling materials utilized, community programs undertaken, etc. Although a standard procedure for environmental reporting does not exist (leading to difficulty comparing one company's performance to another), the reports do indicate a growing realization on the part of the private sector of the environment's importance. Firms produce the reports and audits for several reasons: due to demand from shareholders, to reduce the firm's risk rating, or to generate good public relations. A recent survey of Japanese shareholders found that 85 percent wanted greater comparable data, refined and consistent environmental disclosure.

INTERNATIONAL STANDARDS ORGANIZATION: ISO 14000

ISO 14000 is defined as a "voluntary action by industry to establish environmental management systems (EMS) and to commit to ongoing improvements in environmental performance" (Roht-Arriaza 1997: 292). This system builds on the earlier ISO 9000 to include environmental management approach. To receive certification, companies must formulate an environmental policy and state their environmental goals (i.e., meet national standards, international standards, etc.). Environmental reporting and audits are part of ISO 14000 certification.

The advantages associated with ISO 14000 is that it will facilitate "green" trade and provide an additional incentive for companies to meet environmental standards, thereby freeing government resources from the responsibility. That being said, ISO 14000 has also come under criticism as being a barrier to free trade and inadequate at fully addressing environmental protection. The latter criticism refers to the lack of public disclosure under the new system; although companies must release their environmental strategy, they are not required to fully disclose their effectiveness at reaching their goals (i.e., by publishing environmental audits, reports and EIAs). Furthermore, the standards that firms must meet for certification are not uniform, rather they depend on how high the companies' goals are: meet national or international standards. This could seriously jeopardize the credibility of the program (Roht-Arriaza 1997).

Disadvantages aside, the Korean government has stated that it will require its leading companies to participate in the certification process and several other Asian countries are establishing the necessary institutions for certifying companies. China has introduced the standards in a pilot phase focusing on the export sector, the Standards and Industrial Research Institute in Malaysia has developed draft standards and offers training programs to the private sector, and the Indonesian Standardization Council has formed working groups to design a certification program for the country. Clearly, the success of the new program will depend on the certification's credibility, a comprehensive and developed regulatory framework and cost incentives. In absence of these components, ISO 14000 may be minimally effective at reducing pollution levels and motivating a change in behavior.

ECO-LABELING

Eco-labeling is based on the belief that consumers have the right to purchase products that are comprised of environmentally friendly inputs and produced with the minimal impact on the environment. For the most part, eco-labeling is undertaken primarily on a voluntary basis and is not required by international standards. From an industrial perspective, it can serve as a useful marketing tool to distinguish one product from another and increase the

competitiveness of a product in the world market.

Products can be labeled by the producers themselves, an industry association or by an independent party. The latter is usually the most reliable. The label can be positive or negative. For example, a positive label may describe clean production techniques used and a negative label would indicate the product's destructive impact on the ozone layer (e.g., poisonous materials). General criteria for eco-labeling products depends on the performance or end use of the product, processing and production techniques.

For eco-labeling to be successful, it should be promoted to ensure consumers are aware of the program and what the label actually represents. Several Asian countries are using eco-labels. Examples of voluntary government programs include India's Ecomark (1991), Singapore's Green Label (1992), and Taiwan's Green Mark (1993) programs. For a licensing fee, labels are assigned to products meeting environmental criteria, national standards and regulations. In some cases, initiatives come from outside the country, such as Indonesia's membership in a United States forestry program called Smart Wood. The program is an NGO initiative which sends in outside experts to evaluate a company's forestry and logging practices (NWF 1996). Eco-labeling can be a useful marketing tool and serve to differentiate one firm's product from another. Although national regulations promoting the eco-labeling programs are beneficial, it is consumers' preference for environmentally less-damaging products that is the main driving force behind the success or failure of such initiatives.

Product differentiation, consumer choice and marketing opportunities are cited as reasons why eco-labeling is gaining acceptance throughout the world. This is not to say that there has been no opposition to this environmental strategy. The World Trade Organization (WTO) has been called upon to regulate eco-labeling worldwide. Critics of the program state that such labeling represents a barrier to international trade and regulation is required. Many NGOs feel this will water down the effectiveness (i.e., criteria and credibility) of eco-labeling and that powerful business interests in the WTO oppose it on the basis that it restricts the free flow of trade.

Regardless of the WTO's eventual decision regarding the matter, eco-labeling has begun in Asia. Faced with mounting environmental degradation, proper education and information dissemination may serve to increase consumers' demands for improved industrial accountability and transparency in the marketplace with respect to the environmental impact that products have. Domestic considerations aside, many countries have begun to recognize that to remain competitive overseas requires improving practices in response to client's demands.

CONCLUSION

The past decade has witnessed the reaction of many nations and governments to increased environmental awareness and pressure to conserve nature and its many functions and assets. International events such as the Rio Conference and the Montreal Protocol represent global measures designed to modify public and private environmental behavior in support of greater conservation. The environment, previously considered a public good, has now entered the domain of the industrial sector. Environmental damage and degradation can no longer be considered by firms as an external cost. In response, many nations have implemented instruments created to incorporate environmental considerations into industry's decision-making process.

This paper has outlined the various instruments available to policy-makers, businesses and the public supporting industrial conservation practices. An overview of the regulatory techniques utilized in Asia was presented and their overall effectiveness was highlighted. Countries such as Singapore and Korea have had considerable success developing their frameworks and several environmental institutions and enforceable regulations are in place. This is not the case throughout Asia. Given the considerable budgetary and human resource constraints that many countries in the region face, replicating the traditional Western CAC approach has been largely unsuccessful. As a result of these limitations and a growing awareness of the need to adopt preventative solutions as opposed to curative ones to environmental problems, economic instruments are emerging as an alternative. Primarily applied on an experimental basis in Asia, it is believed that they will address the problem of the environment as an external cost. Barriers to the effective use of economic instruments in Asia are similar to those elsewhere in the world: inadequate pricing, conflicting policies hamper effectiveness, etc. These instruments are attractive to many Asian governments as they lighten the burden for resource-strapped departments.

The final instruments discussed were social instruments. In several Asian countries, an active civil society has assisted with monitoring, evaluation and applying pressure on both the private and public sectors. Informal instruments are emerging as a powerful tool in several Asian nations, particularly those facing severe resource limitations. As environmental awareness continues to grow and public disclosure increases, it is highly likely that local communities

will increase their demands for industrial environmental compliance. Whether firms decide to improve environmental performance voluntarily or not, many companies and multinationals in Asia have begun to realize that there are economic gains to be made from environmentally friendly practices. Clearly, the effectiveness of strategies such as eco-labeling and community pressure depend in great part on the amount of information available to interested parties.

The level of industrial conservation behavior in Asia varies greatly. Considering the different economic, political and social characteristics in the region, it is not surprising to note there are differences. Several governments are moving away from the traditional CAC approach and have begun to realize that policies and approaches must be tailored to their unique situation. National commitment to environmental conservation, combined with increasing social awareness and pressure, will further ensure the integration of industrial development with environmental protection. This can either be a voluntary realization or government imposed. As stated, several firms in India have already realized the potential constraints the environment can impose on business practices and have adopted new operation methods in response. As community awareness and global pressures increase, the Asian industrial sector and national governments may have little choice but to include environmental considerations into decision-making processes in order to fully support sustainable development goals.

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