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A 'law of nature' - The command-and-control approach

Introduction

Environmental degradation has become one adverse effect of development brought about by urbanization and industrialization. In the Philippines, domestic sewage has contributed about 52% of pollution load and industry, 48% (EMB 1996). If not abated, this pollution load could compromise the country's natural resources and jeopardize the economy and people's quality of life. It is, therefore, important to examine the nature of policies that currently address environmental management concerns.

The Philippines for a long time has adopted the command-and-control principle in most of its environmental policies such as the National Pollution Control Decree of 1976, the Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990, the Philippine Mining Act of 1995, the Clean Air Act of 1999. It is only in the 1990s that other policy innovations, e.g., market-based instruments, are being put in place.

This paper, thus, gives perspectives on the command-and-control approach to environmental management drawing heavily from the book of Field (1994). It points to a number of factors that contribute to the success or failure of environmental policy - efficiency and cost effectiveness, equity considerations, and enforceability.

Environment standards - tools for command-and-control

Command-and-control approach to public policy is one where political authorities mandate people, by enacting a law, to bring about a behavior, and use an enforcement machinery to get people to obey the law. In environmental policy, CAC approach basically involves setting standards to protect or improve environmental quality.

A standard is generally a mandated level of performance enforced through a piece of legislation. For example, setting emission standard means legally allowing polluters a maximum level of emission, beyond which is punishable by law. Other examples of CAC tools for environmental management are limits on the volume of timber harvest, bans on cutting trees, and maximum soil erosion. The principle is - to command people or firms not to do something by enacting a law that makes it illegal and delegating authorities to enforce the law, e.g., by imposing fines or penalty to violators.

There are three types of environmental quality standards - ambient, emission and technology.

Ambient standards

Ambient standards refer to never-exceed level for some pollutants in a particular environment. The Philippine Clean Air Act, repealing the National Pollution Control Act, establishes ambient air quality standards for source-specific air pollutants such as sulfur oxide, carbon monoxide, from mobile and stationary sources. For water quality, the minimum parameters include dissolved oxygen, pH or acidity level, biochemical oxygen demand (BOD), and total coliform organisms. As per Department of Environment and Natural Resources (DENR) Administrative Order No. 34, repealing the Pollution Control Act, Table 1 presents ambient water quality standards in the Philippines. Ambient standards can not be directly enforced, but legal measures could be imposed upon polluters to regulate their emission-producing activities.

Table 1. Quality standards for specific pollutants in fresh and coastal and marinewaters.

Water Class	pH	Dissolved Oxygen *(minimum)*	5-day 20C Biochemical Oxygen demand	Total coliform Organisms
		mg/L	*Mg/L*	*MPN/100mL*
Fresh waters				
Class AA	6.5-8.5	5	1	50
Class A	6.5-8.5	5	5	1000
Class B	6.5-8.5	5	5	1000
Class C	6.5-8.5	5	7 (10)	1000
Class D	6.0-9.0	3	10 (15)	-
Marine waters				
Class SA	6.5-8.5	5	3	70
Class SB	6.5-8.5	5	5	1000
Class SC	6.5-8.5	5	7 (10)	5000
Class SD	6.0-9.0	2	-	-

Source: DENR Administrative Order No. 34 repealing the National Pollution Act

Emission standards

Emission or effluent standards are also never-exceed levels applied directly to the quantities of emissions from pollution sources per unit of time. For example, the Philippine Clean Air Act of 1999 allows maximum emission of specific pollutants from vehicles as shown in Table 2. The Act also allows DENR to designate each regional industrial center to allocate emission quotas within its jurisdiction. In effect, emission standards set a constraint to level of performance that has to be observed by the polluters, as highway speed limit does. Emission standard only sets the maximum limit of emission, thereby leaving the polluters the decision on how to achieve it.

Table 2. Emission limits for some pollutants from vehicles, by type.

Pollutant	Light-duty vehicles *(g/km)*	Heavy-duty vehicles *(g/kWh)*
Carbon monoxide	2.72	4.5
Hydrocarbon & nitrogen dioxide	0.97	
Hydrocarbon	-	1.1
Nitrogen dioxide	-	8
Particulate matter (g/km)	0.14	0.36

Source: Republic Act No. 8749 or Philippine Clean Air Act of 1999

Setting emission standards does not necessarily mean meeting ambient standards. Emission standard could be imposed on firms but if there is no control on the number of polluting firms established, aggregate environment quality, i.e., ambient standards, is not directly checked. The recent phenomenon in Bolinao, Pangasinan illustrates this point. The unabated proliferation of fish pens and cages caused the accumulation of fish feeds and other wastes in the water, thus reducing dissolved oxygen content to a harmful level resulting in fish kill.

Technology standards

Technology standards specify the technologies, techniques, or practices including design, engineering, input, and output standards which polluters must adopt or meet to protect the environment. In contrast to emission standards, technology standards impose on polluters certain decisions and technologies to be used. This is some form of "technology forcing' for polluting industries to adopt technological change in order to meet environment standards.

Emerging concerns on environment standards

Standards are popular, as they appear simple and specific in targets. But there are complications as they go through the political/administrative process where other considerations have to be addressed. There are problems regarding setting the level of standards, the uniformity of standards, equity effects, and enforcement.

All-or-nothing quality

The principle of setting standards is 'all-or-nothing' quality, either the standard is met or not, regardless of the cost involved. Setting ambient or emission standards generally considers only damage cost, not abatement cost. Balancing marginal abatement cost and marginal damage cost or minimizing abatement cost vis-a-vis damage to achieve efficiency is not taken into account.

Moreover, standards are considered as threshold levels where risks involved are at the minimum. However, these "safe' levels may not hold true in all cases as toxicologists and other scientists claim there are no threshold for many environmental pollutants. The standards imposed by law may be safe for some individuals but not for others because of varying reactions of human or habitat to pollutants. To shield everything from diverse effects means targeting for zero-risk level or setting standard level of emission at zero, and, is therefore, quite an unrealistic goal.

Uniformity in heterogeneity

A single, uniform standard is essentially imposed for national or nation-wide application. But in reality, regions or areas have heterogeneous situations, e.g.,

population, economic and production activities, such that the costs of damage will expectedly differ. The same level of emission may affect more people and economic activities in a more developed area than in a less developed one. A uniform standard could thus be relatively stringent in less-affected areas than in more-affected areas. Standards should, therefore, conform to situations appropriate to an area.

Equity in multiplicity

Pollution emanates from multiple sources. It would be efficient if the standard level of emission would be achieved at the minimum marginal cost of abatement. With the underlying 'equimarginal principle' of CAC approach, the different polluters, regardless of size or performance, will have to pay the same compliance cost to meet a uniform standard emission. In reality, however, cost of abatement varies across polluters based on the their economic and technological conditions. The greater the variation, the more difficult it is to attain the equimarginal principle of the uniform-standard approach.

Source-specific emission standards would be more appropriate as long as the polluters would be willing to share information on their actual abatement costs to establish individual emission standards.

Paradox of enforcement

Pollution control laws are useless if not enforced and not supported with resources. Standards are often formulated by national authorities but enforced by local authorities. Thus, cost of enforcement may not be thoroughly considered in the formulation leaving local authorities the financial burden. With unavailable or limited funds, local enforcers may resort to compromises or deals with the firms concerned.

Strictness of standards often suggests higher enforcement costs. Sanctions for violators are usually in the form of fines or imprisonment. If fines are too low, offenders may opt to pay the fine than to spend for abatement measures. Higher penalty may motivate compliance but extremely high fines could encourage authorities to make this an avenue for income generation, distorting the litigation process.

Sustainability of enforcement is also another concern. Initially, compliance with standards may be high but if monitoring is not sustained through time, continuous compliance may not be assured. In some instances, polluters may opt to spend their resources to influencing political authorities in relaxing standards than to innovations to abate pollution. Effectiveness of the standards approach depends on time, effort and money invested in enforcement.

Other policy options

Most of these policies Philippines adopt the CAC principle of setting standards and imposing sanctions to regulate exploitation of environment and natural resources. In the industrial sector, over 60% of local factories have adopted nominal pollution control.

Polluters have little incentive to comply because inspection rate is low, legal enforcement is time consuming and fines are minimal (World Bank 2000).

Standards under the command-and-control approach may appear to directly put restraints on pollution. But it has a number of limitations, particularly in the incentive it offers polluters to comply with environment standards. CAC is like a "one-size-fits-all' approach (World Bank 1999) that does not categorically consider varying performance of polluters, thus ignoring efficiency principle. This constraint, thus, poses other policy alternatives for environmental management.

One policy option is incentive-based strategy, e.g., emission tax or charge, estimated according to the level of emission. The incentive system adopted by the Laguna Lake Development Authority (LLDA) in the 90s illustrates how it restored the Lake that has become a basin of industrial wastes from surrounding industries. The LLDA imposed a charge per unit of emission within the legally permissible standard and a higher unit charge for emissions above the standard. The scheme brought about in two years an 88% reduction in BOD discharges from the pilot plants covered in the initial implementation (World Bank 1999).

The Clean Air Act of 1999 does have some provisions on estimating polluters' fees according to volume and toxicity of any emitted pollutant. Because of the proportionate charges involved, incentive-based strategies motivate polluters to be more cautious of their emission levels. This also provides stronger economic incentive to polluters to clean up using their own chosen strategy. Pollution taxes or charges encourage polluters to search for innovations - management or technological - that will reduce emission rates at the least cost.

Regulation - whether standards or taxes and charges - and enforcement are important in environmental management. However, environmental policies should systematically suit local circumstances, such as the pollution load, size of the exposed population and income and simultaneously consider both benefits and costs of pollution control. Effective enforcement will also depend on the community's capacity to respond to environment problems, thus, the importance of information, education and bargaining power. Regulatory policies will only gain leverage if programs to inform and educate the communities are also in place. (***Dulce D. Elazegui***)

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