

**B.A. (Prog.) Semester IV**  
**Environmental Geography**

**Unit-4**

**Environmental Programmes and Policies: Developed Countries; Developing Countries.**

**Environmental Programmes and Policies: Developing Countries. (Part 1)**

**Introduction**

Most developing countries have long since established laws and formal governmental structures to address their serious environmental problems, but few have been successful in alleviating those problems. The development banks, which control resources desperately needed by the developing countries, are promoting the use of economic incentives and other market-based strategies as the key to more effective environmental protection. However, the donors have rarely asked whether the approaches they are urging, which have recently had some success in Europe and the United States, can be implemented effectively in developing countries with limited resources and little experience with market-based policies of any kind.

We worry that these highly sophisticated instruments have been pushed too hard and too fast, and that those who promote them say little about the context and conditions in which they thrive. The targets of this advice should be better informed about everything they would need to do to make market-based instruments work. Otherwise, the cause of environmental protection itself may be dealt a blow when ill-conceived policies divert a country's energies without producing the desired result. Developing-world regulators, already marginalized in their own countries, will have little to show for their efforts in terms of a cleaner environment.

Before imposing a regulatory strategy on the developing world, we should review the experience of the industrialized countries and others that have implemented market-based policies. How extensive is the experience? How successful? What have we learned about the conditions necessary for effective market-based policies? Then we will be ready to consider when and where these policies are likely to work in the developing world.

**HISTORY**

Although incentive-based approaches to environmental control were being developed by economists in the early 1970s when many of the basic environmental laws were being written in the United States, none of the early laws used economic instruments. Market-based tools

began to make inroads in the 1980s when regulators at the U.S. Environmental Protection Agency (EPA) saw that they could be useful in dealing with difficult Clean Air Act implementation problems. Each stack at each regulated facility had been given a discharge permit. The EPA innovation allowed firms to trade those permits internally and externally, so that expensive-to-control sources could emit more and cheap-to-control sources would be encouraged to cut back.

A variation of this system was eventually written into law to create the best-known and most successful U.S. market-based instrument. To control acid rain, Title IV of the 1990 Amendments to the Clean Air Act established tradable emission allowances for sulfur dioxide. Starting in January 1995, the electric power industry in the eastern third of the nation was allocated a fixed number of total “allowances.” The rules allowed firms to bank allowances for future use, buy allowances to meet regulatory requirements rather than reduce emissions, or sell excess allowances.

Rigorous checks and balances built into the program ensure compliance, system credibility, and integrity. Utilities participating in the program were required to have expensive equipment for continuous monitoring. Every allowance is assigned a serial number. EPA records transfers to make sure that a unit’s emissions do not exceed the number of allowances it holds and makes this information available to the public. The transparency in the system provides a level of reassurance to the public and competitors alike. Noncompliance is punished.

Allowance trading has undoubtedly accelerated program implementation and saved money. Utility companies are pleased that they, rather than the government, decide the most cost-effective way to comply.

Although much is made of the success of this program, the reality is that most U.S. environmental programs continue to use traditional regulation because the alternatives pose significant technical and political challenges. Some emissions are too difficult or too expensive to monitor well enough to support trading programs. Equally important, any environmental program must be politically viable. Many in the public interest community oppose economic instruments because they fear that emissions trading cannot be adequately enforced. Some think that market-based approaches provide excuses for polluters to avoid responsibility

A lesson from this brief history is that market-based instruments have been applied gradually and cautiously in the most mature environmental protection regime, the United States. They are limited in application and some are still essentially experimental. Their gradual introduction to resolve specific problems and practical applications has helped to address these concerns and build constituencies for further use.

Many European countries have also implemented economic instruments such as taxes on fertilizer, gasoline, and other polluting inputs. For example, Germany, France, and the Netherlands have effluent charge systems. Most of these innovations are aimed at raising revenue for infrastructure investment rather than encouraging pollution reduction. Charge levels, set too low to provide an incentive for discharge reduction, instead guarantee a fairly regular income stream.

Ironically, there are even examples from the countries of the communist bloc, most of which used fees and fines on emissions as basic tools of environmental protection. However, pollution charges were paid out of the soft budgets of state enterprises and therefore had little chance of influencing enterprise behavior. Ultimately, they have become pay-to-pollute schemes whose revenues support government environment agencies..

After the fall of communism, the multilateral development banks and the Western industrialized countries promoted market-based instruments to a Central European audience eager for alternatives to central planning. They seemed the right targets for this message, as they are in most respects “developed” industrialized economies rather than “developing” countries. Typically, they have excellent universities, high rates of literacy, a technically trained civil service, and an existing system of environmental regulation.

For the most part, economic instruments have not taken hold in the countries in transition. Demonstration emissions-trading and transferable-permit systems with a handful of managed trades were actively pursued in Kazakhstan, Poland, and the Czech Republic. An elaborate Slovak system is scheduled to begin in 2002. But these were only experiments, and they did not deliver on their promise of enabling these countries to avoid the mistakes committed in the name of environmental protection in the West.

With hindsight we can see that these countries simply lacked many of the prerequisites for an effective market-based approach. And we should keep in mind that in many ways these countries are stronger candidates for market strategies than are the developing countries. Among the missing ingredients for success were:

Bone-deep understanding of markets. The actors in complex market transactions must have considerable skills that did not exist in the countries of the former Soviet bloc. Before 1989, scholars studied non-Marxist economics, but industrial managers experienced an economy structured under the rules of state socialism, without profit and loss, Western accounting principles, or a stock market. A few countries had retained a trading mentality in small businesses, but major industry faced a steep learning curve before it could assume the responsibilities of pollution trading.

Reliable recourse when deals fail. Emissions trading is the purchase and sale of paper instruments that represent a right to pollute in the future. These are complex intangible property rights, subject to the normal hazards of commercial transactions. Sellers may default, and buyers may go into bankruptcy. False accounting is a peril that has led to criminal investigations in the United States. Someone must police trades and ensure their integrity. This arbiter can be the environmental authority, another administrative body, or the courts, but it must exist.

We must develop a better understanding of the conditions in each country that influence the performance of specific policy instruments.

Donor advice on emissions trading, however, did not distinguish between countries with working legal systems and those without. In the early days of the transition in particular, such institutions were in short supply. Some of the westernmost countries in transition were beginning to re-establish a European legal system free of political and economic “safety valves,” as Daniel Cole of Indiana University Law School has characterized the “legal means of last resort” by which party and state authorities avoided their own rules throughout the period of Soviet dominance. To the east, Russia and the other parts of the Soviet Union never really had rule-of-law traditions.

Ensuring integrity. Everyone, particularly the public, must believe that trading partners are honoring their commitments. In the United States, where environmental regulation is a very contentious subject, trust is developed through high levels of transparency. Permit requirements, emissions data, and the transactions themselves are all available for inspection by the public. The relative ease with which they can monitor specific transactions and know whether industry is meeting its commitments has helped to convince numerous stakeholders,

including economic competitors, nongovernmental organizations, and the public interest community, to go along with unconventional programs.

When trades are made under public scrutiny, there are fewer reasons to be concerned that differential treatment of polluters will provide opportunities for corruption. But the experience of the citizens of the Soviet bloc countries over the past 45 years leaves most citizens acutely aware of how quickly discretion can be hijacked to serve the purposes of people in power, rather than the environment. Emissions trading programs might work without as much transparency as the United States demands. In Western Europe, the public is more tolerant when industry and government sit down to negotiate. But it is clearly an issue that architects of any trading program must consider, and it requires special consideration in countries struggling with endemic corruption.

Knowing the real cost of compliance. In the United States, industry is motivated to participate in emissions trading by the economic pain firms have experienced in investing in compliance. Industry's capacity to sort this out was honed by a century of experience with cost accounting. One reason firms comply is because they have a clear expectation of consistent and reliable enforcement.

The hard realities of environmental compliance were basically unknown to industry in the Soviet bloc countries. Regulatory bodies were weak. The laws were characterized by scholars as "aspirational," stating idealistic ambitions not connected with day-to-day reality. Environmental requirements were routinely excused in favor of meeting production goals.

When firms must grapple with authentic—rather than theoretical—environmental regulation, they develop a good grasp of the real costs to them of regulation and of what it takes to reach compliance. This motivates firms to look for cheaper ways to reach the required standards. We have seen no evidence that industries will theoretically come to the conclusion that emissions trading will be a cheaper way of achieving compliance than directed regulation. Why try to save money on regulation if you are not expending any to begin with and don't expect to in the future? Compliance practices are beginning to change in a few of the countries in transition, but even today, in most countries environmental enforcement is no more rigorous than it was during the Soviet period, and is likely weaker because of the general confusion.

Genuine monitoring. Any system with the goal of regulating firms releasing pollution to the environment requires knowledge—not a guess—of what each plant is actually discharging. Trading complicates the situation by sanctioning changes in the amount of permitted discharge from each source. Regulators and the public must be assured that real pollution reductions are being traded.

Monitoring in the former Soviet bloc usually measured ambient air quality, not what pollutants plants released at the end of their discharge pipes. In truth, no one could be sure what particular factories were emitting and whether they were meeting legal requirements. For some purposes, there are alternatives to monitoring, such as emissions estimates using the sulfur content of coal. But the accuracy of estimates depends on a number of assumptions, including that the pollution control equipment has been turned on and has been maintained so that it is capable of performing the assumed level of removal. These are not always safe assumptions in countries with rampant corruption and systematic noncompliance.

This brief review makes clear that the former Soviet bloc had considerable economic, cultural, and political baggage that was directly relevant to the introduction of any state-of-the-art environmental tools, including market-based instruments. Nevertheless, the donor and assistance literature we have reviewed was content to limit discussion of these critical issues to vague comments, such as that market-based instruments are effective “if implemented under the right conditions,” according to publications sponsored by the Regional Environmental Center for Central and Eastern Europe. The advice suggests a naiveté about the audience. Many of the promoted solutions would have required fairly fundamental commitments on the part of governments—not just environment ministries—that had no interest in the environment.

One could argue that no harm is done in encouraging countries to aim for the most sophisticated policies, but the reality is that resources and political will are limited. These countries cannot afford the luxury of failed experiments. An opportunity was lost to invest that time and money in less ambitious projects that might have produced a sense of accomplishment and some small environmental gains. The donors’ failure to admit the serious shortcomings in the recipient countries, or to point out the many issues that surrounded the limited introduction of market-based instruments in the United States, had a cost. Environmental professionals in the countries in transition should have been informed that they could not make this leap without constructing supporting institutions.

## WHAT ABOUT THE DEVELOPING WORLD?

The key elements discussed above—accurate monitoring, transparency, a working legal system, and a realistic incentive to trade—are at least as scarce in the developing as in the transitioning world. Corruption, favoritism, and poor environmental enforcement are features of both landscapes. In addition, the developing world may present its own unique challenges. There are fewer trained people, and the best people tend to be concentrated in capitals rather than in field posts; equipment for monitoring and data gathering is scarce, and basic data are unreliable.

None of these factors seem to have discouraged advocates for economic instruments. Unfortunately, by arguing, as Harvard University economist Theodore Panayotou has, that market-based instruments “in effect transfer [important responsibilities] from bureaucrats to the market,” some of the literature has suggested that capacity limitations are a reason for, rather than an obstacle to, the adoption of market-based instruments.

Proponents of economic incentives for developing-country environmental management usually start with the appealing proposition that market-based instruments relax the trade-off between the goals of economic growth and environmental quality. They argue that in the short run, the instruments offer the cheapest solutions and ones that can be achieved without specific knowledge of the technology or pollution-reduction costs of polluting sources. At the same time, the instruments will produce revenue for chronically poor governments. Their final argument is that incentive-based approaches will spur technological advances that, in the long run, make it cheaper to reach better environmental quality. The cost of not adopting market-based policy instruments rests on the entire argument.

Cheapest now. The proponents assume that if each source faces the same price per unit of discharge, either as charge or as the price of a tradable permit, the total cost of meeting some given air or water quality standard will be minimized. For many, although not all, situations, however, the location of each source matters to the environmental results, as many economists have noted. Where location does matter, it is necessary to tailor charges to each source’s location and take account of each source’s costs to achieve “cheapest-now” solutions: not an easy matter in the developing world. To do this with a tradable permit system would require a special kind of permit that grants the right to change the quality at particular points in the region

rather than to discharge a particular quantity of pollutants at the source's location. This is a complex business and has never been tried as a real policy.

No information needed. If it were true that a single-price system produced cheapest-now, it is conceivable that the required price could be found via trial and error. But in the world in which location matters, a trial and error approach is not even conceivable if there are more than a couple of sources. To make matters worse, however, there will almost always be numerous sets of individualized sets of charges that produce the desired environmental quality. Finding any one of these is not the same as finding the cheapest-now set. The responsible regulatory body would have to check out a great many such successes by adding up the costs incurred by the sources in order to know when it was closest to cheapest-now.

Only the highest functioning countries should attempt the most difficult economic approaches such as tradable permits.

The alternative is to find the cheapest-now prices by using mathematical modeling. The model would have to include information about source location and costs of discharge reduction, and to fit each source within a representation of the regional environment. The complexity and data requirements of the effort involved would present a formidable challenge for underfunded, poorly staffed environmental ministries of the developing world..

New sources of revenue. Pollution charges and auctioned permits generate income, an appealing idea for governments needing tax revenue. But even where tax revenues are not in short supply, there is a policy argument for taxing pollution.

A simplified version of this is that it is, in principle, better to tax activities that are undesirable, rather than tax labor or "goods." Taxes on activities that government should be encouraging distort the market outcome from what would be socially optimal in the absence of the tax; too little of the good is made or too little labor is offered. Pollution is something that society wants to discourage, and reducing it below the free-market amount is what pollution-control policy is all about. The revenue is in that sense "free," and everyone is better off if society substitutes it for other taxes, at the same time as it reduces discharges.

There is no question that successful emission charges or periodically auctioned and tradable permits to emit pollution will produce revenue for the responsible agency or for the entire government at the same time that they influence pollution discharges. But the revenue must be put into perspective. First, exactly because pollution discharge levels can be adjusted in



response to these incentives, the relation between those levels and the revenue will be complex. There is no reason to expect that the charge or auctioned level chosen to produce maximum revenue is easy to find or is the same as a level that allows ambient standards to be met at lowest cost. Second, it is unlikely that very much revenue can be raised this way. Calculations based on figures from Sweden's carbon tax suggest that raising more than 1 to 2 percent of a government's budget requirements is most unlikely. Although this is not insignificant, it is also not a major source of revenue. Third, if the charge has its expected effect of changing behavior in the short run and encouraging a shift toward less-polluting technology in the longer run, revenue will decline over time. Fourth, there is nothing easy about collecting this revenue. If a country has trouble collecting sales and income taxes because it has difficulty monitoring sales or wages or because of corruption, there is no obvious reason why it will find it easier to monitor emissions and collect the appropriate taxes or enforce the actual purchased permits. Indeed, the record keeping necessary for ensuring that taxes work is probably much easier for sales and income, because they can be audited against a paper trail. Pollution discharges generally must be measured by special equipment as the pollution is created, and this monitoring capability does not exist in much of the developing world. In view of these differences, pollution "tax" revenue is likely harder to obtain.

The final concern here is political reality. Instituting taxes, particularly those that bite, often requires significant expenditures of political capital, as demonstrated by the U.S. experience with proposed energy tax increases. Environmental policymakers must ask whether the governments in developing countries and the countries in transition, facing steep unemployment and weak industries, will undertake this act of courage, particularly when they rank environmental issues very low among their priorities. Poland reduced its pollution charges in the mid-1990s in response to industry protest when the charges began to rise to a level that might have changed behavior.

Even cheaper in the future. The extra cost imposed by charges or auctioned permits provides a continuing incentive for industry to seek out and adopt new, less-polluting technology to avoid paying some charge amount or purchasing permits. In contrast, traditional nonmarketable permits to discharge are said to lack the incentive to innovate. But saving money is still desirable so long as the cost of achieving the saving is less than the saving. The difference is that there is no incentive to reduce discharges below the level set in the permit.

In any case, the argument assumes that governments will be willing to impose and actually collect charges significant enough to change behavior and that there will be adequate monitoring, political will, and consistent timely collections not eroded by inflation. It does not consider the many countries that insulate firms from the market place with the equivalent of soft budget constraints or who use their banks for loans that support friends or government objectives, irrespective of sound business principles or sober assessment of credit. All these must be assumed away to make the theory plausible.

Other arguments. A few experts argue that using economic instruments can reduce or eliminate the need for regulatory bodies and enforcement programs by, as Harvard's Panayotou argues, taking full advantage of the self-interest and superior information of producers and consumers "without requiring the disclosure of such information or creating large and costly bureaucracies."

Comparing economic instruments as a group, he argues that they substitute for efforts to force compliance through enforcement and that they "tend to have lower institutional and human resource requirements than command and control regulations." Developing countries cannot afford the "generous" infusion of "resources such as capital, government revenue, management skills, and administrative and enforcement capabilities" that are demanded by command and control requirements, but not by market-based instruments.

This argument flies in the face of the empirical evidence of the U.S. experience and the complications and qualifications discussed above. Despite the fact that Panayotou acknowledges that "the informational requirements of economic instruments are not insignificant," the proponents of market-based incentives in the developing and transitioning world are not telling the entire story. When the details are taken into account, much less is given up by postponing the drive for economic incentives than is claimed.

## SONGS OF EXPERIENCE

Many countries that have been the target of development assistance have one or more versions of market-based instruments on their books, and most of the communist bloc countries, as noted earlier, used pollution charges as a primary tool of environmental protection. We have not seen any convincing evidence that these policies have changed behavior or achieved their environmental goals.

A number of country- or region-specific reports claim to portray “ground truth,” but they rarely grapple seriously with the institutional issues surrounding the introduction of market-based instruments or discuss results and impediments. At best, there are brief allusions to “difficult” enforcement problems, as in many of the Environment Discussion Papers that came out of Harvard Institute for International Development’s Agency for International Development-funded Newly Independent States Environmental Economics and Policy Project.

The few studies that go more deeply into a single country’s experience sometimes do reveal the difficulties of applying environmental instruments, acknowledging, for example, inadequate monitoring and the problem of corruption. An example from University of Windsor geographer V. Chris Lakhan in the *Electronic Green Journal* documents Guyana’s experience: “The inherited legacy of environmental problems and current environmental abuses will not disappear with the mere [passing of laws and development of plans]. Success in environmental protection...will depend on addressing...administrative neglect and unethical practices, fragmentation of environmental institutions, shortages of professional and technical environmental personnel, paucity of financial resources, and the uncontrolled development practices of local and foreign investors.”

But more often, as exemplified by reports on Colombia’s experiment with charges on water pollutants, such studies resemble advocacy for the recommended programs rather than disinterested evaluation.

Donors and advisors should encourage development of credible behavioral rules, verification mechanisms, and a culture of compliance.

In sum, it is almost impossible to evaluate the actual experience of developing countries with market-based environmental policy instruments. These gaps in understanding are, unfortunately, not unusual. There are, similarly, only limited reports on the success or failure of other environmental development efforts, such as the promotion of National Environmental Action Plans, basic environmental law drafting, and various efforts to introduce technology.

There is no universally right choice of instrument for managing a nation’s environment. All policy instruments require monitoring capability, enforcement resolve, and control of corruption. Unfortunately, no single instrument provides a magic way around these concerns. More fundamentally, even the cheapest way of meeting some targets may be too big a commitment for some countries. Reaching environmental targets requires a politically tough collective decision to impose costs on the influential few for the benefit of the faceless many

and to stick with the decision for a sustained period. It is therefore not surprising to see uneven implementation and slippage from time to time.

Our most urgent suggestion is that in this difficult situation, policy selection should not be a function of fad or ideology. The donors, advisors, and the countries themselves must invest energy in setting realistic targets and putting into place procedures that make some steady progress toward the ultimate goal. They must increase their attention to the importance of institutional reform and develop better understandings of the conditions in each country that influence the performance of specific policy instruments.

This suggests other ways of proceeding that are more consistent with scarce institutional resources and might promise some environmental returns that could in time become significant. One approach would be to emphasize incremental improvements in pursuit of pragmatic goals, particularly ones that help to build a transitional system that will take account of existing capabilities and institutions. Taking more measured steps does not have the same sense of adventure as a great environmental leap forward, but it might result in real, although small, initial environmental gains and could be accomplished without losing sight of the ultimate goal of developing the most efficient ways to manage the environment.

A concrete way to way to think about this would be a tiered approach. Countries with the lowest institutional capability level might start with simple discharge-control technology requirements, which are hard enough when experience and funding are lacking. The basis for selection would be to ask what is achievable and relatively easy to monitor. Ideally, success will breed regulatory confidence and more success.

Countries with a bit of experience under their belts could move to technology-based discharge limitations similar to those found in the U.S. Clean Water Act. They might establish discharge standards, such as plume opacity, which can be easily monitored, or put in place deposit-refund systems, not only for beverage containers but also for car batteries, tires, and dry-cleaning fluid. Only the highest functioning countries should attempt what we consider the most difficult of the economic instruments: making discharge permits tradable or charging per unit of pollution discharged.

The most important thing the donors and advisors can do is to encourage the development of credible behavioral rules, mechanisms for verifying and encouraging compliance, and a culture in which compliance is the first choice of action rather than the last.

Institutional capacity should not be an eternal barrier. Regulatory capacity and confidence can be developed in a number of ways. Institutions, like people, must practice to learn, and environmental policy is a particularly good practice ground because clean air and clean water are something most societies want. But setting the standard for success too high defeats confidence and confuses common sense. We believe this is what has happened with the effort to move the countries of the developing world directly to sophisticated market-based instruments for environmental protection.