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Water pollution control in emerging and transitional countries

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ABSTRACT: ***The policy prescription for resolving environmental issues in developing and transitional countries (CIT) is gradually polarizing into two camps. Market-based instruments (MBIs) are widely used in these nations, according to one set of academics and policy supporters, including international organizations. The opposing viewpoint is that institutions must be created first, or that policymakers should choose a gradual or tiered strategy that takes into consideration current capabilities. Environmental control in these nations, according to the organization, is more difficult than in developed countries due to financial, institutional, and political limitations. In the near term, the urgent requirements of developing nations may be successfully handled by learning from the challenges faced by a few successful instances and creating an appropriate policy instrument in response. In this article, three such examples from three distinct regions of the world—Malaysia (Asia-Pacific), Poland (Eastern Europe), and Colombia—have been highlighted (Latin America). The study investigates whether policy tools resulted in lower levels of water pollution in these nations, as well as what role MBIs had in pollution reduction. According to the case studies, an overall improvement in environmental compliance was achieved via a mix of instruments—license fees, standards, charges, and subsidies—enforced by aggressive enforcement.***

KEYWORDS: ***Costs, Environmental, Impact, Pollutants, Water Pollution.***

1. INTRODUCTION:

The policy prescription for resolving environmental issues in developing and transitional countries (CIT) is gradually polarizing into two camps. In these nations, a group of academics and policy supporters, including international institutions such as the World Bank, supports widespread use of market-based (MBIs)/economic instruments (EIs). The other side is adamant on using a tiring or piecemeal strategy. MBIs should be used by poor nations and CIT to address environmental issues, according to proponents, since they create "win-win" scenarios. They benefit the government (by raising revenue in a cost-effective manner), the environment (by encouraging polluters to change their behavior and or using the revenue generated to support environmental protection efforts), and the economy (by creating incentives for private sector investment in the development of cost-effective environment-beneficial technologies). However, in recent months, there has been a lot of pushback against the notion of supporting MBIs uncritically. Researchers argued that either institutions must be built first or the environment must be protected first[1]. A variety of acronyms are used throughout the article. The complete forms are provided when and when these abbreviations are used, as well as a list of these abbreviations in the Appendix. Policymakers should choose a gradual or tiered strategy based on their current capabilities. Environmental control in poor nations is much more difficult than in developed countries due to financial, institutional, and political limitations. Researchers in a similar spirit, argues that, in addition to efficiency, the selected environmental policy instrument must be politically acceptable to different stakeholders and supported by existing institutions (primarily the legal system), levels of human capital, and infrastructure. He goes on to say that the four elements for MBI effectiveness, namely openness, accurate monitoring, a genuine trade incentive, and trust, are rare in CIT and almost non-existent in underdeveloped nations. In this context, Researchers argue that many developing countries and CIT face: (a) more severe

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environmental degradation; (b) a greater reliance on environmental resources for economic development[2]; (c) a weak institutional base to implement environmental policy; (d) a greater risk of resistance to the introduction of MBIs; (e) a greater risk of resistance to the introduction of MBIs;Despite these drawbacks, the prospective (theoretical) advantages of adopting MBIs may obviously exceed the expenses associated with addressing these flaws. Any such effort, though, might take a long time and cost a lot of money. In the near term, the urgent requirements of developing nations may be successfully handled by learning from the challenges faced by a few successful instances and creating an appropriate policy instrument in response. In this article, three such examples from three distinct regions of the world—Malaysia (Asia-Pacific), Poland (Eastern Europe), and Colombia—have been highlighted (Latin America). The study investigates whether policy tools resulted in lower levels of water pollution in these nations, as well as what role MBIs had in pollution reduction. Malaysia's situation is particularly intriguing. The palm oil processing industry's more rigorous rules did not hinder its [3] development; rather, they complimented the industry's attempts to innovate and stay competitive. Poland, on the other hand, had the greatest economic development in the Eastern European (CEE) Region from 1990 to 1997, while having one of the highest pollution costs (mostly air). Colombia is yet another fascinating example of an environmental charge that is succeeding despite a challenging policy context. The scheme's success is all the more attractive considering the strong GDP growth (averaging 4.6 percent from 1985 to 1995) and the fact that most of the expansion was resource intensive (agricultural or mining). Other nations may benefit from the good features of these policies since they have resulted in decreased water pollution in these countries. A pollution fee is a financial sacrifice for a company, and it is very likely that it will be resisted, suggesting implementation problems. The case studies from Poland and Colombia illustrate how these challenges were overcome during implementation. As a result, the examples provide valuable insights for other developing nations. It should be noted right away that the emphasis of this article is on water pollution, and as such, it does not attempt to evaluate the benefits and drawbacks of other potential tools for reducing water pollution [4].

2. DISCUSSION

Water usage taxes in Colombia have a long history, dating back to 1942, when the Ministry of Agriculture established 'vigilance' service fees to fund water use monitoring. INDERENA (Institute of Renewable Natural Resources) and regional Environmental Protection Agencies have been imposing water usage fees since 1974. (EPAs). INDERENA created eight different fee rates based on water use in 1982, ranging from hydropower production (at US$ 0.012 l/sec/month) to shipping (at US$20/vehicle/semester). These charges had no major effect on the cost of water to consumers. Furthermore, they were not gathered in a methodical manner. According to available statistics, just US$ 0.116 million was collected between 1989 and 1989, despite a potential income of almost US$ 90 million. The government devised a plan to strengthen the environmental regulatory framework and address environmental problems in a cogent manner as part of the National Development Plan for 1991–94. This resulted in Law 99, which established the Ministry of Environment (MoE), the National Environment Council (NEC), and the National Environmental System, as well as the closing of INDERENA, in December 1993. The Ministry of the Environment assumed full responsibility for environmental issues and was given control of the National Environmental Fund. The National Environmental Council (NEC) was established as a vehicle for securing agreements among various socioeconomic groupings on issues of national environmental policy[5].The function of the

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Corporations Autonomies Regional's (CARs) was further revised and reinforced by Law 99, which decentralized authority and made 16 new CARs exclusively responsible for environmental management in their territories. The employment of EIs, particularly "compensatory" and "retributive" pollution charges, was also stressed in the law. The 'compensatory' tax refers to the compensation provided to CARs in order to guarantee a certain degree of quality for a particular water resource, while the 'retributive' tax refers to the retribution or compensation provided to the water body for serving as a garbage dump. The new law redefined retributive rates, requiring that the tax:

- Represent the societal costs of pollution;
- Be imposed for utilizing the resource as a receiver of the discharge;
- Apply to all activities, public and private.

On an annual basis, the MoE determines the tax amount and collection method by creating a tax structure and identifying the factors to be considered. In addition, the Ministry sets a national minimum tax rate. Local environmental authorities may only modify the rate levels higher to match the location's carrying capacity. 31 Following Decree 901, the retributive tax was ultimately introduced in 1997. The following were the major problems addressed by this decree:

- At first, the tax will only be applied to organic waste emissions, such as BOD and TSS. The minimal tax rate will be US$ 0.03 per kilo and US$ 0.013 per kilo.
- Each regional EPA will set an environmental goal that will be updated every five years. The goal will be set via a consensus-building and participative process including many stakeholders involved with the water resource in issue.
- Polluters are required to submit an emission report every six months. Random emission testing will be conducted by EPAs to ensure the veracity of the data.
- Regional tax rates will be modified every six months until the specified objective is met.
- The regional factor (a multiplier) will be increased by 0.5 to modify tax levels.

This means that for those areas that accept the Ministry's minimum level, the tax will double in the first year, then rise by 50, 33, 25, and 20% between the second and fifth years. Seven densely inhabited, developed, and polluted areas were covered in the initial phase of deployment. Watershed Cap and Charge was the name of the initiative (WCC). According to an estimate of abatement costs, a fee of US$ 100 per ton would cut the industry's organic emissions to waterways by 80%. (Wheeler, 2000). However, the initiative started with a low fee of US$ 28 per ton for BOD and US$ 12 for TSS. It was anticipated that these fees would be high enough to have an impact on pollution levels, but not so expensive as to enrage the sector.

2.1. Application:

The facility permit for point sources of pollutant discharges is Poland's main policy tool for attaining environmental goals (and emissions). All industrial entities in Poland are required by

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law to apply for licenses from the Voivod16 administration for water intake and wastewater disposal. The permit stipulates the following:

- The maximum quantity of sewage disposal;
- The greatest concentration of certain contaminants;
- Additional sewage technical characteristics (e.g., the radioactivity or temperature).

An environmental impact statement (EIS) is required as part of the application process, which includes information on

- Production levels,
- Kinds of production processes,
- Fuels utilized,
- Types and quantities of discharges/emissions,
- The types of pollution controls implemented.

Although companies must self-declare all data, the accuracy of the information is readily verified since the EIS must be authorized by an impartial reviewer. Because the costs and penalty for any pollutant not covered by a valid permit are quadrupled, there are significant incentives to acquire at least a temporary permit [6]. If environmental requirements are breached, new licenses may be refused. The majority of Poland's bigger plants operate under a legal permission or a temporary authorization. Water polluters accounted for 17,389 establishments in 1992, while air polluters accounted for 46,305. Half of the facilities operate without legal licenses or with just temporary licenses due to a lack of resources in processing permit applications. In Poland, the facility permit for point sources of pollutant discharges is the most important legislative tool for attaining environmental goals [7].

2.2. Advantage:

The NEP had three main goals:

- Encourage polluters to reduce the social costs of meeting environmental goals.
- Ensure that charges are proportional to marginal damages.
- Ensure that charges generate revenue that can be used for environmental investments and related purposes (e.g., education, research, monitoring equipment, and so on).

The Ministry of Environmental Protection, Natural Resources, and Forestry (MEPNRF) establishes the process for levying charges, which includes the preparation of a list of pollutants for charge assessment and the determination of charge rates. The following are the main characteristics of the water pollution charge:

- any enterprise discharging its sewage directly into surface waters or soils must obtain wastewater discharge permits.

- the charge is calculated on the basis of the total volume of selected pollutants present in the wastewater and is levied on six major classes of pollutants, namely BOD, COD, SS, heavy metals, chlorate and sulphate ions, and volatile phenols.

- any enterprise discharging its sewage directly into surface waters or soils must obtain wastewater discharge Charge rates are generally updated once a year and adjusted for anticipated inflation in the next year to prevent rate slippages.

It should be emphasized that, throughout the 1970s and 1980s, when charges were initially implemented, consumer goods prices did not accurately represent manufacturing costs, consumers were generally shielded from the possible price effect of the levies. As a result, public discussions were not included in the initial planning. Similarly, the State-owned companies' soft financial constraints prevented any attempt to engage the industry before developing the instrument. However, in Poland after 1990, industry consultation became one of the most significant elements in the development of policy tools. Factors like as damages, abatement costs, and the economic features of the polluting sector are considered for determining charges, and rates are finally established at levels that are politically acceptable and satisfy revenue needs. In 1990 and 1991, the costs were raised and varied by geographical areas and industrial type, reflecting pollution severity. For example, Katowice, a water-scarce area, has rates that are twice as high as the rest of Poland. The wastewater emissions from various industries have been divided into five categories. For polluter category 1 businesses, such as chemical and fuel processing, regular charges are doubled. Enterprises in polluter group 2—the paper and pulp industry—have a multiplication factor of 0.85 of the normal rates, and so on. The EPL (1990 amendment) has an unusual feature in that businesses may consider environmental costs as regular production expenditures and deduct the amount paid from their taxable revenue. Another appealing feature enables businesses to deduct the amount imposed in the current year from taxable revenue, even if the charges are paid in the next calendar year[8].

2.3. Working:

Although companies must self-declare all data, the accuracy of the information is readily verified since the EIS must be authorized by an impartial reviewer. Because the costs and penalty for any pollutant not covered by a valid permit are quadrupled, there are significant incentives to acquire at least temporary permit. If environmental requirements are breached, new licenses may be refused. The majority of Poland's bigger plants operate under a legal permission or a temporary authorization. The goal of a pollution charge system, no matter where it is implemented, is to keep pollution levels in check by making polluters pay a price for their excesses. The fees are imposed by government agencies and are adjusted yearly to account for inflation and non-compliance. In the case of Poland, the same has been done. Poland's example is particularly intriguing since, despite having one of the highest pollution penalties, it had the greatest economic growth in the CEE area from 1990 to 1997. Polluters were incentivized to invest in environmental protection equipment as a result of the legislation. In 1998, environmental protection expenditures rose by 1.8 times in real terms compared to 1991[6].

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True, public investment in wastewater treatment facilities was one of the major drivers in improving water quality in Poland. However, it should be considered in the context of Poland's broader environmental policy. The strict effluent limits imposed by the MEPNRF on November 5, 1991, were the primary motivation for the building of water treatment facilities. The directive established a new water protection strategy, tying effluent regulations to the extent and effectiveness of wastewater treatment for the first time. 26 Because the quality of river water had previously been utilized as the basis for constructing wastewater treatment facilities, the change in direction prompted towns to invest in extremely effective water treatment technology. Other factors that led to a decrease in wastewater production were the adoption of more efficient technologies, the introduction of water pricing, and other measures that decreased the demand for water [9].

CONCLUSION

The current article presents three examples from three distinct regions of the globe in which government initiatives resulted in water pollution management. The case studies demonstrate that policy instrument implementation has never been a one-time event. Instead, in the majority of these nations, it was an organic process in which numerous reversals were successfully dealt with as and when a crisis arose. According to the case studies of palm oil mills in Malaysia, water pollution charges in Poland, and Colombia's pollution charges program, a combination of instruments—license fees, standards, charges, and subsidies—enforced by consistent enforcement leads to an overall improvement in environmental compliance. 38 In fact, recent research on the adoption of new environmental policy instruments (NEPI) in eight industrialized countries40 comes up with comparable findings. Despite the fact that all of these nations have adopted the NEPI, research indicates that legislation remains the most effective tool for pollution management the combined use of multiple instruments teaches other nations that sufficient care should be given to ensure that the instruments do not overlap or conflict with one another. The use of a variety of tools also shows that the State's job of combating pollution is now considerably more complex than it was before, when it relied only on CAC laws. Because multiple instruments have been used to address the problem at the same time, a critical question arises: "What is the relative efficacy of each instrument?" Understanding the relative efficacy of various tools may aid developing nations more effectively[10]

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