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Environment and Economy: Lessons of Japan's Environmental Problems and Policies*

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I. INTRODUCTION

What are the lessons to be learned by other countries from the Japanese experience of environmental disruption and pollution control policy?

The performance of the Japanese economy is a subject of international interest. Several developing countries recognize the economic development process in Japan as a model for their own. This model should, however, reflect not only the importance of positive economic achievements, but also the negative consequences of unrestrained industrial growth.

This paper analyzes the development and the basic features of Japanese pollution control policy during the period from the 1960s to 1970s, and concludes with some lessons from the Japanese experience and future tasks based on an assessment of pollution control policy in Japan.

II. POLLUTION CONTROL POLICY IN JAPAN: SOME CRITICAL ISSUES

In spite of the great potential of environmental and health damage, pollution source control policy had not been accepted by the government and industry during the 1950s, according to the narrow oriented economic development policy.

It wasn't until the summer of 1967 that the Basic Law for Environmental Pollution Control was promulgated in Japan. It was called the constitution of pollution control policy, but anti-pollution movements and various other people and groups criticized its purpose because the law's stated aims was "harmony with sound economic development." The unmistakable implication was that the need for pollution control is not absolute, and thus might, in certain cases, yield to the interest of promoting economic activities. In 1969, the Tokyo Metropolitan Government established its landmark Pollution Prevention Act. This law acknowledged environmental rights as the basic rights of Tokyo citizens,

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and rejected the theory of harmony with economic activities that was espoused by the central government.

The second half of the 1960s saw a number of pioneering developments in the fight against pollution, and special mention must be made of the role of local governments, which should be given primary credit for Japan's internationally acclaimed pollution control policy. They initiated the fashioning of the policy, which prodded the central government into action.

The Basic Law for Environmental Pollution Control was revised at the "Pollution Diet Session" in 1970 so as to abandon the "harmonization principle" and come closer to the principles espoused by the Tokyo Metropolitan Government's Pollution Prevention Act. It also allowed local governments to independently create more stringent regulation. Altogether, 14 new regulatory statutes were established under the new principle. It can be said that the development of Japanese environmental policy was pioneering after 1970.

Japanese success with pollution control during the early 1970s has been noted internationally, especially in Western Europe.¹ It is, however, fair to say that pollution control policy during this period is not anticipate-and-prevent policy but react-and-cure policy. It should also be pointed out that the true motivating force behind these changes has been citizen movements that shaped public opinion, which in turn forced administrative agencies to act.²

With the enforcement of stricter environmental laws, some of the world's most innovative regulatory instruments were created, including the areawide total pollution load control system for air pollutants and effluents. Japanese pollution control policy also employs several unique approaches such as pollution control agreements and a pollution-related health damage compensation system. It may be worthwhile here to introduce Japan's unique experiences on pollution control policy.

1. Environmental Regulation vs. Technological Development: The Case of Car Exhaust Standards

The automobile and its associated industries account for some 10% of Japan's gross domestic product. This enormous expansion of automobile production was accompanied already in the early 1970s by an accelerating increase in environmental pollution, traffic accidents, and heavy congestion. These "external diseconomies" are borne by the citizens.³ In 1972 the Environment Agency announced a policy of establishing limits on the volume of automobile exhaust gases based on the Clean Air Act, which had been passed in the United States the year before, to reduce carbon monoxide (CO) and hydrocarbon (HC) concentrations in automobile exhaust to one-tenth contemporary levels by 1975, and nitrogen oxides (NOx) levels to one-tenth by 1976. The 1975 standards were to be enforced in full. The 1976 standards, however, encountered resistance from automobile companies, which asked for substantial relaxations on the grounds of technical difficulties. The research department of the Japan Industrial Bank applied a cost-benefit analysis performed by the National Academy of Science to this issue and reached the following conclusion: "If automobile emission standards are implemented, it will unavoidably (1) push up automobile prices, (2) increase fuel consumption, and (3) lower vehicle performance. Therefore, the demand for automobiles will decrease, many related businesses will suffer adverse effects, and annual production will decline by ¥82,700 million; this will cause a total loss of 94,000 jobs, which, in addition to adverse effects on the international account balance, will have a major adverse effect on the national economy. It is important that we have cautious, scientific discussion on the matter, and not be dominated by emotions." The central government instructed the Central Council for Environmental Pollution

Control to reexamine the policy. Public opinion reacted strongly against this. As a result, the seven major cities of Tokyo, Kawasaki, Yokohama, Nagoya, Kyoto, Osaka, and Kobe organized research groups on automobile exhaust control to inquire into the matter. Automobile companies were asked to present their prospective compliance dates and to explain their cases regarding the technical feasibility of meeting the 1976 standard. After the hearings it was learned that only two major automobile companies were insisting that meeting the deadline was difficult on technical grounds, and that the other companies had already developed the technologies to satisfy the 1976 standard. The research group published the report, which concluded that the proposed 1976 standard was technically achievable, and it also set forth the social responsibility of automobile companies, which developed new approaches for raising fuel efficiency and obtaining needed pollution abatement technology at the same time. The pressure of regulation therefore encouraged technological development. As a result, they were able to produce cars that are less-polluting and the most efficient in the world. This is one of the reasons why Japan actually became preeminent in the world in terms of automobile production.⁴

Professor Prud'homme analyzed the relationship between policy choice and technological development based on the Japanese experience, and concluded as follows:⁵

“What happened is that science and technology provided answers to most of the problems raised. The possibilities of science and technology are such that they extend the frontiers of rationality. A rational decision is one that takes into consideration costs and benefits.

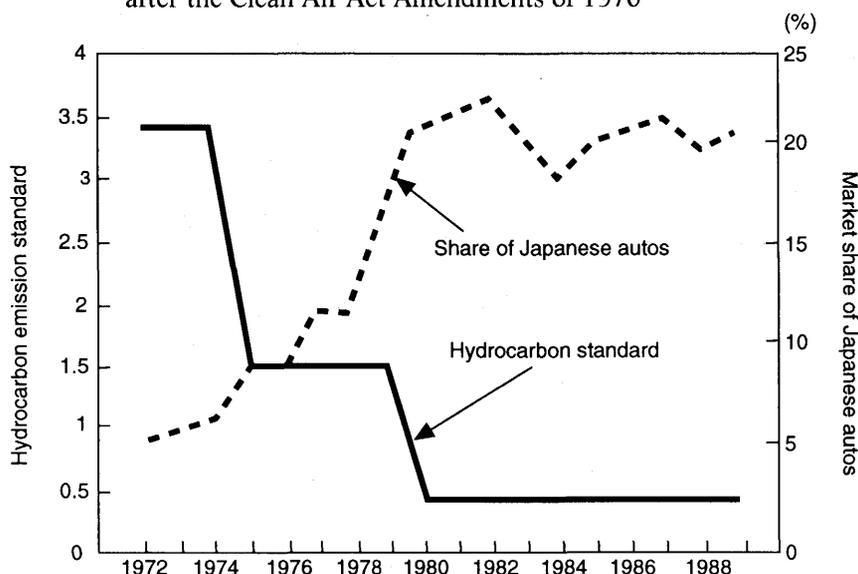
The problem is that it is not only very difficult to determine benefits (i.e., damage avoided), it is also often impossible to estimate costs. Cost of processes that have not yet been invented cannot be estimated. They are said to be very high or even infinite (“It can’t be done”), but may well turn out to be reasonable. And it is decisions based upon such overestimated costs that are irrational. The Japanese experience in the field of pollution abatement lends support to the idea that to a large extent it is not technology that should constrain policy choices, but policy choices that should constrain technology.”

The postponement allowed American automakers to continue producing dirty, gas-guzzling, which contributed to a relative decline in the competitiveness of American cars, and thereby boosted the popularity of Japanese cars in the U.S. market as shown in Figure 1.

In other Japanese industries as well, the 1970s was a time when efforts to meet tough standards gave birth to numerous pollution control technologies and/or cleaner production technologies.⁶ Until then it had been taken as an article of faith that the imposition of environmental regulations would tend to sap the vitality of industry and retard the economic growth rate. But as the foregoing contrast of the Japanese and American auto industries makes clear, there are at least some cases where a compelling need to satisfy stricter controls will generate demand for new technologies, accelerate the speed of inventions, and ultimately make an industry more powerful. As in the case of production technologies, necessity is the mother of invention, and social needs for environmental protection drive pollution control expertise forward.

The experience of Japan's auto industry was precisely of this sort, and can be held up to the world as a lesson on the benefits of enforcing rigid standards. For that matter, other industries were experiencing much the same thing.⁷

Figure 1 Exports of Japanese Automobiles to the United States after the Clean Air Act Amendments of 1970



Source: Materials from The Tokio Marine and Fire Insurance Co., Ltd.'s Third Environmental Seminar (prepared by Michael Walsh). "Environmental Risk and Environmental Law (Volume on the U.S.)," edited by The Tokio Marine and Fire Insurance Co., Ltd., Yuhikaku Publishing Co., 1992.

2. The Role of Local Governments in Pollution Control

During the 1950s and 1960s, pollution grew worse and worse, especially in metropolitan areas. The number of protest movements demanding stronger measures against pollution increased at that time. As a result, progressive mayors and governors were elected in Yokohama, Metropolitan Tokyo, Osaka, and elsewhere.

Although local governments may enact ordinances and bylaws, it is, as a rule, not possible for such ordinances to exert stronger control than that envisaged by the policy of central government, as stipulated by Article 14 of the 1947 Local Government Act. Generally, local governments sought ways of controlling pollution without getting into conflict with national law and the central government. One method was pollution control agreements. Generally they are agreements between local governments and industries that define the essential duties of business managers in protecting the natural environment. The first such pollution control agreement was signed in 1964 between the City of Yokohama and an electric utility when a new coal-fired thermal power plant was planned for construction near a densely populated area. At that time, in spite of the 1962 Law on Emission Control, electric power plants were exempted from the jurisdiction of not only the Ministry of Health and Welfare, but also local governments. Yokohama's case was a landmark event because a local government had been able to induce an industry to undertake specific pollution control measures. It is the following two factors that made it possible for this local government to enforce stricter pollution controls than the central government.⁸

- (1) Yokohama's local government had staff members with sufficient specialized knowledge to give technical advice to the electricity utility, and

(2) its citizens gave ample support to the agreement.

Following the City of Yokohama agreement, in September of 1968, a pollution control agreement was reached between the Tokyo Metropolitan Council and the Tokyo Electric Power Company (TEPCO). It included the following provisions:

- (1) The amount of sulfur dioxide to be discharged from both the company's old and new plants should be reduced to 50% of the 1967 level by 1974;
- (2) Low-sulfur oil should be used;
- (3) TEPCO should permit representatives of the Tokyo Metropolitan Council to enter and inspect its generating plants;
- (4) An "open door to the public" principle should be observed; and
- (5) Representatives from both the Tokyo Metropolitan Council and TEPCO should be on a pollution control committee.

Since both the Tokyo and Yokohama pollution control agreements were innovative, effective, and successful in pollution control, similar pollution control agreements were concluded around the nation. About 40,000 pollution control agreements have been concluded to date. In effect they amount to local versions of administrative guidance for regulating industry. This is because they derive their effect from local governments' persuasion, not from the legal force of ordinances. And while local governments might instead have passed ordinances in a bid to bring polluters to heel, this would have led to inconsistencies between national and local legislation, thereby inviting interference from the central government and wasting much time in a policy coordination process.

Responding to public opinion and calls from environmental groups, local governments also came up with other techniques to clean up the environment. After the central government announced environmental quality standards, for instance, local governments set a broader range of even stricter standards for the areas under their jurisdiction. Now that the release of carbon dioxide, which exacerbates global warming, is also viewed as harmful, the administrative know-how and systems devised for other pollutants can be applied to carbon dioxide emissions as well.

Some legal scholars have questioned whether local authorities exceeded their legitimate powers by using tools like these. But at a time when the central government had yet to come to grips with environmental issues, local governments had little choice but to forge ahead on their own. I might further observe that the efficacy of the measures adopted by local governments for pollution control was not dependent solely on their design. It owed much also to the achievement, or lack, of public financing and political systems commensurate with the principle of local autonomy, which were supported by the participation of community residents.

In Taiwan, South Korea, and some other Asian countries these days, the question of local autonomy is drawing increasing attention, and there are calls for the reform of local government systems and public finance. The emergence of this issue would seem to indicate that people in these countries, disturbed by the deteriorating quality of the environment, are seeking ways to counter it by putting more power into the hands of local authorities. If that is the case, the role played by Japan's local governments in combating pollution may offer them pointers on how to proceed. Indeed, the Japanese experience in this respect may be of quite universal relevance to developing countries, and Japan's local authorities, along with nongovernmental organizations, may be able to do the world a service by disseminating information on what they have achieved.^{9,10}

Table 1 Pollution Control Investment Costs as a Percentage of GDP

Years	GDP (Fiscal years)	Private			Public			Total			
		Pollution control investment by big corpora- tions ^a	Pollution control investment by small and medium enterprises ^b	Total private investment by sector	Share of GDP	Pollution control public works by central government	Construction projects by local governments	Total public investments sector	Share of GDP	Total private and public investment	Share of GDP
1970	75298.5	163.7	27.4	191.1	0.25	60.9	345.1	406.0	0.54	597.1	0.79
1971	82399.3	270.6	55.0	325.6	0.39	92.6	542.6	635.2	0.77	960.8	1.16
1972	96486.3	323.2	109.7	432.9	0.45	140.7	739.3	880.0	0.91	1312.9	1.36
1973	116715.0	440.3	205.2	645.5	0.55	225.1	852.4	1077.5	0.92	1723.0	1.48
1974	138451.1	785.5	204.4	989.9	0.72	272.2	1071.0	1343.2	0.97	2333.1	1.69
1975	152361.6	928.6	140.7	1069.3	0.70	284.9	1277.2	1562.1	1.03	2631.4	1.73
1976	171293.4	844.5	98.3	942.8	0.55	374.8	1330.8	1705.6	1.00	2648.4	1.55
1977	190094.5	513.9	64.5	576.4	0.30	498.7	1674.8	2173.5	1.14	2749.9	1.45
1978	208602.2	399.8	51.9	451.7	0.22	714.6	2048.8	2763.4	1.33	3215.1	1.54
1979	225288.0	296.0	61.7	357.7	0.16	947.0	2274.8	3221.3	1.43	3579.5	1.59
1980	245349.4	316.9	70.0	386.9	0.16	972.5	2481.1	3453.6	1.41	3840.5	1.57
1981	260135.7	402.8	70.8	473.6	0.18	1011.0	2619.4	3630.4	1.40	4104.0	1.58
1982	272108.8	443.4	83.1	526.5	0.19	1008.3	2550.5	3558.8	1.31	4085.3	1.50
1983	283513.8	460.9	85.0	545.9	0.19	997.0	2477.3	3474.3	1.23	4020.2	1.42

Notes: a. Survey by MITI. Based on realization data.

b. Estimation based on realization data for 1981 and the information about trends in pollution control investments by small businesses (Quality of the Environment in Japan 1982, p. 50).

Source: Adapted from Stanislaw (1987).

III. POLLUTER PAYS PRINCIPLE: The Case of Japan

The method of making businesses more responsible for damage to the environment by pollution is to include a monetary assessment of environmental losses into the costs of production. This procedure is known as the internalization of externalities and/or social costs.¹¹ A transfer of costs that represent environmental damage into businesses' production costs serves as a fundamental of the economic approach to external diseconomies such as environmental pollution.

The idea of extending the scope of business costs by including the externalities is regarded as essential in order to repair the failure of the market mechanism in the field of the environment. The increase in the private costs of production by including a monetary assessment of pollution-induced environmental losses is known as the polluter pays principle. Generally, this principle has been adopted in all developed economies. Its aim is to make producers the first to cover environmental expenses. This does not mean, however, that producers alone must bear the costs, but that they should also be aware of the negative effects of their production by inclusion in their costs. Environmental expenses can be shifted to consumer prices, as well as reduced through technological improvements. It is important, however, that environmental expenses be one of the factors that could influence businesses' economic decisions.

The polluter pays principle is limited in many respects. It was originally introduced in 1972 by the OECD as an economic principle in order to (a) prevent distortion in international trade, and (b) improve the allocation of resources.¹² Its aim is not to condemn or to punish producers for damage to the environment. The polluter pays principle can be also suspended when it could lead to the disturbance of international trade. The form and scope of its implementation are left to governments.

The OECD report¹³ pointed out that the polluter pays principle in Japan is one of the salient features of Japanese pollution control policy. That is, the principle is not understood as a "polluter pays principle" but as a "punish polluters principle," which just means that polluters are guilty, and must be punished. In this sense, the report suggested that Japanese environmental policy had been largely noneconomic and was not based on economic theory. However, the OECD Environment Committee also pointed out that the Japanese government often helped producers (polluters) abate effluents through tax reductions and/or subsidies.¹⁴ Let us examine how the principle applied to the policy in Japan.

Next to the costs of pollution control equipment, which underlies the concept of the polluter pays principle, the costs of improving the environment, green zone creation, the operation of monitoring systems, and compensating for material and health damage were also listed as obligations for producers. The broad interpretation of the externalities that ought to be internalized into the costs of production can be successfully implemented under two conditions. First is that a proper type of pollution control policy be implemented by the country. Second is that a satisfactory level of environmental expenses be borne by businesses and public authorities.

1. Environmental Expenses in Japan

The definition of environmental expenses is not very clear. Purification of wastes is without a doubt an example of environmental costs. But the losses sustained when the natural landscape is transformed, or when a particular species disappears, are difficult to count or

assess. Even when the concept of environmental expenses is incorporated into financial planning, it is not always easy to determine what part of costs being spent on the development of a new technology that also reduces pollution can be regarded as environmental expenses. In some cases, there is real difficulty in assessing them. But the lack of statistics also derives from the reluctance with which environmental expenses have been assessed. First are the costs of health damage compensation. Second are the costs of pollution control investments.

2. Pollution Control Investment Costs

Investment costs for pollution control equipment are included in the environmental expenses borne by businesses. Introduction of emission standards at the beginning of the 1970s caused a fast increase in pollution control spending by business. Pollution control investments can be regarded therefore as a method of internalizing environmental damage into the costs of production. Statistical data provide information about the amount and the structure of pollution control investments by big corporations (capitalized at over ¥100 million) and about the publicly financed pollution control investments by the central and local governments. Table 1 presents statistics showing the scope of pollution control investments by the private and public sectors, and these investments' share of the GDP.¹⁵

One of the characteristic features of pollution control investments in Japan is their rapid growth in the early 1970s. During a 14-year period (1970-1983) they increased to about seven times the total investment cost. However, the share of the GDP was stable during the late 1970s and the 1980s.

The data presented in Table 1 also show there was a big difference in pollution control investments paid by private and public sources. After dynamic growth in the early 1970s, pollution control investments by private enterprises drastically decreased. Their place was taken by public investments, which tended to rise. The explanation for the decline in private-sector pollution control investments after 1975 is that under the system of environmental regulations there are no longer any incentives to invest in pollution control equipment after meeting the emission standards introduced by the government. On the other hand, costly investment projects for water treatment and for building sewerage systems have led to an increase in public spending for environmental purposes, especially by the local authorities. Such being the case, there ought to be a new phase of rapid growth in private-sector pollution control investments in the future due to depreciation of the equipment that had been bought in the past. There also ought to be a drop in the flow of money for government-financed investment projects related to the environment because of large improvements that had already been made. To effect changes in the structure of industrial production, changes can be made in the industrial portion of the new wave of pollution control investments in Japan.¹⁶

The statistical data presented in Table 1 show that the share of pollution control investments in Japan's GDP is relatively stable. The fluctuations are narrow, being around 1.5% of GDP starting in 1973. But they show significant internal changes in participation by private and public capital in environmental expenses.

The calculations shown in Table 1 ought to be regarded with care because of the many statistical gaps. There is only a small possibility verifying the findings of this table. The only study conducted to assess the share of pollution control investments in the GDP covers the period from 1971 to 1974. Another way of verifying Table 1's findings to make an international comparison. This method can be applied only to the air pollution investments by private enterprises. Table 2 shows the figures reproduced to point out the differences.

Table 2 GDP Share of Pollution Control Investment by Private Enterprises

	<i>France</i>	<i>FRG</i>	<i>USA</i>	<i>Japan</i>
1970	—	—	—	0.51
1971	—	—	—	0.75
1972	—	—	—	0.68
1973	—	0.46	—	0.75
1974	0.32	0.43	—	0.94
1975	0.34	0.40	0.83	0.88
1976	0.31	0.34	0.75	0.62
1977	0.26	0.29	1.00	0.28
1978	0.22	0.25	0.66	0.21
1979	0.20	0.21	0.62	0.15
1980	0.18	0.23	0.63	0.17
1981	0.16	0.23	0.41	0.19
1982	0.12	0.27	0.53	0.20
1983	0.11	—	—	0.20

Source: *OECD Environmental Data*, Paris, 1985, p. 271.

The correspondence between the data presented in Tables 1 and 2 is visible in the late 1970s and 1980s. The share of pollution control investments in the GDP in the early 1970s seems exaggerated in Table 2. It also shows no conformity with the OECD assessment. The comparison of data given for different countries shows that a common trend in private-sector pollution control investments has diminished. It supports the suggestion that there must be a common reason that induced the decline in the second half of the 1970s. The decrease in private-sector pollution control investments has occurred in many countries despite the different methods adopted by their pollution control policies. The world economic situation at that time was a general recession, and the economic growth rate in Japan in 1975 fell below that of the previous year for the first time in the postwar period. Although Japan's situation was slightly better than that of other industrialized countries, the annual economic growth rate fell to between 3 and 5%. Because of this economic situation, the economic policy priority in most of the industrialized countries became one of anti-stagflation and stability. This inevitably induced the change in the direction of pollution control policy.

3. Subsidizing Policy vs. Polluter Pays Principle

It is not wrong to say that public policy had been initiated to control environmental pollution, and that private enterprises invested in pollution control equipment and compensated for health damage in Japan. This, however, does not mean that the polluter pays principle was strictly applied to polluters. As the OECD pointed out, Japanese pollution control policy also provided for assistance to private enterprises for pollution control investments through a subsidizing policy. This takes the form of tax benefits and of favorable interest loans. Some examples are (a) a 59% special depreciation in the first year for pollution abatement equipment, (b) a tax reduction in the commodity tax for low-pollution automobiles, (c) a subsidy for desulfurization that takes the form of a reduction in tariffs on imported crude oil that is desulfurized, and (d) lending programs with favorable interest loans for pollution control.

Table 3 shows a comparison of government subsidies to outlays by private enterprises according to the polluter pays principle.¹⁷ According the table, even if compliance costs for

Table 3 A Comparison between Government Subsidies and PPP Outlays by Enterprises
(FY1976, ¥100 million)

<i>Government subsidies</i>		<i>PPP Outlays by enterprises</i>	
(1) Tax reductions for pollution control measures by private enterprises:	619	(1) Contributions by private enterprises under the compensation law:	356
(a) for national tax:	370		
(b) for local taxes:	249		
(2) Public expenditures for pollution control projects:	438	(2) Expenditures by private enterprises on pollution control projects:	483
(3) Public loan to private enterprises for industrial protection policy:	343		
Total	1,400		839

Notes: 1. Subsidies through special loans are estimated as 11.52% of total expenditures from the Government Fiscal Investment and Loan Account (*Zaisei Toyushi*).

2. The pollution control project costs are taken from the figures for December 1977.

Source: Miyamoto, 1981; p. 252.

environmental regulation are taken into account, it is evident that financial aid to polluting businesses from the public sector was great enough to mitigate the burden of private businesses for pollution control. This indicates that the polluter pays principle has not been applied adequately to pollution control policies in Japan.

IV. THINKING OF THE JAPANESE MODEL¹⁸

It would be appropriate at this juncture to consider the widely circulated Japanese government statement that, "[Japan] can contribute [positively to the situation] by utilizing technology accumulated in the process of its own experience in overcoming industrial pollution while continuing to maintain high [levels of] economic growth." Let us briefly take up the issue of how postwar Japan's experiences with regard to economic development and environmental problems/policies might best be transmitted.

Generally speaking, the instances of failure in the history of economic development were not negative because they taught us what should not be done. Japan's experience with regard to environmental problems and policies, as exemplified by the infamous cases of Minamata disease and itai-itai disease and so on caused by industrial pollution, will no doubt remain in the annals of human history, but must nevertheless serve as lessons to the world, that they may never be repeated. Unfortunately, the currently reality in Asia and much of the rest of the world is that Japan's important and painful experiences and lessons are being ignored, and environmental and human disruption continues to be repeated.

This is not because Asian nations are not studying the experience of Japan. The Taiwanese government, for example, has studied the Japanese system of environmental legislation in great detail. The areas being studied, understood, and implemented are not, however, necessarily the areas in which Japan has been a pathfinder. Examples of such progressive areas include the process by which the performance of both automobiles and the automotive industry were eventually improved through the legislation of automobile emis-

sions regulations, and the process whereby the Japanese economy was qualitatively improved as efforts by local municipal bodies coincided with a series of environmental lawsuits to advance pollution control policy.

Instead, the so-called "environmental" policies that Taiwan has adapted from Japan are represented by the following three items. The first is Taiwan also South Korea have employed a Japanese system designed to facilitate the construction of electric power plants. In areas where residents have actively opposed prospective sites for electric power plants, a type of electric power tax has been established. Proceeds from the tax have been used as subsidies to finance policies to encourage site selection and approval, thereby speeding up the process. While the overall evaluation of this type of policy remains a subject for future debate even in Japan, and while it must be admitted that such a policy probably does temporarily help with site selection, it actually deepens the inherent contradictions involved in the development of power generation facilities.

The second item consists of tax cuts and subsidies for corporate pollution countermeasures, in violation of the polluter pays principle. This type of policy is not initiated for the sake of environmental preservation itself, but rather as a mere part of a larger industrial policy.

Third comes the policy of coastal development through the filling in of land with waste. This method is expected to provide significant economic value in that it simultaneously offers an inexpensive way to dispose of waste that is a problem to get rid of, and provides new land for development activities. In addition, formerly polluted coastal areas are cleaned up without the use of separately allocated funds, thereby killing three birds with one stone.

In the city of Kaohsiung, Taiwan's largest heavy industrial base, a huge area equivalent to one third of the current city is being filled in with waste to make new land. This policy has often been used in Japan as an instrument of local development, particularly in the Seto Inland Sea and in Tokyo Bay. However, as is feared in Japan, irreversible damage to the natural ecosystem cannot be avoided, and the method is completely against the worldwide movement towards reconstruction of artificial coastlines currently occupied by industrial sites, thereby revitalizing natural coastal areas accessible to people.

In other words, the Japanese model as comprehended and introduced by Asia—Taiwan is but a typical example—does not consist of the experience, lessons, and policies for environmental preservation and the process by which they were created in Japan. Rather, it consists only of the necessary "environmental" policies required to propel economic development forward. In this sense, it can be said that the Japanese experience is being transmitted only after passing through the filter known as development. This tendency is most prevalent in areas where policies of "development dictatorship" and "economic development supremecism" have been adopted.

V. CONCLUSION

In order to rectify this warped transmission of Japan's experiences and lessons, it will be necessary to establish a forum of exchange whereby Japan can actively disseminate information to citizens of various countries. That is, in order to formulate a truly global environmental policy that transcends the individual interests of nations and corporations, it will be necessary to garner not only the support of enterprises, countries, and international organizations throughout the world, but also the collective activity in support of environmental preservation by the world's citizens on a global scale. To accomplish this, it is necessary in turn to

uncover the common benefits of environmental preservation accruing to the citizens of developed and developing nations alike, and to proceed with the creation of an international network of grassroots environmental NGOs that can point the way towards realization of those benefits. This kind of improvement in our learning capacity is indispensable to the process of transforming the behavior of individuals, and of society as a whole, from environmentally disruptive to being environmentally sound.

The OECD report concludes that: "Japan has won many pollution abatement battles, but has not yet won the war for environmental quality."¹⁹ The latter half of this phrase still suggests the current situation in Japan. However, the former is quite debatable.

Although the OECD report evaluated Japanese pollution control policy as having been largely noneconomic but workable, it is rather questionable whether the principle of the policy has been consistent. One may conclude that Japan's pollution control policy has swayed between the pressure of the anti-pollution citizens' movement and the interests of business and industry.

From the economists' point of view, pollution is the outcome of a serious failure of the market mechanism. However, the failure is not to be attributed to the market itself, but to the legal framework within which it operates.

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7. No doubt there were also various cases in which companies shifted plants overseas in a bid to escape from anti-pollution campaigns and moves to strengthen pollution controls at home. If Japan's experience is to be effectively communicated to the developing world, quantitative analysis must be conducted on the overall response by industries and companies to environmental controls.
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