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Industrial Growth and Environmental Protection in Metro Cebu: Some Challenges and Recommendations*

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In the past two decades, partly because of the urban deconcentration efforts of the government, industrialization has spread outside of Metro Manila and into the provinces. Among the fastest growing new industrial areas has been Metro Cebu.

The rapid industrial development of Metro Cebu, however, raises serious concerns about the well-being of its sensitive coastal environment. At present, there are already reports that industries contribute significantly to the pollution in the area. It is feared that unbridled industrial growth in the future will lead to further environmental degradation which can negate the economic gains from industrialization.

This *Policy Notes* summarizes the results of a recent study (Israel 1997) which looked into the relationships between industrial growth, industrial pollution and environmental protection in Metro Cebu, using the manufacturing sector as case study. The purpose of the research was to gather information that could be of use in formulating recommendations for the proper management of industrial pollution in Metro Cebu and other similarly situated areas in the country.

PIDS Policy Notes are observations/analyses written by PIDS researchers on certain policy issues. The treatise is wholistic in approach, and like the PIDS Executive Memo, it aims to provide useful inputs for decisionmaking.

The author is Research Fellow at the Institute. The views expressed are those of the author and do not necessarily reflect those of PIDS or any of the study's sponsors.

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Focus of the Study

Based on available data, two groups of mutually exclusive manufacturing establishments in Metro Cebu were studied in detail. These were the (a) Board of Investments (BOI)-registered projects, and (b) Mactan Export Processing Zone (MEPZ) firms. As shown in Tables 1 and 2, the number of establishments falling under the two groups has rapidly increased over the years. While growth was faster in the late 1980s than in the early 1990s, the overall performance for the 1975-96 period was clearly impressive.

Among the BOI projects, the largest subsectors have been food and furniture manufacturing while among the MEPZ firms, the largest number has been wearing apparel manufacturing. In Metro Cebu, these subsectors were made up largely of small and medium enterprises (SMEs).

Looking at the Sector's Pollution Potential

Because of the rapid industrial growth in Metro Cebu, fears about possible significant pollution in the area logically arose. To ascertain the potential effects of the manufacturing sector in terms of industrial pollution, the establishments were matched with the pollution potential classification of industries formulated by the Environmental Management Bureau (EMB 1993). Results showed that a significant percentage of the cur-

rently operating BOI and MEPZ establishments were potentially pollutive and/or hazardous (Table 3). In particular, about 40 percent of the establishments were found to be potentially pollutive while approximately 49 percent were potentially hazardous. It was also noted that among the subsectors with a large SME composition, food manufacturing was found to be potentially highly-pollutive while furniture manufacturing was potentially hazardous.

Industrial Pollution Prevention: Laws and Compliance

There are a number of national laws relating to industrial pollution enacted in the Philippines over the years. One important legislation is Presidential Decree (PD) 1586 of 1978 which established the Environmental Impact Statement (EIS) system. Among others, the EIS system requires all environmentally critical firms to submit an Environmental Impact Assessment (EIA) study and get an Environmental Clearance Certificate (ECC) from the Department of Environment and Natural Resources (DENR) before they operate.

Another major legislation is PD 984 or the National Pollution Control Decree of 1976 as amended by Executive Order (EO) 192 of 1987. This law stipulates that the prevention, abatement and control of pollution is a national

policy. Its implementing rules and regulations are provided in DENR DAO Nos. 34 and 35 which outline the water and air quality standards to be adhered to by polluting industries. To meet these standards, the DENR requires potentially risky industries insofar as the environment is concerned, to establish wastewater treatment facilities (WTF) or air pollution control device (APCD) for waste clean-up.

Still another important piece of legislation relating to industrial pollution is Republic Act (RA) 6969 or the Toxic Substances and Hazardous Wastes Control Act of 1990. This law regulates the production, use and trade of toxic and hazardous wastes by industries.

How do the industrial establishments in Metro Cebu as a group respond to these laws? To what extent is pollution control practised by these firms?

Establishments with ECCs. The regional DENR has been requiring all industrial firms in Metro Cebu to acquire ECCs. However, based on available 1995 data, only a small portion—about 16 percent—of the operating manufacturing establishments had ECCs (Table 4). This low compliance rate was even worse among some subsectors which were potentially highly pollutive or hazardous. For instance, only 10 percent of establishments in the food manufacturing industry had ECCs.

To address the problem of establishments operating without

Table 1
BOI-Registered Manufacturing Projects in Metro Cebu,
by Industry Group and Period of Registration, 1975-1996^a

PSIC Code	Industry Group	Period of Registration							
		1975-1980		1981-1985		1986-1990		1991-1996	
		No.	%	No.	%	No.	%	No.	%
311 & 312	Food	6	20.00	10	20.41	15	11.54	23	21.30
313	Beverages	-	-	-	-	-	-	-	-
314	Tobacco	-	-	-	-	-	-	-	-
321	Textile	-	-	1	2.04	5	3.85	3	2.78
322	Wearing apparel except footwear	2	6.67	2	4.08	2	1.54	5	4.63
323	Leather and leather products, leather substitutes and furs, except footwear and wearing apparel	-	-	-	-	1	0.77	-	-
324	Footwear, except rubber, plastic or wood footwear	1	3.33	-	-	-	-	1	0.93
331	Wood, wood and cork products, except furniture	-	-	2	4.08	6	4.62	5	4.63
332	Furniture and fixtures, except primarily of metal (including repairs)	9	30.00	27	55.10	35	26.92	13	12.04
341	Paper and paper products	-	-	-	-	3	2.31	1	0.93
342	Printing, publishing and allied industries	-	-	-	-	-	-	-	-
351	Industrial chemicals	-	-	-	-	3	2.31	-	-
352	Other chemical products	2	6.67	-	-	2	1.54	5	4.63
353	Petroleum refineries	-	-	-	-	-	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-	-	-	-	-	-
355	Rubber products	-	-	-	-	-	-	1	0.93
356	Plastic products, n.e.c.	-	-	-	-	2	1.54	4	3.70
361	Pottery, china and earthenware	-	-	-	-	1	0.77	1	0.93
362	Glass and glass products	-	-	-	-	-	-	-	-
363	Cement	-	-	-	-	-	-	-	-
369	Other nonmetallic mineral products	-	-	1	2.04	16	12.31	3	2.78
371	Iron and steel basic industries	2	6.67	-	-	2	1.54	-	-
372	Nonferrous metal basic industries	-	-	-	-	-	-	-	-
381	Fabricated metal products, except machinery and equipment, furniture and fixtures primarily of metal	1	3.33	-	-	1	0.77	5	4.63
382	Machinery except electrical	-	-	-	-	1	0.77	2	1.85
383	Electrical machinery, apparatus, appliances and supplies	1	3.33	-	-	1	0.77	1	0.93
384	Transport equipment	1	3.33	-	-	1	0.77	1	0.93
385	Professional and scientific and measuring and controlling equipment, n.e.c. and photographic and optical instrument	-	-	-	-	-	-	1	0.93
386	Furniture and fixtures primarily of metal (including repairs)	-	-	-	-	1	0.77	7	6.48
390	Other industries	1	3.33	1	2.04	2	1.54	6	5.56
400	Mixed industries ^b	4	13.33	5	10.20	30	23.08	20	18.52
	Total	30	100.00	49	100.00	130	100.00	108	100.00
	Cumulative Total	30		79		209		317	
	Periodic Growth Rate (%)			163.00		165.00		51.67	
	Periodic Average Growth Rate							76.00	

Source: BOI Makati Office Data Files

^aThe list includes all projects, currently operating or not.

^bMixed industries are those whose activities/products fall under more than one industry classification.

Table 2
Manufacturing Firms in the MEPZ, by Industry Group
and Period of Registration, 1975-1996

PSIC Code	Industry Group	Period of Registration							
		1975-1980		1981-1985		1986-1990		1991-1996	
		No.	%	No.	%	No.	%	No.	%
311 & 312	Food	-	-	1	50.00	-	-	1	1.72
313	Beverages	-	-	-	-	-	-	-	-
314	Tobacco	-	-	-	-	-	-	-	-
321	Textile	-	-	-	-	-	-	-	-
322	Wearing apparel except footwear	1	25.00	-	-	5	19.23	13	22.41
323	Leather and leather products, leather substitutes and furs, except footwear and wearing apparel	1	25.00	-	-	-	-	2	3.45
324	Footwear, except rubber, plastic or wood footwear	-	-	-	-	-	-	-	-
331	Wood, wood and cork products, except furniture	-	-	1	50.00	-	-	-	-
332	Furniture and fixtures, except primarily of metal (including repairs)	-	-	-	-	-	-	-	-
341	Paper and paper products	-	-	-	-	-	-	1	1.72
342	Printing, publishing and allied industries	-	-	-	-	-	-	1	1.72
351	Industrial chemicals	-	-	-	-	1	3.85	1	1.72
352	Other chemical products	-	-	-	-	-	-	-	-
353	Petroleum refineries	-	-	-	-	-	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-	-	-	-	-	-
355	Rubber products	-	-	-	-	-	-	-	-
356	Plastic products, n.e.c.	-	-	-	-	-	-	3	5.17
361	Pottery, china and earthenware	-	-	-	-	-	-	-	-
362	Glass and glass products	-	-	-	-	-	-	-	-
363	Cement	-	-	-	-	-	-	-	-
369	Other nonmetallic mineral products	-	-	-	-	-	-	-	-
371	Iron and steel basic industries	-	-	-	-	1	3.85	3	5.17
372	Nonferrous metal basic industries	-	-	-	-	-	-	2	3.45
381	Fabricated metal products, except machinery and equipment, furniture and fixtures primarily of metal	-	-	-	-	2	7.69	2	3.45
382	Machinery except electrical	-	-	-	-	2	7.69	5	8.62
383	Electrical machinery, apparatus, appliances and supplies	1	25.00	-	-	4	15.38	2	3.45
384	Transport equipment	-	-	-	-	1	3.85	7	12.07
385	Professional and scientific and measuring and controlling equipment, n.e.c. and photographic and optical instrument	1	25.00	-	-	1	3.85	-	-
386	Furniture and fixtures primarily of metal (including repairs)	-	-	-	-	-	-	-	-
390	Other industries	-	-	-	-	4	15.38	2	3.45
400	Mixed industries	-	-	-	-	5	19.23	8	13.79
	Total	4	100.00	2	100.00	26	100.00	58	100.00
	Cumulative Total	4		6		32		90	
	Periodic Growth Rate (%)			50.00		433.33		181.25	
	Periodic Average Growth Rate							166.15	

Source: MEPZ Office Data Files

Table 3
BOI and MEPZ-Operating Manufacturing Establishments in Metro Cebu,
by Industry Group and Pollution Potential, 1996

<i>PSIC Code</i>	<i>Industry Group</i>	<i>Pollution Potential</i>	<i>Number of Establishments</i>	<i>Percent to Total</i>
311 & 312	Food	Highly pollutive/nonhazardous Pollutive/nonhazardous	41	12.69
313	Beverages	-	-	0.00
314	Tobacco	-	-	0.00
321	Textile	Pollutive/hazardous	7	2.17
322	Wearing apparel except footwear	Nonpollutive/nonhazardous	25	7.74
323	Leather and leather products, leather substitutes and furs, except footwear and wearing apparel	Highly pollutive/hazardous	3	0.00
324	Footwear, except rubber, plastic or wood footwear	Nonpollutive/nonhazardous	1	0.31
331	Wood, wood and cork products, except furniture	Nonpollutive/hazardous	8	2.48
332	Furniture and fixtures, except primarily of metal (including repairs)	Nonpollutive/hazardous	69	21.36
341	Paper and paper products	Highly pollutive/hazardous	4	1.24
342	Printing, publishing and allied industries	Nonpollutive/hazardous	1	0.00
351	Industrial chemicals	Highly pollutive/extremely hazardous	5	1.55
352	Other chemical products	Highly pollutive/extremely hazardous	6	1.86
353	Petroleum refineries	-	-	0.00
354	Miscellaneous products of petroleum and coal	-	-	0.00
355	Rubber products	-	-	0.00
356	Plastic products, n.e.c.	Pollutive/hazardous	6	1.86
361	Pottery, china and earthenware	Pollutive/hazardous	1	0.31
362	Glass and glass products	-	-	0.00
363	Cement	-	-	0.00
369	Other nonmetallic mineral products	Highly pollutive/hazardous	14	4.33
371	Iron and steel basic industries	Highly pollutive/hazardous	5	1.55
372	Nonferrous metal basic industries	Highly pollutive/hazardous	2	0.00
381	Fabricated metal products, except machinery and equipment, furniture and fixtures primarily of metal	Nonpollutive/nonhazardous	9	2.79
382	Machinery except electrical	Pollutive/hazardous	10	3.10
383	Electrical machinery, apparatus, appliances and supplies	Pollutive/hazardous	10	3.10
384	Transport equipment	Pollutive/hazardous	6	1.86
385	Professional and scientific and measuring and controlling equipment, n.e.c. and photographic and optical instrument	Nonpollutive/nonhazardous	10	3.10
386	Furniture and fixtures primarily of metal (including repairs)	Pollutive/nonhazardous	6	1.86
390	Other industries	Mixed	14	4.33
400	Mixed industries	Mixed	60	18.58
	Total		323	100.00

Source: BOI Makati Office Data Files
 EMB (1993). "Environmental Impact Assessment Handbook."

Table 4
BOI and MEPZ-Operating Manufacturing Establishments in Metro Cebu,
by Issuance of an Environmental Clearance Certificate, 1995

<i>PSIC Code</i>	<i>Industry Group</i>	<i>Number Issued ECC</i>	<i>Total Number of Establishments</i>	<i>Percent to Total</i>
311 & 312	Food	4	41	9.76
313	Beverages	-	-	-
314	Tobacco	-	-	-
321	Textile	1	7	14.29
322	Wearing apparel except footwear	10	25	40.00
323	Leather and leather products, leather substitutes and furs, except footwear and wearing apparel	1	3	33.33
324	Footwear, except rubber, plastic or wood footwear	-	1	0.00
331	Wood, wood and cork products, except furniture	-	8	0.00
332	Furniture and fixtures, except primarily of metal (including repairs)	1	69	1.45
341	Paper and paper products	1	4	25.00
342	Printing, publishing and allied industries	-	1	0.00
351	Industrial chemicals	1	5	20.00
352	Other chemical products	-	6	0.00
353	Petroleum refineries	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-
355	Rubber products	-	-	-
356	Plastic products, n.e.c.	1	6	16.67
361	Pottery, china and earthenware	-	1	0.00
362	Glass and glass products	-	-	-
363	Cement	-	-	-
369	Other nonmetallic mineral products	-	14	0.00
371	Iron and steel basic industries	2	5	40.00
372	Nonferrous metal basic industries	1	2	50.00
381	Fabricated metal products, except machinery and equipment, furniture and fixtures primarily of metal	3	9	33.33
382	Machinery except electrical	1	10	10.00
383	Electrical machinery, apparatus, appliances and supplies	4	10	40.00
384	Transport equipment	5	6	83.33
385	Professional and scientific and measuring and controlling equipment, n.e.c. and photographic and optical instrument	1	10	10.00
1386	Furniture and fixtures primarily of metal (including repairs)	-	6	0.00
390	Other industries	5	14	35.71
400	Mixed industries	10	60	16.67
	Total	52	323	16.10

Source: DENR Region VII, EIAD Files

Note: The establishment data are in terms of the number of firms.

an ECC, the DENR has been exerting efforts to penalize those caught intentionally disregarding the regulation. The data, however, indicate that for 1995, only 15 firms were penalized which was an insignificant count compared to the total potential number of violators.¹

Establishments with WTFs. Similarly, only a small portion—approximately 4 percent—of the operating establishments in Metro Cebu had WTFs and the low rate held true even among subsectors which were potentially environmentally risky (Table 5). For instance, only 7 percent of firms had WTFs in food manufacturing, a subsector generally known as a generator of significant volumes of wastewater. It is difficult to ascertain the level of actual compliance among firms as there was no available information on the exact number of firms required to put up the WTFs. The high dominance of potentially environmentally risky firms without water treatment facilities implied in the data, however, indicates that compliance may indeed have been low.

Establishments with APCDs. In contrast, a relatively higher percentage of operating establishments in Metro Cebu—about 37 percent—had APCDs (Table 6). This higher rate prevailed as well

in some subsectors which were potential generators of significant levels of air pollution. In the furniture industry, for instance, 57 percent of the firms had air pollution control facilities. Nonetheless, in spite of the improvement, a large percentage of firms which were potentially air-polluting remained without APCDs, indicating that air pollution remains a serious problem in the manufacturing industry.

Toxic and hazardous waste management. In general, the implementation of RA 6969 in Metro Cebu has been quite slow. At present, the DENR activities related to its implementation are preliminary in nature, e.g., staff briefings, preparation of an inventory of chemicals used by firms, and similar activities.

In general, among the manufacturing establishments, current practices for the handling and disposal of industrial wastes, including toxic and hazardous, leave much to be desired. For untreated wastewater, for example, the disposal is usually done by draining the water directly into the drainage systems that flow into canals, river systems and ultimately the sea. In the case of sludge and chemical wastes, the wastes are stored in drums and other durable containers and placed in safe-houses within plant sites. The firms' plans for the disposal of these stored wastes over the long-term or when they close shop are not known.

To help address the problem of toxic and hazardous wastes, the Philippine-German Project on Industrial Pollution Control Cebu (PGP-IPCC), a foreign-funded project, was set up in the early 1990s. Among its ongoing activities is the establishment of a common wastewater treatment plant in the area. The plant is envisioned to service the highly pollutive electroplating subsector which has a large SME component. Because of the specific clientele of the treatment plant, however, it does not cover the problem of toxic and hazardous wastes coming from other potentially pollutive manufacturing subsectors.

Conclusions

The following conclusions may be drawn from the findings of the study.

First, although there has been rapid growth in the industrial sector of Metro Cebu, this development has been dampened by a negative side-effect: the proliferation of potentially environmentally risky firms, many of which are SMEs. *Second*, the environmental protection efforts by the government have not kept pace with the industrial development in the area. In particular, environmental regulations have not been effectively implemented as manifested by the relatively low percentage of potentially pollutive or hazardous establishments with ECCs and pollution control facilities and the non-implementation of

¹All firms as early as 1995 were required to have ECCs in Metro Cebu, regardless of scale. There are no available data, however, that break down firm compliance by scale.

Table 5
BOI and MEPZ-Operating Manufacturing Establishments in Metro Cebu,
by Type of Water Treatment Facility, 1995

<i>PSIC Code</i>	<i>Industry Group</i>	<i>Number with WTF</i>	<i>Total Number of Establishments</i>	<i>Percent to Total</i>
311 & 312	Food	3	41	7.32
313	Beverages	-	-	-
314	Tobacco	-	-	-
321	Textile	-	7	0.00
322	Wearing apparel except footwear	1	25	4.00
323	Leather and leather products, leather substitutes and furs, except footwear and wearing apparel	-	3	0.00
324	Footwear, except rubber, plastic or wood footwear	-	1	0.00
331	Wood, wood and cork products, except furniture	-	8	0.00
332	Furniture and fixtures, except primarily of metal (including repairs)	-	69	0.00
341	Paper and paper products	-	4	0.00
342	Printing, publishing and allied industries	-	1	0.00
351	Industrial chemicals	-	5	0.00
352	Other chemical products	1	6	16.67
353	Petroleum refineries	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-
355	Rubber products	-	-	-
356	Plastic products, n.e.c.	-	6	0.00
361	Pottery, china and earthenware	-	1	0.00
362	Glass and glass products	-	-	-
363	Cement	-	-	-
369	Other nonmetallic mineral products	1	14	7.14
371	Iron and steel basic industries	-	5	0.00
372	Nonferrous metal basic industries	-	2	0.00
381	Fabricated metal products, except machinery and equipment, furniture and fixtures primarily of metal	1	9	11.11
382	Machinery except electrical	-	10	0.00
383	Electrical machinery, apparatus, appliances and supplies	1	10	10.00
384	Transport equipment	-	6	0.00
385	Professional and scientific and measuring and controlling equipment, n.e.c. and photographic and optical instrument	-	10	0.00
1386	Furniture and fixtures primarily of metal (including repairs)	-	6	0.00
390	Other industries	3	14	21.43
400	Mixed industries	2	60	3.33
	Total	13	323	4.02

Source: DENR Region VII, EQD Files

Note: The establishment data are in terms of the number of firms.

Table 6
BOI and MEPZ-Operating Manufacturing Establishments in Metro Cebu,
by Air Pollution Control Device, 1995

<i>PSIC Code</i>	<i>Industry Group</i>	<i>Number with APCD</i>	<i>Total Number of Establishments</i>	<i>Percent to Total</i>
311 & 312	Food	20	41	48.78
313	Beverages	1	-	0.00
314	Tobacco	-	-	-
321	Textile	1	7	14.29
322	Wearing apparel except footwear	1	25	4.00
323	Leather and leather products, leather substitutes and furs, except footwear and wearing apparel	1	3	33.33
324	Footwear, except rubber, plastic or wood footwear	-	1	0.00
331	Wood, wood and cork products, except furniture	3	8	37.50
332	Furniture and fixtures, except primarily of metal (including repairs)	39	69	56.52
341	Paper and paper products	1	4	0.00
342	Printing, publishing and allied industries	-	1	0.00
351	Industrial chemicals	1	5	0.00
352	Other chemical products	-	6	0.00
353	Petroleum refineries	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-
355	Rubber products	-	-	-
356	Plastic products, n.e.c.	1	6	16.67
361	Pottery, china and earthenware	1	1	100.00
362	Glass and glass products	-	-	-
363	Cement	-	-	-
369	Other nonmetallic mineral products	6	14	42.86
371	Iron and steel basic industries	-	5	0.00
372	Nonferrous metal basic industries	-	2	0.00
381	Fabricated metal products, except machinery and equipment, furniture and fixtures primarily of metal	8	9	88.89
382	Machinery except electrical	-	10	0.00
383	Electrical machinery, apparatus, appliances and supplies	6	10	60.00
384	Transport equipment	3	6	50.00
385	Professional and scientific and measuring and controlling equipment, n.e.c. and photographic and optical instrument	4	10	40.00
1386	Furniture and fixtures primarily of metal (including repairs)	-	6	0.00
390	Other industries	6	14	42.86
400	Mixed industries	16	60	26.67
	Total	119	323	36.84

Source: DENR Region VII, EQD Files

Note: The establishment data are in terms of the number of firms.

the law regulating toxic and hazardous wastes.

Recommendations

For Metro Cebu to be able to meet the challenges of rapid industrial growth, a number of recommendations are hereby being proposed.

First, the EIS system must immediately be streamlined. In its 1995 policy study, the Industrial Environmental Management Project (IEMP) came up with a list of suggestions on how to improve the EIS system (IEMP 1995). The government must seriously consider these suggestions and implement them without delay. Among others, the suggestions which merit forceful enforcement is the raising of the penalty fee to a significantly higher level on firms operating without ECCs and the expansion of coverage of the EIS system to all development projects. The former provides a substantial financial disincentive for establishments not to comply to regulations while the latter promotes proper pollution management regardless of the nature and scale of manufacturing operations.

Second, to improve on the implementation of industrial pollution regulations and laws, the division of the regional DENR implementing them, the Environmental Quality Division (EQD), must be strengthened. At present, this division suffers from major resource constraints, especially

given the magnitude of its tasks. For instance, personnel doing monitoring have to individually cover a large number of firms scattered in a wide regional area. Furthermore, transport facilities are wanting and allowances are oftentimes barely enough to cover travel expenses. Thus, the staff and budget of the division must be improved proportionate to the increasing clientele it is handling. A rough estimate is that resources have to be raised to at least double the current level for the division to satisfactorily meet the current demand for its services.

Third, another important reform is the strengthening of the legal arm of the DENR. At present, there are only a couple of lawyers serving in the regional office. Immediate action to address this problem is important since success in the implementation of environmental laws depends to a large extent not only on the technical ability to monitor and identify offenders but also on the legal ability to file and win cases in court against them. There is a dire need to study ways to raise the number of quality lawyers in the DENR.

Fourth, to improve pollution management among the SMEs, assistance to this group is necessary and must be considered. The efforts of the PGP-IPCC to help the SMEs in the electroplating industry is a big step in the right direction. Once this project ends, there is the need for the

government to continue what it started and, if possible, expand efforts to a larger coverage, i.e., other industrial subsectors. There are some specific concerns which the government can concentrate on with regard the SMEs. One is in the area of financing. Since it is generally thought that SMEs have limited capability to solely finance pollution control, the government may come in and help address the problem. Another area is compliance monitoring. As mentioned, the DENR currently has limited capability to monitor firms, including the thousands of SMEs, and badly needs help from other government agencies and even the private sector. Thus, it must look for ways to establish strong linkages with other entities for monitoring purposes. An interesting effort along this line is the Joint Inspection Team (JIT) for monitoring which the DENR, Department of Labor and Employment (DOLE), and the Department of Health (DOH) together are currently pilot-testing. This experiment certainly deserves credit although its present participants are composed mostly of national government agencies and some segments of the private sector only.

The above brings us to the *fifth* recommendation which is the active tapping of the local government units (LGUs) for pollution management. With the devolution of some previously centralized environmentally-related functions, these units have become

a potent force in environmental management. In general, the newly-formed provincial and municipal natural resources and environment committees and offices must be made active in industrial pollution control such as monitoring activities. In addition, the government must explore avenues through which the LGUs can help assist in pollution law enforcement.

Relatedly, to further involve LGUs in industrial pollution control, local legislators must be trained in environmental legislation. These officials can potentially assist in pollution control via the formulation of local ordinances that supplement national pollution laws. Specifically, provincial board members and city and municipal councilors must be trained in the relevant environmental sciences so that they can gain the technical knowledge needed for the formulation of environmental legislation for their areas.

Sixth, over the long-term and beyond the current efforts to control industrial pollution in Metro Cebu, the use of market-based instruments should also be studied. At present, pollution control in the area as well as in the Philippines as a whole has been centered on the use of regulatory instruments. Theoretical developments in recent years, however, suggest that it may be superior to mix market-based and regulatory instruments instead of solely using just the latter for pollution management. In

particular, the imposition of pollution charges by subsector based on the estimated monetary values of pollution-related damages may be a potent tool for pollution control.

Before a specific pollution charge or a similar market-based instrument can be imposed, however, a substantial amount of information will be needed to estimate it reliably. The information include those on the physical and economic parameters related to pollution per subsector, e.g., levels of economic activity, pollution emission, pollution concentration, pollution exposure, damage functions and value of damage. In Metro Cebu as in the Philippines, it is accurate to say that such mass of information do not yet exist at a level that allow reliable computation. Thus, further research on the physical and economic parameters of industrial pollution will be necessary in the future so market-based instruments can be applied.

Finally, some sectors argue that governance in the Philippines is highly legalistic and that major improvements in environmental

management can only be pursued by first adhering to the national legislative process. For instance, other specific actions which may potentially improve pollution control, e.g., implementation of programmatic EIAs which simplifies the EIA process for economic zones, retention of incomes from polluted-related fines in the regional offices that help upgrade regional resources and capabilities, and others, can only be implemented by amending existing laws or drafting new laws. If, indeed, the law or the lack of it is the problem, then the legal section of the DENR should be spearheading efforts to put in place legislation needed to support pollution management in the regions. 📄

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