OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

23123

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Industrial Policy and the Environment in the Philippines

Prepared for the Government of the Philippines
under UNDP-financed TSS-1 facility

NC/PHI/97/020
July 1999

This report was written by Ralph A. Luken, Senior Environmental Advisor, Sectoral Support and Environmental Sustainability Division, Cleaner Production and Environmental Management Branch. It draws heavily on reports prepared by four Philippine national experts: Erlinda Medalia (Industrial Policy), Antonio Oposa (Environmental Policy), Ramon Abracosa (Cavite case study) and Danilo Israel (Cebu case study). It was edited by UNIDO consultants Paul Hesp and Richard S. Stevenson.

Table of Contents

Table of Figures:

Acronyms

AO	Administrative Order
ASEAN	Association of South-East Asian Nations
AC	Authority to Construct
BOD	biological oxygen demand
BOI	Board of Investments
BOT	build-operate-transfer
BP	Batas Pambansa
CDO	Cease-and-Desist Order
DAO	DENR Administrative Order
DENR	Department of Environment and Natural Resources
DTI	Department of Trade and Industry
ECC	Environmental Compliance Certificate
EIC	Environmental Impact Certificate
EMB	Environmental Management Bureau
ENRAP	Environment and Resource Accounting Project
EIA	environmental impact assessment
EIAD	Environmental Impact Assessment Division
EO	Executive Order
ERP	effective rate of protection
EPZA	Export Processing Zone Authority
EQD	Environmental Quality Division
FIA	Foreign Investment Act
LDA	less developed area
FDI	foreign direct investment
IPP	Investment Priorities Plan
MEPZ	Mactan Export Processing Zone
NCR	National Capital Region
OIC	Omnibus Investment Code
PAB	Pollution Adjudication Board
PCMP	Progressive Car Manufacturing Program
PEZA	Philippine Special Economic Zone Authority
PIDS	Philippine Institute for Development Studies
PO	Permit to Operate
PSIC	Philippine Standard of Industrial Classification
RAIGC	Regional Agro-Industrial Growth Centres
SME	small and medium-scale enterprise
SPM	suspended articulate matter
TLO	Temporary Lifting Order
UNIDO	United Nations Industrial Development Organization

Executive Summary

Industrial policy can have a significant influence on the environmental character of industrial growth and thereby on the sustainability of economic growth as a whole. This paper addresses the past and current relationship between industry and the environment in the Philippines and makes recommendations for new approaches and policies needed to enhance the contribution of industry to sustainable development.

Industrial policy has affected the rate of growth, the sectoral composition and the location of industry in the Philippines. While recognizing that a host of other factors (fiscal, political, etc.) also influence the nature of manufacturing and the growth of the economy, there is no evidence that industrial policy has thus far played any significant role in determining the pollution intensity or general environmental impact of Philippine industry.

From the mid-1970's to 1996 the Philippine manufacturing sector showed low rates of growth, roughly comparable to those of overall economic growth and to growth rates in the industrial sector as a whole. Compared to the services sector, the manufacturing sector has been sluggish, and within the industrial sector its growth in most years was outstripped by other industrial activities. Also, the growth rates in Philippine manufacturing have been consistently lower in comparison to those of other ASEAN countries.

In spite of sluggish overall growth in the manufacturing sector, several factors suggest that the pollution potential of the manufacturing sector increased disproportionately during this period of over twenty years. The absolute level of manufacturing more than doubled during the period and the sectors with the greatest pollution potential grew the most. Also, as a direct result of industrial policy, manufacturing growth was concentrated in a few regions outside the national capital region. While this reduced the increase of environmental pressure from industry in the Metro Manila area, it clearly accelerated the potential in other areas where less attention was paid to environmental impacts because of their perceived higher absorptive capacity.

Moreover, the distribution of pollution potential within the manufacturing sector remained relatively unchanged, whereas it improved over time in two other ASEAN countries (Singapore and Thailand) for which there is comparable data. In these countries the percentage of industry in the less polluting categories increased significantly over the same period. By contrast, the very limited shift of proportions among categories of industries in the Philippine manufacturing sector reflects the lack of a dynamic industrial policy addressing the polluting potential of industrial growth.

A strong environmental regulatory program is essential to complement an environmentally concerned industrial policy in altering the overall pollution potential of industry. Unfortunately, the regulatory program in the Philippines has failed to respond to the continued presence of a number of manufacturing firms with high pollution potential and to the intensification of industrial activity in the geographic regions where industrial policy has fostered growth. As shown in the two case studies summarized in this document, pollution discharge permits are not tailored to specific plants, and environmental monitoring facilities and enforcement are inadequate.

Few firms in Cavite and Metro Cebu comply fully with environmental regulations, or have been penalized for non-compliance.

This document proposes that effective environmental management to achieve significant reduction of industrial pollution in the Philippines will require:

- Easy access by the public and local governments to information on the pollutant discharges of firms, on the health and economic effects of industrial pollution, and on the actions possible by industry and the community to minimize those effects;
- A focus on small and medium enterprises and the creation of mechanisms to help them select and adopt least-cost process and pollution control technologies and appropriate environmental management techniques;
- The integration of environmental management issues with economic and spatial planning, at all levels from the nation to the community;
- Strengthening of the environmental monitoring and enforcement system and the institutional framework, including the Environmental Management Bureau of the DENR;
- A regulatory regime which emphasizes waste minimization and continuous improvement and allows firms greater flexibility in how to meet waste reduction targets;
- A complementary set of market-based economic instruments that create positive incentives for firms to improve their processes and to reduce their wastes and the overall environmental impact of their activities; and
- Greater cooperation among industry, regulators and the science and technology community in finding least-cost solutions, and the active participation of the business community in the setting of standards, in national and community planning, and in monitoring the performance of their peers.

A clear national industrial policy is needed in order to change the composition of the manufacturing sector progressively toward a less polluting mix, and to improve the efficiency and quality of processes used. It must incorporate environmental objectives on par with the more conventional economic objectives (e.g., increased employment, value added, import substitution and export promotion). It is regrettably often overlooked that the "environmental" objectives of sustainability of natural resources and protection of public health are also economic objectives, equally important to the long-term economic viability and competitiveness of a nation.

An environmentally responsive industrial policy should include:

- Effective integration of environmental objectives with economic and social objectives;
- Fiscal and facilitative incentives for local and foreign investment in key industries which are less polluting and more consistent with the sustainable use of local natural resources;
- Incentives to new or expanded industry in all sectors to adopt more efficient processes and achieve cleaner production, as measured against global benchmarks;
- Incentives for firms to adopt and be certified to international standards of good environmental management;
- The promotion of industrial ecology, including incentives for firms to process wastes for reuse and for industrial estates to encourage co-location of complimentary industries;
- A focus on small and medium enterprises with provisions to encourage and assist them to achieve cleaner production;

- Market-oriented tariff and trade policies to achieve the most. competitive and efficient uses of resources (i.e., without protection or subsidy);
- Full cost-pricing of resources to incorporate environmental costs and realistic concession agreements for natural resources;
- Requirements that new investments fully identify their environmental consequences and be continually self-reporting with transparency to their surrounding communities;
- The means to inform and train financial and insuring institutions on industrial environmental objectives and the reduction of lending risk through cleaner production and better environmental management; and
- Fora at all levels by which industry can participate in setting industrial policy and objectives and in monitoring the performance and achievements of industry.

Some areas in which UNIDO may be able to offer relevant assistance include:

- Assistance in integrating an environmental dimension into industrial policy and defining a comprehensive national program to promote cleaner production;
- Capacity building for local governments in industrial environmental management; Stimulating industrial self-regulation and private sector initiatives;
- Establishment of a National Cleaner Production Center; and
- Identification of industrial estates and other areas where centralized environmental services can be developed and industrial ecology can be promoted.

Each of the elements described is important to achieving good environmental management and cleaner production in the Philippines. The essential component, however, is a national vision and plan. It must integrate the tools of an innovative regulatory regime and the incentives of a comprehensive industrial policy into a participatory and holistic approach to radically reduce industrial pollution without stifling economic growth. Without vision, a plan and the strong backing of both government and business, the many valuable efforts to promote environmental management and cleaner production will not gain their combined potential and thereby may fail to achieve their critical common objective.

I. INTRODUCTION

While industrial growth is mainly a function of market forces, governments actively pursue policies and activities to accelerate industrialization. These policies, directly and indirectly, affect the natural environment. Sound industrial and environmental policies are not incompatible, even though it is a difficult task either to set (and enforce) environmental standards that do not have some negative impact on industrial development options, or to formulate industrial policies that take environmental issues fully into account.

Optimizing welfare (i.e., development which attains economic, social and environmental objectives) therefore requires studying the relationship between industrial policies and (potential) industrial pollution. In this context, the extent to which environmental policies and management have prevented or mitigated pollution resulting from the chosen industrial policies is an important question to be addressed.

The objective of this study is to examine these issues in order to understand better the relationship between the industrial and environmental policies of the Philippines, and to be able thereby to recommend policy measures that could optimize economic benefits with reduced environmental damage. Although there are other important areas of concern with respect to environmental goals, the study focuses on those industrial policies and environmental policies that relate to industrial activities. It is thus not intended to be a comprehensive study of environmental management and policy in the Philippines.

Four documents were prepared as background material for this report. The first two provide a review of Philippine industrial and environmental policies as they have affected industrial activities over the past twenty years, with the end of assessing their net impacts on the environment. The next two documents describe the industrialization process in two selected industrial areas: Cavite and Cebu. The case studies document the changing nature and type of industrialization that has occurred, the implementation of environmental regulations, and related changes in environmental quality.

The findings and observations are used to formulate recommendations for improving environmental policy and industrial policy to mitigate the pollution potential of accelerated industrial growth. This report summarizes and integrates the findings of the four background documents, supplements those documents as needed, and adds conclusions and recommendations as appropriate.

2. SOURCES OF STRESS ON THE ENVIRONMENT

Metro Manila is one of the most polluted urban areas in the world. The growing problem of industrial pollution is seen in the pollution load of the river systems of Metro Manila. It is estimated that 30 per cent of the pollution of the river systems of Metro Manila is caused by industrial wastes, the balance being caused by domestic wastes[1]. Similarly, 30 percent of the air pollution is attributable to industrial sources, mainly the power sector; while the rest is mainly attributable to mobile sources. Data collected from 1991 to 1992 show a substantial increase in pollution levels when compared to air quality data from 1975 to 1978. Suspended particulate matter (SPM), carbon monoxide and lead concentrations currently exceed the ambient air standards.

The situation is even more critical with regard to hazardous wastes. Approximately 2,000 cubic meters per year of solvent wastes and 22,000 tons of heavy metals, infectious wastes, biological sludge, lubricants and intractable wastes, as well as 25 million cubic meters of acid/alkaline liquid wastes are improperly disposed of annually in the Metro Manila area. 2

In Cavite results from water samples in the various rivers showed that in some parts of these rivers pollutant concentrations are extremely high, including color, biological oxygen demand (BOD), suspended solids and total solids. The level of mercury in the Zapote, Imus and Ilang-ilang rivers was found to exceed the standards. With respect to air quality, results show that in some cases near the Bacoor Poblacion and inside and outside the EPZA, the level of SPM exceeded the ambient standard. In Metro Cebu the growing strain on the environment has likewise become worrisome. In several places ground water salinity levels already exceed drinking water standards, and water samples from major rivers contain heavy metals like lead, copper, cadmium and mercury, in many cases also exceeding acceptable standards. In the case of air pollution, two of the sampling stations for SPM revealed violation of air quality standards in 1992.

The only comprehensive overview of environmental pollution in the Philippines has been made by the Environment and Resource Accounting Project (ENRAP), which estimated the total pollution loadings by sector for water and air in 1988 and 1992. The results are presented in Table 1 and show that the food, beverage and tobacco products industries are the largest contributors to pollutant loadings. Although the different industry groups are not categorized as heavily polluting by the World Bank and UNIDO, they are responsible for a large share of total output by the Philippine manufacturing sector, which helps to explain their high share of total pollution. The lack of priority given to environmental issues by the often small enterprises in the industry would be another explanatory factor. After the food industry, the basic metals, paper and textile industries are the largest contributors to pollutant loadings.

1 *Industrial Environmental Management Project, A-51.*

2 *Industrial Efficiency and Pollution Control Study,* 1993.

Table 1: Water and air pollutant emissions from industry 1000 metric tons

CODE	Industry	Particulate Matter		Sulphur Dioxide		Nitrous Oxide		Volatile Organics		BOD5*		SS**	
		1988	1992	1988	1992	1988	1992	1988	1992	1998	1992	1998	1992
311	Food products	129220	154890	29420	36150	23569	36180	19190	295080	57310	67130	58250	72120
313	Beverages	3440	4860	7910	8540	4050	5770	2680	3880	59570	59570	62180	62180
314	Tobacco	570	960	990	1280	730	1160	610	980				
321	Textiles	2580	3850	10780	10550	3350	4560	2150	3260	25690	21090	14210	12510
322	Wearing apparel, ex footwear	820	1360	720	830	1050	1630	950	1480				
323 & 324	Leather products and footwear	150	250	100	130	190	300	170	270	2030	2370	3140	3670
331	Wood products, ex furnit.	10940	15470	5070	5900	10550	16320	9790	14930	710	210	790	60
332	Furniture, ex metal	630	1040	360	450	800	1250	740	1140				
341	Paper and products	29580	31620	11330	13130	2940	4060	1600	23330	11200	11710	16340	17160
342	Printing and publishing	720	1200	390	500	920	1440	850	1320				
351&352&356	Industrial chemicals, plastic prods.	18150	19490	10480	10510	4370	6410	4210	6080	5180	5310	2110	2270
353	Petroleum refineries	1340	1570	1950	2010	5720	1800	1590	1650	2340	2360	690	690
354	Miscell. pet. & Coal prod.	10	10	50	60	10	20	0	0				
355	Rubber products	700	1010	2530	2460	920	1260	630	940				
361	Pottery, china, earthenware	390	520	1460	1220	510	640	350	490				
362	Glass and products	1230	1660	1090	1320	2280	2960	2950	820			210	240
363	Mfr. of cement	6670	6840	20130	18060	12060	11570	1470	2060			2170	2650
369	Other non-metallic products	2010	2800	720	890	1700	2580	1570	2340				
371	Iron and steel	65430	66570	9350	10720	3680	4940	2460	3430	440	470	1170	1810
372	Non ferrous metals	14610	20340	1990	2290	910	1290	580	830				
381	Fabricated metal products	720	1210	680	880	940	1510	3770	4520	5760	7130	12410	13000
382	Machinery, except electrical	480	800	260	340	610	970	2420	3590	2210	3230	950	1390
383	Machinery electrical	920	1500	660	780	1160	1800	1060	1640			9930	9940
384	Transport equipment	560	900	370	440	710	1080	740	1100				
385	Prof. and scientific equipment	30	50	20	201	40	50	30	50				
390	Other manufactured products	280	470	150	200	350	570	330	520				
	TOTAL	292180	341240	118960	129660	84119	112120	62890	375730	172440	180580	184550	199690

* Biological Oxygen Demand
** Suspended Solids

3. PHILIPPINE INDUSTRIAL POLICY

3.1 Overview of Trade and Investment Policies

Trade and investment policies have been the major tools of Philippine industrial policy. Especially before major reforms started in the 1980s, trade policy made liberal use of tariffs and import licensing requirements to protect local industries. The Philippine investment policy is largely embodied in the investment incentive system, the Omnibus Investment Code (OIC) that is administered by the Board of Investments (1301). It promotes selected activities in its Investment Priorities Plan (IPP) through the granting of fiscal incentives. The OIC is also relevant to the attainment of regional development objectives through the promotion of industrial estates, the promotion of Foreign Direct Investment (FDI), and the Build-Operate-and-Transfer (BOT) scheme, most recently for environmental support facilities.

From the post-war period to the present the Philippines has undergone major changes in its trade policy regime. Five stages or periods can be traced in its trade policy. The first is the prereform era with a highly trade-restrictive and protectionist policy regime covering the post-war period up to the 1970s, supporting the inward-looking import-substitution strategy at that time. This is followed by the first major trade reforms during the first half of the 1980s when the 198185 Tariff Reform Program brought down all tariff rates to within 50 per cent from highs of 100 per cent. The third period saw major import liberalization in 1986-88. The fourth period is the second phase of the Tariff Reform Program, narrowing down the tariff range to mostly within 30 per cent. This was implemented by the Aquino Administration under Executive Order 470 (EO 470) over a five-year period from 1991 to 1995. Finally, the fifth period is that covered by EO 264 and implemented by the Ramos Administration from 1996 to 1998. This further narrows the tariff range to between 3 and 10 per cent (excluding some agricultural products).

Investment incentives were introduced as early as 1946. The earliest version offered an exemption from all internal revenue taxes for a period of four years to "new and necessary" industries, the same set of industries the ensuing trade and exchange controls would protect. In the fifties, incentives in the form of liberalized imports of raw materials and intermediate inputs were added. In the sixties, exemption from duties on imported equipment was made available to "basic" industries.

The system of investment incentives was formally institutionalized in 1967 with the Investment Incentives Act. Priority areas were selected and capacity was established for these areas. Incentives were geared mainly towards production for the domestic market, which was given further incentives in the form of tariff and/or import control protection (import licensing requirement or outright import bans). In 1970 incentives were extended to non-traditional exports with the passing of the Export Incentives Act (RA 6135). Since then, the Investment Incentives Act has been amended and codified three times, culminating with Executive Order 226 or the 1987 Omnibus Investment Code (OIC).

Regional dispersal of industries and promotion of regional investment have been among the development goals of the Philippine government. The first concrete program involved the creation of the Export Processing Zones, with the first estate, Phividec, being established in 1976. Incentives for locating outside Metro Manila have long been part of the OIC. Indeed, by

the 1980s, investment incentives were no longer available for firms locating "within Metro Manila. Starting in 1991/92, the BOI in implementing the OIC has actively promoted regional investments through special programs. For example, it provides pioneer status to firms locating in the identified Less Developed Areas (LDAs). The promotion of industrial estates was accelerated, and a central agency, the Philippine Export Processing Zones Authority (PEZA) was established in 1995 to coordinate efforts in this area. It has also started the promotion of Regional Agri-industrial Growth Centres (RAIGC). The RAIGC program is implemented by the Department of Trade and Industry and has identified at least one RAIGC in each of the 13 regions.

3.2 Trade Policy and the Environment

Before the trade reforms removing the import restrictions were implemented, more than a third of the industrial sectors were subject to some form of import controls. Except for a few which were prohibited (mainly for national security reasons), the products and commodities concerned required BOI and/or Central Bank clearances. Some of these import regulations were clearly for health and sanitary reasons. The majority, however, were for industrial protection. This was the case for products covered by local content programs such as the Progressive Car Manufacturing Programs (PCMPs). In other cases, the criterion for import was local availability (subject to price and quality comparability). For iron and steel products, for example, importers first had to negotiate with domestic producers how much they could import. For pulp and paper, the same local availability criterion was used by the BOI when granting import clearances.

The regime created biases and unintended results which became embedded in the system. To summarize, the past protracted protectionist trade policy resulted in 3 major biases:

- The protection structure resulted in an import-dependent import-substituting policy. The low tariffs on imported inputs made them artificially cheap, discouraging backward domestic linkages. The high tariff on imported finished consumer products, on the other hand, promoted finishing stage or assembly type of industries. Thus industries, which were heavily dependent on imported inputs, grew until they were constrained by the limited size of the domestic market;
- Exports, on the whole, were discouraged by the highly protectionist trade policy. The protectionist trade regime inevitably promotes a low exchange rate of the domestic to the main international currencies, which acts as a general penalty to exports;
- The protection structure artificially cheapened capital, encouraging greater capital intensity.

It is difficult to determine how these general biases of past trade policy affected the environment. The effect of the resulting biases are usually mixed. Examine for example the capital bias of past protectionist policy. While in many cases, light industries would probably be considered to be relatively less polluting than heavy industries, no generalization can be made. Labour-intensive industries (e.g. garment manufacturing) may be less polluting and capital intensive industries (e.g. certain chemical industries) may be relatively more polluting, but there are cases where the opposite holds. Relatively clean capital-intensive industries and dirty labor-intensive industries do exist. To some extent, the same mixed effects may occur as a result of a bias in favour of assembly and later-stage production, although in most cases the earlier stage of production generates more pollution.

Perhaps the bias against exports allows more definitive conclusions. First of all, the inherent bias against exports resulting from the former trade protectionist regime made the country heavily dependent on exports of primary products, particularly agricultural crops and other natural resource-based (mining and forestry) commodities. These primary industries generally impose a greater burden on the environment. Exports of industrial products which have to compete in the world market, however, need to keep abreast of global developments (technological and otherwise) which are increasingly demanding a cleaner and greener environment. Interviews by the Philippine Institute for Development Studies -Association of South-East Asian Nations (PIDS-ASEAN) Trade and Environment Project showed that exporting industries in general are more readily adopting cleaner technology[3].

Finally, investments in new machines proceeded slowly under the inward-looking industrial strategy promoted by the highly protectionist regime. This was due to some extent to the limited domestic market it served and to the lack of competition. For example, up to the late 1980s the textile industry relied on old technology and capital equipment, and investments in new machines started to grow only then. In general, the sluggish investment in new machines had a negative impact on the environment.

On the whole, it remains difficult to assess the overall impact of past protectionism on the environment. Looking at the effect of trade policy on individual manufacturing sectors may shed some light. This is done in Table 2 which presents the effective rate of protection (ERP) of three digit PSIC industries grouped according to their pollution potential classification. The ERP, which is a measure of overall trade protection on value-added, represents a good summary measure of the protection effect of trade policy. Looking at the ERP structure vis-a-vis pollution potential thus helps to provide a more detailed picture of the relation between trade policy and the pollution potential of manufacturing industries. The table uses a pollution potential classification based on World Bank and UNIDO sources, and matches these with the estimates of ERP. The matching may not be exact in some cases (because of the different classifications used in the computation of the ERP), but it should be a good approximation and some observations can be drawn.

The table illustrates even more clearly the mixed effects of trade policy on the environment. There are a number of sectors with high pollution potential, which received relatively high effective protection (e. g., cement, other non-metallic products, etc) and a number of sectors with low pollution potential received low effective protection (e.g. apparel, wood, etc.)

[3] PIDS-ASEAN: *Results of the Workshop on Trade and Environment: Issues and Opportunities,* Manila, May 11-12, 1995.

Table 2. ERP for Manufacturing Sectors Classified by Pollution Intensity

PSIC/POLLUTION CLASSIFICATION	1983	1988	1994
More polluting industries			
341 Paper and paper products			
351 Industrial chemicals	53.2	8.5	3.0
353 Petroleum refineries	56.6	59.6	20.1
363 Cement	79.2	42.4	19.5
369 Other non-metallic mineral prods	280.3	17.4	18.4
371 Iron and steel	38.3	80.5	9.1
372 Non-ferrous metal basic products	-9.7	-11.3	-1.2
Somewhat polluting industries			
311 Food	32.9	22.3	14.5
312 Other food	11	21.3	50.3
313 Beverages	83.7	52	44
321 Textiles	92.8	30.6	1.9
323 Leather and leather products	-13.9	1.74	8.0
342 Printing and publishing	68.2	72.4	13.6
352 Other chemical products	37.7	44.8	29.1
381 Fabricated metal products	82.3	66.3	28.7
383 Electrical Machinery	42.5	30.9	4.7
384 Transport equipment	50.6	48.8	57.3
386 Furniture and fixture of metal	182.7	75.9	-4.5
Less polluting industries			
314 Tobacco	147	60.6	53.4
322 Apparel except footwear	3.1	3.9	4.7
324 Footwear except rubber	-6.5	-5.3	0.2
331 Wood and cork products	2.1	4.5	7.5
332 Furniture and fixture except metal	-2.6	1.9	-0.1
354 Prods. Of coal and petroleum	74.5	-5.5	-10.1
355 Rubber products	129.3	18.9	17.3
356 Plastic products, n.e.c.	119.7	20.9	17.9
361 Pottery and china	224.1	4.7	3.6
362 Glass and glass products	67.1	37.4	20.2
382 Machinery, except electrical	28.1	11.7	0.4
385 Professional and scientific eq.	-13.2	21	1.1
390 Other manufacturing machinery	8.1	4.6	-0.8

Sources: Medalla, et.al. 1991. " Catching Up with Asia's Tigers." Vol. II Medalla, E.1997. "Trade and Industrial Policy Beyond 2000: An Assessment of the Philippine Economy"

In these cases, the protection structure clearly encourages industries with greater pollution potential. However, there are also a number of industries with low pollution potential receiving relatively high effective protection. Thus, no clear generalizations can be made. This is not really surprising, and could even be expected, as trade and industrial policies have been formulated independently of environmental objectives.

It is interesting to note, however, that with trade reforms (indicated by the ERP for 1994) the level of protection for these relatively more pollution-intensive industries went down substantially. Some continue to be protected, but the levelling effects of the trade reforms benefit, in relative terms, industries with a low pollution potential and low protection. Thus, while trade reforms starting in the 1980s would have mixed effects across sectors with respect to the environment, the reforms could have had on the whole a positive impact on the environment. Furthermore, the liberalized trade regime would lower the cost of pollution abatement equipment.

3.3 The Investment Incentive System and the environment

In general, the investment incentive system reinforced trade policy, especially until export incentives were introduced in the 1970s. The attention paid to exports mitigated the bias of trade policy somewhat, but because of its limited coverage the approach was inadequate and resulted in export concentration on a few products (garments in the 1970s, and electronics starting in the late 1980s). There was some improvement in the incentive system with the enactment of BP 391 during the period 19831987, manifested in the higher share of exports, lower capital-labour ratio, and smaller average size of firms during that period. However, these trends were reversed with the termination of BP 391 and the passing of EO 226 in 1986, by which the capital-intensity and size biases were restored. Furthermore, there were fewer incentives to export. The results of the PIDS-DIA study confirm that activities within the framework of the EPPhave on average a higher ERP[4]. The impact on the environment is thereby likely to be similar.

The investment incentive system would, however, have a specific impact on industrial dispersal through the promotion of regional investment. Table 3 shows that over the years an increasing proportion of investment has taken place outside the National Capital Region (NCR). Only investments in industrial estates have been approved in the NCR. The dispersal of industries would help to reduce pollution in Metro Manila.

Foreign investment policy runs parallel to the overall investment incentive system. This was especially true before the passing of the 1992 Foreign Investment Act (FIA). Before this, BOI had an implicit positive list for foreign investments which closely coincided with its IPP. There were restrictions on foreign investment in some areas, generally related to natural resource exploitation, but most EPP areas were open to DFIs. Hence, foreign investments were not likely to have had a more negative impact on the environment than domestic investments. On the contrary, foreign firms are usually found to adhere more closely to environmental regulations.

[4] Medalla et al.: *Catching up with Asia's Tigers*, Volume 1, 1966.

Table 3: Distribution of Projects Approved Under Various Investment Incentive Programs, Percentage By Region

Region No:	Region Name	1981-1985	1986-1990	1991-1995
1	Ilocos	2.3	0.8	1.4
2	Cagayan Valley	0.6	0.3	0.5
3	Central Luzon	8.8	8.8	13.8
4	Southern Tagalog	18.2	17.9	29.7
5	Bicol	1.9	0.8	1.4
6	Western Visayas	2.9	5.6	3.5
7	Central Visayas	6.3	7.6	8.6
8	Eastern Visayas	0.8	0.3	1.1
9	Western Mindanao	1.4	1.0	0.9
10	Northern Mindanao	4.4	1.9	3.2
11	Southern Mindanao	5.2	3.0	5.9
12	Central Mindanao	0.9	0.7	0.4
CAR	Cordillera Autonomous Region.	0.2	0.3	0.7
ARMM	Muslim Mindanao	0	0.1	0.1
NCR	National Capital Region	45.7	49.6	22.4
	No Region Indicated	0.5	1.4	3.9
	Several Locations	0	0	2.6
	Total	100	100	100
	Number of Projects	**152**	**597**	**516**
	National Capital Region	45.7	49.5	22.4
	Outside NCR	53.8	49.1	71.1

The new FIA has liberalized entry of foreign equity. The negative list where DFI is restricted has been limited to firms exploiting natural resources, those dealing with the production of firearms and other national-security related activities, and small enterprises catering to the domestic market with less than US$100,000 paid-up capital. It is too early to determine whether such opening up will lead to cleaner technology and production or will encourage the emergence of pollution havens.

3.4 Industrial Estate Promotion and the Environment

The first EPZs were established in 1972 and the first industrial estate was Phividec in 1974. The Philippines were initially not very successful in this area, but have been catching up rapidly in recent years as private developers have established many new estates. Up to 1986 estates had very low occupancy rates. It was only in the 1990s that industrial estates began to grow, both in number and in occupancy rates. Before that, BOI regional investment incentives were the major driving force in the dispersal of industries. They continue to be a factor, but the promotion of industrial estates has become more important. The environmental impact of the estates can only be determined by looking more closely at their environmental management procedures and the facilities available at these estates, as is done in the case studies of Cavite and Cebu which are summarized in chapter 5.

3.5 Industrial Pollution Potential

Past industrial policy and continuing reforms have impacted on the growth, level of industrial activity, and sub-sectoral composition of the industrial activity and its location. While changes in industrial activities arise also from a host of other factors (monetary, fiscal, agricultural, political, etc.), the industrial production structure and, to an extent, the growth of the economy would reflect the impact of these policies. Table 4 shows the changes in the Philippine economy and in the manufacturing sector since the 1970s.

Table 4: Production Structure of the Economy: Average Growth Rates in Real Terms

Sector Years:	**75 - 80**	**80 - 85**	**85 - 90**	**90 - 95**	**90 - 96**
Agriculture, Fishery and Forestry	4.5	0.4	1.9	1.3	1.5
Agriculture	6.2	1.8	2.6	2.2	2.3
Forestry	-2.6	-11.3	- 6.0	-24.7	-27.0
Industry	7.4	-2.3	1.5	2.3	2.9
Mining and quarrying	8.8	6.9	4.4	- 1.0	-1.1
Manufacturing	5.1	-1.8	2.9	2.2	2.6
Construction	18.2	-6.9	-1.5	2.2	3.4
Electricity, gas and water	7.6	6.1	2.1	5.8	6.0
Services	5.5	1.9	4.4	2.9	3.4
Transport, commerce and storage	7.0	2.1	4.3	2.8	3.4
Trade	6.3	1.8	4.3	3.1	3.5
Offices, dwellings and real estate	1.7	1.2	3.6	1.9	2.2
Private services	4.8	5.8	3.8	2.6	2.9
Government services	3.7	2.6	4.6	3.7	3.6
Gross Domestic Product	6.0	-1.0	2.8	2.3	2.8
Gross National Product	5.9	- 0.6	3.4	3.1	3.6

Source: National Income Accounts, NSCB

Apart from the early 1970s, the industrial sector has shown very low rates of growth throughout the period. Manufacturing growth rates were roughly comparable to those for overall economic growth and for growth rates in the industrial sector as a whole. But compared with the services sector, the performance of manufacturers has been sluggish, and within the industrial sector growth was in most years outstripped by other industrial activities. Past industrial policies therefore do not seem to have been particularly successful. In 1995 the share of manufacturing in GDP was 24 per cent as compared to 28 per cent in 1975. The downward trend has continued during recent reforms. This could be due to a number of factors. Possibly the main reason is that the industrial sector is still in the process of adjustment and restructuring, with most new investment taking place only in the last three to four years.

Another reason for the delayed response was the failure of government to implement readily the necessary complementary measures, particularly with respect to the exchange rate.

The weak performance of Philippine industry is confirmed by a comparison in Table 5 of the industrial sector's growth with that of its Asian neighbours. In terms of gross output, the Philippines was the number two manufacturing country in ASEAN during 1970-74, behind only Thailand. By 1990-94, it had slipped to last place. Growth rates in Philippine manufacturing have consistently been well below those for all other ASEAN countries.

Table 5: Changes in Industrial Output

Absolute Value (Million US$ 1990)				**% Change**		
Countries	**70 - 74**	**80 - 84**	**90 - 94**	**70-74/80-84**	**80-84/90-94**	**70-74/90-94**
Indonesia	4260	10710	50320	150	370	1080
Malaysia	5610	18370	47180	230	160	740
Philippines	9890	17685	23480	80	30	140
Singapore	8550	24140	42850	180	80	400
Thailand	16320	37870	94900	130	150	480
ASEAN	44630	108770	258740	140	140	480

Source: UNIDO

Have the growth trends in manufacturing resulted in shifts in pollution potential within the manufacturing sector, and how does Philippine manufacturing compare with other ASEAN countries in this respect? One approach for determining if there has been a shift in the pollution potential of the industrial/manufacturing sector is to group the 3-digit manufacturing sectors by the pollution potential classification used before. The shares in gross output by pollution potential classification are then computed using the available census data for the 1970-74, 1980-84 and 1990-94 periods. The results of this operation are presented in Table 6.

Industries with a low pollution potential have an almost constant share in industrial output. During 199094 it stood at 16.6 per cent, as it did also during 1970-74. There is a slight increase to 18 per cent during 1980-84. Within the category the decreasing shares of tobacco manufacturing (PSIC 314) and wood and wood products (PSIC 331) and the increasing share.

Table 6: Philippines - Shares of Industry Sectors in Total Manufacturing Output

	Absolute value (Mil. US$ 1990)			Share (%)		
More polluting **industries**	**1970-1974**	**1980-1984**	**1990-1994**	**1970-1974**	**1980-1984**	**1990-1994**
341 Paper and products	328	462	510	3.3	2.6	2.1
351 Industrial chemicals	487	648	749	4.9	3.7	3.1
353 Petroleum refineries	929	3199	2865	9.4	18.1	11.7
369 Non-metal. mineral	214	237	586	2.2	1.3	2.4
371 Iron and steel	402	663	1174	4.1	3.7	4.8
372 Non-ferrous metals	67	173	471	0.7	1	1.9
Subtotal	**2427**	**5382**	**6355**	**24.6**	**30.4**	**26 . 0**
Somewhat polluting industries						
311 Food products	2747	4006	5243	27.8	22.6	21.5
313 Beverages	431	830	1522	4.4	4.7	6.2
321 Textiles	744	1089	940	7.5	6.2	3.9
323 Leather products	16	22	44	0.2	0.1	0.2
342 Printing and publish.	161	218	358	1.6	1.2	1.5
352 Other chemicals	714	1208	1821	7.2	6.8	7.5
381 Fabricated metals	331	396	444	3.3	2.2	1.8
383 Machinery, electric.	282	790	2446	2.9	4.5	10
384 Transport equip.	400	631	1172	4	3.6	4.8
Subtotal	**5826**	**9190**	**13990**	**58.9**	**51.9**	**57.4**
Less polluting industries						
314 Tobacco products	500	837	710	5	4.7	2.9
322 Wearing apparel	102	484	1119	1	2.7	4.6
324 Footwear	20	55	93	0.2	0.3	0.4
331 Wood products	394	589	373	4	3.3	1.5
332 Furniture	40	133	189	0.4	0.8	0.8
354 Petroleum and coal	22	12	32	0.2	0.1	0.1
355 Rubber products	195	284	371	2	1.6	1.5
356 Plastic products	112	246	424	1.1	1.4	1.7
361 Pottery	11	46	65	0.1	0.3	0.3
362 Glass	110	133	161	1.1	0.8	0.7
382 Machinery, ex elect.	104	186	258	1.1	1.1	1.1
385 Profes. & scientific	6	16	43	0.1	0.1	0.2
390 Other	25	95	201	0.2	0.5	0.8
Subtotal	**1641**	**3116**	**4039**	**16.5**	**17.7**	**16.6**
Total	**9894**	**17688**	**24384**	**100**	**100**	**100**

of wearing apparel (PSIC 322) indicate a modest degree of structural change. The share of the industries with medium pollution potential decreased somewhat over 1970-94, from 59 to 57 per cent. During 1980-84 the share of this category dropped to 52 per cent, but this decrease was almost cancelled out by a rapid increase in the production of electrical machinery (PSIC 383) during the last period. The only other clear indications of structural change in this category are the decreasing shares of the food products and textile industries (PSIC 311 and 321) and the slow but continuous increase in beverages (PSIC 313) over 1970-94. The heavily polluting industries saw their share rise only slightly from 25 per cent in 1970-74 to 26 per cent in 1990-94, with a peak of 30 per cent during 1980-84. This was largely the result of a brief boom in petroleum refining (PSIC 353).

A full comparison with other ASEAN countries is hampered by the lack of data for some of the countries. Data for shifts among pollution categories were only available for Singapore and Thailand (Table 7). In Singapore there is a clear trend toward industries that pollute less. The lowest pollution category saw its share rise from 28 per cent in 1970-74 to 35 per cent in 1990-94. There has been a very strong growth in machine building (ISIC 382), much of it precision engineering, which accounted for most of the output in this category by the last period. The industries with a medium pollution potential have become heavily dominated by electrical machinery (ISIC 383), which explains most of the growth in this category. After a peak in 1980-84, the potentially heavy polluters saw their share decrease from one-third to one-fifth of total industrial output, with strong decreases in petroleum refining (ISIC 353) in the last period.

These positive developments are in part the result of the government's economic strategy which heavily emphasizes modern services. Many manufacturing operations have been relocated across the border into Malaysia. While this option is not open to the Philippines, it would be worthwhile to investigate the other factors which have encouraged the shift away from industries with a large potential for pollution. In Thailand a trend toward industries with a low pollution potential can be noted as well[5]. This category of industries saw its share of total output rise from 13 per cent in 1970-74 to 25 per cent in 1990-94. Most of the growth is due to the expansion of the wearing apparel industry. The share of industries with a medium pollution potential decreased from 62 per cent to 54 per cent over the whole period. Within this category, the share of the food and beverages industry has decreased quite strongly, while textile manufacturing, electrical machinery and transport equipment are the most important growth. industries. In the category of industries with a large pollution potential, the rapidly declining share of petroleum refining is noteworthy. This largely explains the decrease by one-fifth of the share of the whole category.

Thailand's situation can be compared roughly with that of the Philippines, and the Thai example shows that a strongly export-driven industrial development strategy can help to bring about a shift toward industries with a lower pollution potential. A different question, of course, is whether without a strong drive to promote cleaner production at the plant level the rapid overall growth of Thailand's manufacturing sector has not neutralized the positive effects of this shift.

[5] A similar trend occurred in Indonesia. See World Bank, 1994, *"Economy-wide. Policies and the Environment: Emerging Lessons from Experience "*.

Table 7: Singapore/Thailand - Shares of Industry Sectors in Total Manufacturing Output

Singapore	Absolute value (Mil. US$ 1990)			Share (%)		
More polluting	**1970-**	**1980-**	**1990-**	**1970-1974**	**1980-1984**	**1990-1994**
341 Paper and products	74	210	449	0.9	0.8	1.1
351 Industrial chemicals	95	327	1560	1.1	1.4	3.7
353 Petroleum refineries	2407	8065	5433	28.1	33.4	12.8
369 Non-metal mineral	158	600	670	1.8	2.7	1.6
371 Iron and steel	101	222	288	1.2	0.9	0.7
372 Non-ferrous metals	32	109	108	0.4	0.4	0.3
Subtotal	**2867**	**9533**	**8508**	**33.5**	**39.6**	**20.2**
Somewhat polluting industries						
311 Food products	758	1205	951	8.9	5	2.2
313 Beverages	89	198	283	1	0.8	0.7
321 Textiles	225	228	196	2.6	1	0.5
323 Leather products	23	30	37	0.3	0.1	0.1
342 Printing and publish.	169	478	893	2	2	2.1
352 Other chemicals	151	508	1159	1.8	2.1	2.7
381 Fabricated metals	333	1061	2372	3.9	4.4	5.6
383 Machinery, elect.	947	4984	10964	11.1	20.6	25.8
384 Transport equip.	606	1326	2275	7.1	5.5	5.4
Subtotal	**3301**	**10018**	**19130**	**38.7**	**41.5**	**45.1**
Less polluting industries						
314 Tobacco prod.	141	126	191	1.6	0.5	0.4
322 Wearing apparel	218	615	803	2.5	2.5	1.9
324 Footwear	28	32	25	0.3	0.1	0.1
331 Wood products	332	367	158	3.9	1.5	0.4
332 Furniture	38	181	294	0.4	0.7	0.7
354 Petroleum & coal	186	526	335	2.2	2.2	0.8
355 Rubber products	827	487	87	9.7	2	0.2
356 Plastic products	82	353	959	1	1.5	2.3
361 Pottery	2	1	5	0	0	0
362 Glass	20	55	102	0.2	0.2	0.2
382 Machinery ex. elect.	287	1341	10933	3.4	5.6	25.7
385 Profes. & scientific	76	199	501	0.9	0.8	1.2
390 Other	157	301	430	1.8	1.2	1
Subtotal	**2394**	**4584**	**14823**	**27.9**	**18.8**	**34.9**
Total	**8562**	**24135**	**42461**	**100**	**100**	**100**

Source: UNIDO

Table 7 (cont.)

Thailand	**Absolute value (Mil. US$ 1990)**			**Share (%)**		
More polluting Industries	**1970-1974**	**1980-1984**	**1990-1994**	**1970-1974**	**1980-1984**	**1990-1994**
341 Paper and products	187	447	1491	1.1	1.4	1.6
351 Industrial chemicals	395	956	403	2.4	3	0.4
353 Petroleum refineries	3011	3086	7779	18.5	9.6	8.2
369 Non-metal. mineral	290	984	4882	1.8	3.1	5.1
371 Iron and steel	126	1129	3360	0.8	3.5	3.5
372 Non-ferrous metals	113	44	1684	0.7	0.1	1.8
Subtotal	**4122**	**6646**	**19599**	**25.3**	**20.7**	**20.6**
Somewhat polluting industries						
311 Food products	4071	10541	17364	24.9	32.8	18.3
313 Beverages	1718	3058	2348	10.5	9.5	2.5
321 Textiles	1773	446	12400	10.9	1.4	13.1
323 Leather products	32	182	863	0.2	0.6	0.9
342 Printing and publish.	193	330	3505	1.2	1	3.7
352 Other chemicals	504	1581	2383	3.1	4.9	2.5
381 Fabricated metals	940	971	2300	5.8	3	2.4
383 Machinery, electrical	370	1361	4579	2.3	4.2	4.8
384 Transport equipment	514	1475	5693	3.1	4.6	6
Subtotal	**10115**	**19945**	**51435**	**62.0**	**62.0**	**54.2**
Less polluting industries						
314 Tobacco products	232	851	1186.8	1.4	2.6	1.3
322 Wearing apparel	199	1148	9478.6	1.2	3.6	10
324 Footwear	32	212	739.4	0.2	0.7	0.8
331 Wood products	392	738	1547.6	2.4	2.3	1.6
332 Furniture	140	336	1122.4	0.9	1	1.2
354 Petroleum & coal	17	59	31.2	0.1	0.2	0
355 Rubber products	283	167	2392	1.7	0.5	2.5
356 Plastic products	114	956	405.6	0.7	3	0.4
361 Pottery	18	43	324	0.1	0.1	0.3
362 Glass	168	255	712.6	1	0.8	0.8
382 Machinery, ex. elect.	302	257	3273.8	1.8	0.8	3.5
385 Profes. and scientific	15	36	605.8	0.1	0.1	0.6
390 Other	168	499	2027.2	1	1.6	2.1
Subtotal	**2080**	**5557**	**23848**	**12.6**	**17.3**	**25.1**
Total	**16317**	**32148**	**94882**	**100**	**100**	**100**

Source: UNIDO

The findings of this analysis by and large lead to the conclusion that the lack of dynamism in the Philippine manufacturing industry is reflected in the generally limited shifts among categories of polluting industries. The industrial policy reforms undertaken in the past decade have at least not led to a significant increase in pollution potential from the industrial sector, and the decline in protection for a number of relatively high pollution potential industries noted above may in fact have had a positive impact on the environment. Furthermore, the liberalized trade regime would lower the cost of pollution abatement and other similar equipment, and the regional dispersal of industries would help to reduce environmental stress in the most polluted areas, although this strategy may not reduce overall pollution.

It should be noted that the approach used in this analysis indicates pollution potential, not the actual pollution impact of industrial growth on the environment. Actual impact is to a large extent determined by the environmental policy and regulatory framework designed to ensure that industry internalizes the potential pollution damage.

4. PHILIPPINE ENVIRONMENTAL POLICY AND REGULATIONS AFFECTING INDUSTRY

Effective environmental policy and regulations have a potentially greater impact on industries than industrial policy itself because they attempt to directly address the environmental problem at the source and force industries to internalize environmental costs. This chapter reviews Philippine environmental policy and regulations affecting industrial pollution. It summarizes the important laws and regulations and makes some assessment of their effectiveness where possible. The case studies in chapter 5 provide more details on the impact of the relevant policies and regulations.

4.1 Ambient Environmental Quality Standards and monitoring

A comprehensive set of ambient standards is essential if an industrial environmental management program is to have clear objectives, justifying support for the program by all segments of society. As standards are achieved, there will be benefits to the country's ecosystems, public health and enterprises (waste reduction, higher quality of water, etc).

A number of ambient standards for measuring air, water and soil quality have been formulated by the Department of Environment and Natural Resources (DENR). DEER Administrative Orders (AO) 34 and 35 provide legal coverage to the maintenance of water quality in the country. AO 34, issued in 1990, includes classifications for both surface and coastal water. For each classification current beneficial use (e.g., drinking water, etc.) is given. It also contains water quality criteria for each class appropriate to the designated beneficial use. The standards for discharge of effluents to the different classifications of water bodies are prescribed in AO 35. A recent review of the two AOL finds the Philippine classifications adequate. The next review should enable the publication of standards and criteria in the year 2000.

Between 1972 and 1982 a national monitoring program was established for some rivers and lakes. The design called for yearly and semestral sampling of all major rivers and monthly sampling of Metro Manila rivers. After the reorganization in 1987 budget reductions have restricted sampling to less frequent intervals and only on a few selected rivers nationwide. However, some water quality management projects have built-in monitoring activities, notably the Pasig River Rehabilitation and the Ilog Ko-Irog Ko Projects.

4.2 Environmental Impact Assessment

The Philippine Environmental Policy Act (PD 1151), promulgated in 1977, established the Environmental Impact Assessment System (EIA). The EIA requirements help guide the design of projects, with the intention of minimizing their impact on the environment. All projects, which have a significant impact on the environment, must prepare a detailed statement on such impact. Initially, the impact statement required by the EIA contained alternatives to the proposal, environmental impacts of proposed activities, and adverse environmental effects that cannot be avoided and the mitigation measures for these. Over time, the contents of the EIA documents have grown far beyond these basic elements to

include aspects of social acceptability, environmental management planning and environmental monitoring and guarantee fund mechanisms.

Projects covered by the EIA system must secure an Environmental Compliance Certificate (ECC) from DENR. The EIAs are required to follow a standard outline. However, this practice has tended to encourage submission of voluminous reports that include irrelevant information. DENR Department Order No. 21 (1992) amended the original EIA rules and regulations, introduced the concepts of social acceptability and an environmental guarantee fund, and decentralized the system by involving regional DENR units in the review of project descriptions and the issuance of ECCs. Criteria for assessing social acceptability of projects have proven contentious and developing a standard formula for determining the amount of environmental guarantee fund has been difficult. To date, environmental guarantee fund requirements have been imposed mainly on large projects, such as mining and geothermal development.

The above indicates that the EIA, in concept a planning tool, has become very much a regulatory instrument. Because of the complex details, the EIA system necessitates the engagement of a consultancy firm. If the EIA must be submitted and processed by the Environment Management Bureau (EMB), the time needed for processing is at least 6 months. For projects not requiring a full EIA, processing of documentation by the DENR regional office takes three to four months. For business enterprises this is an unacceptable delay which results in opportunity losses and higher interest charges. In response to protests, the DENR therefore issued AO 11 in 1992 which allows the use of area-based EIAs for industrial estates. This means that industrial firms locating inside industrial estates need not conduct EIAs if the industrial estate as a whole has been covered by an approved "programmatic" EIA. The party responsible for preparing the EIA is the owner or operator of the industrial estate, who is then responsible to see that those plants locating in the estate adhere to the conditions of the EIA.

The programmatic EIA applied to an entire industrial estate is based on a carrying capacity analysis. This determines the maximum waste load that the local ecosystem can assimilate, or the maximum amount of ground water extraction that can be allowed, or the level of air emissions ensuring acceptable ambient air conditions (determined from modelling). From the carrying capacity assessment of the area, a determination of the appropriate type or mix of industries, as well as the allowable intensity of development, can then be made. This is incorporated into a management plan which becomes the basis for issuing an environmental clearance for the industrial estate. The management plan also serves as reference for compliance monitoring. Guidelines for carrying capacity analysis of industrial estates have been prepared by the DENR

4.2 The Regulatory Framework

The Philippine Environmental Code (PD 1152), also promulgated in 1977, spells out in detail the various aspects of environmental management such as air and water quality standards, land use management, natural resource management and waste management. It also defines the basic elements of a regulatory program. The regulatory function consists of discharge standards, permits, monitoring and enforcement.

4.3.1 Standards

Regulatory standards cover a variety of pollutants. For industrial activities, these tend to be mostly performance based (i.e., they indicate specific levels of permissible factory emissions/effluents), and to a lesser extent technology based (i.e., referring to a specific technology). These standards include:

- ambient concentration standards, which specify quantitative ambient water and air quality targets;
- mass-based standards, which specify quantitative limits for emissions to air, land and water for any given emission source and for specific types of pollutants; and input standards, which specify quantitative and qualitative standards for production inputs (such as fuel quality).

4.3.2 Permitting

Authority to issue environment permits is vested in the DENR and exercised through its regional offices. At present, two kinds of permits are used. One is the Authority to Construct (AC) issued as a requirement for the construction of pollution abatement facilities, such as a wastewater treatment facility or air pollution control device[6]. The other is the Permit to Operate (PO) issued annually for the continued use of a pollution abatement facility. The fees paid for these permits are small. DENR is currently looking into ways to rationalize the permitting system by merging the two permits into a single "permit to discharge" which will have a defined time limit (e.g., 5 years).

What appears to be lacking are plant specific discharge permits that tailor the general limits for all parameters of concern that a facility must meet on a monthly and annual basis as well as maximum limits that must not be exceeded at any point in time. Such a permit to discharge can also then be priced in a way that reflects the cost to society of damages created by pollution discharges. This will allow building up a fund for pollution management.

A pollution charge system based on the production levels of individual firm has been operating over a year in industrial areas along Laguna Lake. A firm can reduce its charges by demonstrating that its actual discharges are less than the assumed levels, providing some incentive for cleaner-production. Unfortunately, the system is vulnerable to misinterpretation and has been seen by some as providing industries with a license to pollute so long as they pay.

[6] This is, however, also part of the regulatory framework as it comes under the EIA.

Efforts have been made to educate; the public about its advantages, but the system initially faced strong opposition in the media. DENR now plans to extend the system nationwide.

4.3.3 Monitoring

The regulations require that all holders of ACs and POs submit quarterly reports of their emissions and effluents. Spot-check inspection and validation of submitted data are severely hampered by the lack of personnel and laboratory equipment. In Region 4-A, for example, covering the provinces of Cavite, Batangas, Aurora and Quezon, one of the most highly industrialized regions in the Philippines, a team of only one chief chemical engineer, one chemist and one engineering aide must perform all of the earlier mentioned functions for all factories and establishments. The Environmental Quality Division of Region 4-A only has a capability to test effluents for total suspended solids. Air quality testing equipment is available only at the National Capital Region Regional Office. At the community level jurisdiction extends only to minor complaints relating to pollution caused by rice and feed mills.

4.3.4 Enforcement

Because the DENR is primarily an administrative agency, its enforcement of pollution control laws is often focussed on the imposition of administrative sanctions such as fines and/or cancellation of permits and licenses. Aside from imposition of fines, the DENR, through the Pollution Adjudication Board (PAB), is also empowered to order the cessation of environmentally harmful activities through Cease-and-Desist Orders (CDOs).

When a CDO is imposed it remains in force until the PAB issues a Temporary Lifting Order (TLO). This is issued when the polluting firm makes a commitment to put up an antipollution device, submits a pollution control scheme or plans and a performance bond equivalent to 25 per cent of the estimated cost of installation/repair of the pollution control device, and undertakes interim measures to mitigate the pollution during the construction period. The TLO specifies the period, usually not more than six months, within which the polluting firm may be allowed to operate. The regional office of the DENR is directed to monitor the progress of the construction and submit a report to the PAB. For violations of orders of the PAB, a fine not exceeding P5,000 per day for every day of violation may be imposed after due notice and hearing. PD 984 likewise imposes penal and civil sanctions which may be imposed by regular courts aside from administrative sanctions that may have

5. FINDINGS FROM THE CASE STUDIES

Two case studies were conducted to review the impact of industrialization on the environment in two industrialized areas: Cavite Province and Metro Cebu. The studies document the nature and type of industrialization, the nature and implementation of environmental regulations, and changes in environmental quality. They then assess how environmental policies and institutions responded or failed to respond to the increase in the pollution potential of the new industry environmental problems. The findings of these studies are summarized below.

5.1 The Cavite Case Study

Although Cavite province is predominantly agricultural, its proximity to Metro Manila has led to the establishment of various industries. This has created increased employment opportunities in the area and, in turn, population influx. The major industry sub-sectors in the province are food processing, beverages and tobacco; textiles, garments and leather goods; furniture and other wood products; paper and paper products; chemicals, rubber and plastic products; and metallic and non-metallic mineral products. Most of these industrial activities are labour-intensive, especially those in manufacturing and assembly of fabricated metals and in the garments industry. Production is directed toward both domestic markets and exports.

5.1.1 Industrial growth

Prior to 1980, there were only 23 firms in Cavite, primarily in Alfonso, Carmona and Dasmarinas. Most of these predominantly small-scale companies were outside the industrial estates. As of June 1995, however, 508 firms were registered in Cavite, an increase of 87 percent since 1988 (Table 8). Of these, 396 were operating, 55 were pre-operational and 77 had already closed down. Most of these new firms were located inside industrial estates, and overall there has been a shift from small scale to medium and large-scale industries.

Presently, there are 18 industrial estates in Cavite occupying a total land area of 915 ha., and three more are under construction. The biggest industrial estate is the Cavite Economic Zone with a land area of 276 ha.; the smallest is the Bulihan-NHA Industrial Estate with only 3 ha. As of June 1996, the Cavite Economic Zone had the largest number of companies (188) as well as the largest number of employees (40,900). Other large industrial estates in terms of area, number of companies and employees are the Peoples Technology Complex, First Cavite Industrial Estate, and Imus Informal Industrial Estate. Operators of industrial estates in the province generally give preference to small and medium enterprises (SMEs).

5.1.2 Size and branch classification of industries

Out of 396 firms operating in the province, there are data on capitalization for 361. Based on these data and following the latest industry classification of the Department of Trade and Industry (DTI), 11 are considered cottage industries, 157 are small-scale, 121 are medium-scale, and 72 are large-scale industries. Manufacture of fabricated metal products,

machinery and equipment (PSIC 38) and textile, wearing apparel and leather industries (PSIC 32) predominate, comprising 29 per cent and 26 per cent, respectively, of the total number of firms in Cavite. Firms classified under PSIC 38 are mostly producers of electronics and electrical products, while firms classified under PSIC 32 are mostly in the manufacture of wearing apparel. The other main industries are the manufacture of chemical, petroleum, coal, rubber and plastic products (PSIC 35) and of non-metallic mineral products (PSIC 36), with shares of 14 and 7 percent, respectively, in the total number of firms.

Table 8: Number of Industrial Establishments in Cavite by Year

Year	Number of companies
Prior to 1980	23
1980	28
1981	31
1982	37
1983	43
1984	47
1985	51
1986	55
1987	64
1988	82
1989	128
1990	183
1991	229
1992	306
1993	362
1994	460
1995	508

Source: Provincial Government, Trece Martires, June 1995 data

5.1.3 Pollution potential of industries

Industries in Cavite can further be classified in terms of their pollution potential. Table-9 (numbers differ from those mentioned in Table - 8) indicates that about 10 per cent of the firms in Cavite are considered potentially heavy polluters, while almost 56 per cent have a low pollution potential. This is mainly due to the strong positions of the wearing apparel and nonelectrical machinery sectors. During 1986-1996, the percentage of potentially heavy polluters doubled because of new firms in paper and paper products, other non-metallic mineral products and iron and steel.

Table 9: Cavite Industrial Enterprises by Pollution Potential Category

PSIC/Pollution Classification	Number of firms		Percent Share	
	1985-86	1995-96	1985-86	1995-96
More Polluting Industries				
341 Paper and paper products	0	11	0	2.2
351 Industrial chemicals	0	6	0	1.2
353 Petroleum refineries	0	1	0	0
363 Cement	0	0	0	0
369 Other non-metallic min. prod.	2	17	3.2	3.5
371 Iron and steel	0	15	0	3.1
372 Non-ferrous metal basic pro.	1	1	1.6	0.2
Subtotal	**3**	**51**	**4.8**	**10.2**
Somewhat Polluting Industries				
311-312 Food manufacturing	12	34	19.4	7
313 Textiles	0	3	0	0.6
321 Leather and leather products	2	18	3.2	3.7
323 Printing and publishing	0	7	0	1.4
342 Other chemical products	4	24	6.5	5
352 Fabricated metal products	2	11	3.2	2.3
381 Electrical machinery	3	26	4.8	5.4
384 Furniture and fixture of metal	2	38	3.2	7.9
Subtotal	**25**	**161**	**40.3**	**33.3**
Less Polluting Industries				
314 Tobacco	0	0	0	0
322 Apparel except footwear	9	69	14.5	14.3
324 Footwear except rubber	2	7	3.2	1.4
331 Wood and cork products	4	12	6.5	2.5
332 Furniture and fixture exc.metal	5	9	8.1	1.9
354 Products of coal and petroleum	0	1	0	0.2
355 Rubber products	2	10	3.2	2.1
356 Plastic products, n.e.c.	0	18	0	3.7
361 Pottery and china	0	2	0	0.4
362 Glass and glass products	0	2	0	0.4
382-383 Machinery exc. electrical	5	107	8.1	22.1
385-386 Professional and scientific equipment	1	6	1.6	1.2
390 Other manufact. machinery	6	29	9.7	6
Subtotal	**34**	**272**	**54.9**	**56.2**
Total of All Manufacturing	**62**	**484**	**100**	**100**

5.1.4 Location within industrial estates

Approximately 65 per cent of the firms in Cavite are located inside industrial estates. Most of these are firms in the wearing apparel (PSIC 321), fabricated metal products (PSIC 381)) and plastic products (PSIC 352) industries. This reflects the overall composition of the industrial sector. The firms are mostly SMEs, although there are some large firms in terms of capitalization.

5.1.5 Compliance with EIA requirements

The use of EIAs to assess the potential impact of industrial development has not been widespread, as far as can be judged from the compliance rate in Cavite. The number of ECCs issued has been far below the number of firms that have located in Cavite since the late 1980s. The number of ECCs issued in Cavite climbed to 128 in 1994 and to 263 in 1995. ECCs issued were not limited to industrial projects, but included a considerable number of small mining projects, feed mills, piggeries and housing projects.

While by law an ECC must be secured by an industrial firm prior to operation, many companies are operating without one. This is indicated by, among other sources, interviews with officials of industrial estates. In the Cavite Economic Zone, for example, only 30 per cent of the firms have been issued ECCs. According to an official at the Zone, firms can secure an ECC without fully complying with the requirements by negotiating with the DENR. At the South Coast Industrial Estate, 10 out of 11 firms already operating do not have ECCs.

5.1.6 Compliance with pollution control regulations

Firms which need to install air emission control and wastewater treatment plants to meet the standards apply for an Authority to Construct (AC) and a Permit to Operate (PO) these facilities. There are separate permits for air and water treatment facilities.

Review of the DENR files for firms with permits to operate wastewater treatment plants shows that for 1996 only 96 out of 267 firms that need them have been given permits. Those with permits include 29 rice mills and 12 hardware firms. This illustrates the major flaw in the system that the firms that really need permits are not fully covered (such as industrial firms) while scarce administrative resources are expended attempting to enlarge the coverage of semi- or non-industrial operations.

A similar situation exists for air pollution control. Twenty-nine permits to operate air emission control facilities have been issued for rice mills and 12 more have been issued for hardware firms. A total of 105 companies need to install air emission control facilities, but only 13 firms have been issued permits to operate air emission control facilities in 1996. In short, many firms which should obtain such permits do not bother to comply.

Only two (Cavite Economic Zone and Gateway Business Park) of the 18 industrial estates have centralized wastewater treatment facilities. All industrial establishments in these

estates are required to connect to the facility. All other industrial estates require locators to provide their own wastewater treatment plants. In the case of the South Coast Industrial Estate in Carmona, for example, eleven companies are operating but none of them have installed a wastewater treatment plant. In this case, wastewater is discharged directly to the drainage system, which then flows out to the nearest river.

Although some firms have installed wastewater treatment facilities and have secured permits for them, there is no guarantee that these facilities are actually operated. DENR does no regular monitoring of such facilities. The usual practice, according to DENR, is to monitor the facilities of the big firms. However, random interviews with several big firms suggested otherwise. The wastewater treatment of one big firm producing dairy products has reportedly not been inspected by DENR in over one year. Even if firms operate wastewater treatment and air emission control facilities, there is no assurance that water and air quality standards are being met, as quarterly reports of some firms show.

It is not clear what the response of DENR has been in these instances. By law, industrial discharge monitoring is the responsibility of the source of the discharge while DENR's function is to check on the accuracy of the reported discharges. Sources are required to submit quarterly reports. However, compliance is limited mainly because the existing penalties for non-submission of such reports are low, and only a handful of firms have actually been penalized. In addition, there are not enough laboratories to send samples and the cost of analysis is high. The current penalty for not submitting required self-monitoring reports on effluent levels from industry sources is a mere revocation of accreditation for the firm's designated Pollution Control Officer (PCO). The value, however, of such accreditation to the firm itself is low since the accreditation is issued to the individual. In effect, the responsibility for pollution monitoring lies with an individual (who is a minor officer of the firm) instead of the firm itself or its senior management. If the Pollution Control Officer loses accreditation, the firm simply designates a replacement.

During the period from 1993 to 1996, only seven firms have been issued cease and desist orders (CDO) by DENR for violating pollution control laws. In 1993 and 1994 four firms were issued CDOs because they violated effluent standards. In 1995, two firms were issued CDOs, not because of their non-compliance with standards but because they were caught operating without the required permits. The latest firm issued a CDO was the Network Metal Industries, in March 1996. Although the firm was not yet operating, effluent and air emissions during the construction phase were found to exceed the standards, prompting the DENR Regional Office to issue a closure order.

Throughout Cavite, only one firm, Cathay Farms, was required to pay a fine. It was found to be exceeding standards in 1994 and was immediately issued a CDO with a fine of P5,000 per day per violation. To date, the accumulated fine is estimated at P1.2 million. According to DENR, Cathay Farms is presently not operating and has declared bankruptcy.

In general, the regulatory system lacks teeth because its sanctions are not credible and fail to serve as an effective deterrent. Fines are low compared with the cost of compliance

(e.g., the cost of wastewater treatment), so it is financially preferable for firms to pay fines rather than to comply with standards. Since being set in 1978 (through PD 984), the maximum fine of P5,000 per day has not been adjusted, even for inflation. Because current fines are not a deterrent, DENR has mainly resorted to CDOs to force compliance. It then has to devote its limited logistics to monitoring discharges (to support sanctions) rather than to monitoring ambient conditions, which is its main task. CDOs, supposedly a tool of last resort, have unfortunately become the main tool for forcing compliance, with undesirable consequences. They test the credibility of the DENR, and firms are ever ready to use the arguments of job losses and social unrest against closure.

5.2 The Cebu Case Study

For this case study, Metro Cebu is defined as the area that covers the cities of Cebu, Mandaue and Lapu-lapu and the municipalities of Talisay and Consolacion. The area is located in the central part of the province. Lapu-Lapu city is situated on Mactan Island (connected by bridge to the mainland) while the rest of the cities and towns are located on the mainland.

Metro Cebu had a population of about 1.1 million in 1995. Congestion will be a worsening problem as the population increases in the narrow coastal plain. There is also a growing water and air pollution problem in the region, which is partly caused by industrial activity. Together, these factors are a significant risk to the health and welfare of the inhabitants and the state of the environment in the area.

5.2.1 Industrial growth

Prior to 1981, there were only 34 registered firms in Metro Cebu. Of these, 30 were registered with the BOI and located around Metro Cebu, and only four were located in the Mactan Export Processing Zone (MEPZ), Table 10. Most of them were SMEs. Furniture and fixtures and food processing dominated. In recent years, the manufacturing sector of Metro Cebu has grown rapidly as a result of many factors, the most important of which is the more conducive investment, trade and overall industrial policy climate in the region. Growth is concentrated mostly in the cities and the MEPZ, and only a few firms are located in the smaller towns. SMEs continue to be the main type of enterprise. Industrial growth was faster in the eighties than in the nineties, but overall growth was very high on average.

In 1996, there were 317 firms registered with BOI and 90 in the MEPZ. Of the firms registered with BOI, 65 per cent have registered since 1986, and of the MEPZ firms, 92 per cent have registered since that year. Of the number of firms registered with BOI, only 233 firms are operating. The remainder are either being established (about 10 per cent), never became operational or have closed down.

Table 10: Number of Industrial Establishments Added in MEPZ, Cebu

Period	Number of Companies
1979 - 1980	4
1981 - 1985	2
1986 - 1990	26
1991 - 1996	58
Total	90

Source: MEPZ, Cebu

After the MEPZ commenced operations in 1979, the number of firms initially grew very slowly. The second half of the decade saw a rapid increase. Several reasons have been put forward to explain this, and some of them are identical to those that have stimulated overall industrial growth. Apart from site specific factors such as improved infrastructure and services support, advantageous land rent and other incentives, and safety and security in the zone, they include general factors such as the cheap and English-speaking labour force, and the better political climate in Metro Cebu and the whole country after the political upheaval of 1986.

5.2.2 Size and branch classification of industries

Of the 233 BOI firms located in Metro Cebu (Table 11), furniture and fixtures and food products constitute the largest industry groups. The share of furniture and fixtures manufacturing reached a peak in the early eighties and subsequently declined. The share of food manufacturing was stable in the late seventies and early eighties, declined in the late eighties and then recovered its original share in the early nineties. Other important industries are non-metallic minerals, other wood products industries and wearing apparel.

Of the 90 firms in the MEPZ, the largest industry groups are the manufacturers of wearing apparel, electrical machinery, and professional and scientific equipment. Other significant industry groups are the manufacturing of food products, leather products, wood and wood products, paper and paper products, printing, industrial chemical products, plastic products, iron and steel basic industries, non-ferrous metal basic industries, fabricated metal products, and machinery except electrical and transport equipment. Like the BOI projects, many of the MEPZ firms are classified as falling under more than one industrial category. Data on firm size were not available.

5.2.3 Pollution potential of industries

To determine the pollution potential of manufacturing establishments in Metro Cebu, the BOI projects and MEPZ firms discussed in the study are matched with the pollution potential classification of industries. The results are presented in Table 11. BOI and MEPZ firms show a very similar distribution among pollution potential categories with firms found predominantly in the low-pollution potential category.

Table 11: Metro Cebu - Industrial Enterprises by Pollution Potential Category

PSIC / Pollution Classification	Number of Firms in 1995-1996	
	BOI	MEPZ
More Polluting Industries		
341 Paper and paper	3	1
351 Industrial chemicals	3	2
353 Petroleum refineries	0	0
369 Other non-metallic mineral products	14	0
371 Iron and steel	1	4
372 Non-ferrous metals	0	2
Somewhat Polluting Industries		
311-312 Food products	39	2
313 Beverages	0	0
321 Textiles	7	0
323 Leather and leather products	0	3
342 Printing and publishing	0	1
352 Other chemical products	6	0
381 Fabricated metal products	11	4
383 Electrical machinery	0	10
384 Transportation equipment	3	3
Less Polluting Industries		
314 Tobacco	0	0
322 Apparel except footwear	6	19
324 Footwear except rubber	1	0
331 Wood and cork products	7	1
332 Furniture and fixtures except metal	69	0
354 Products of coal and petroleum	0	0
355 Rubber products	0	0
356 Plastic products	3	3
361 Pottery and china	1	0
362 Glass and glass products	0	0
382-383 Machinery except electrical	3	7
385-386 Professional and scientific equipment	1	9
390 Other manufacturing machinery	55	19
Subtotal	**146**	**58**

In the MEPZ, the wearing apparel industry is important, whereas among the BOI industries it is the wood products industry. The food, beverages and tobacco industry dominate the category of industries with medium-level pollution potential, while *the* manufacture of nonmetallic minerals products is potentially the heaviest polluter in Cebu.

The MEPZ was set up in 1979 as one site, but now comprises two sites, MEPZ I and MEPZ II. The former has a total land area of 119.4 hectares while the latter has 62 hectares. MEPZ II is intended primarily for light and medium industries. There were 90 operating firms in MEPZ I in 1996, of which 88 were manufacturing firms. There were only 2 firms in MEPZ II, both in manufacturing.

5.2.4 Location within industrial estates

Apart from the MEPZ, there are three other industrial estates, each intended for a specific group of industrial activities:

- Cebu Light Industrial Park Ecozone (63 ha): light to medium, non-polluting, primarily export-oriented manufacturing;
- New Cebu Township (36.6 ha): light industry, precision assembly, warehousing and storage;
- West Cebu Industrial Park Special Zone (245 ha): export processing, shipbuilding, heavy equipment manufacturing and complementary industrial activities.

No other details are available, and the categories do not match the pollution potential categories used above. However, the Cebu Light Industrial Park Ecozone evidently intends to minimize its environmental impact. The West Cebu Industrial Park Special Zone would potentially have the strongest impact.

5.2.5 Compliance with EIA and ECC requirements

Before a firm can build its plant and operate it must acquire three main licenses from the DENR: the ECC upon satisfactory completion of an EIA, followed by the AC and the PO. As indicated before, the AC is required for the construction of pollution-related facilities such as water treatment facilities or air pollution control devices, whereas the PO is required for the actual operation of the facilities. Once the firm operates it must meet the air and water quality standards established by the DENR. If the standards are violated, a firm may be required to upgrade its environmental facilities, or worse, may be subject to financial penalties or a CDO. When a firm ceases to operate, the DENR requires that it clean up and restore the environmental conditions at the plant site to acceptable levels.

All firms have to obtain an ECC before they can operate. In reality, many firms in Metro Cebu have been operating for years without one. Of the total number of DENR-monitored manufacturing firms for which data are available, only 22 per cent of BOI firms and 73 per cent of MEPZ firms have received ECCs. Overall, 67 per cent of firms have ECCs.

The DENR has penalized firms which were caught disregarding the EIA regulation and operating without an ECC. In 1995, 15 manufacturing firms were fined for ECC violation. Most of the firms are located in Mandaue City and Lapu-Lapu City. This number, however, is insignificant in relation to the total number of manufacturing firms in Metro Cebu without ECCs.

More than half of the firms given fines have paid, implying that the DENR can actually collect the fines. A closer look at the records also showed that many of the firms were made to pay the maximum penalty of P50,000. Some firms, however, were able to negotiate a reduction of their fines to as low as a fifth of the maximum amount.

5.2.6 Compliance with pollution control regulations

In Metro Cebu, all manufacturing firms whose wastewater can potentially exceed standards are required to build a wastewater treatment facility. Only about 4 percent of BOI and MEPZ firms have such facilities. Most of these belong to the food processing, non-metallic mineral products, beverages, industrial chemicals, and mixed manufacturing sub-sectors.

The low number of firms within the MEPZ that have wastewater treatment facilities highlights a potential problem in the environmental management of the export zone. The MEPZ at present has neither a common wastewater treatment facility for resident firms nor a zone pollution control office and specific unit to handle pollution-related problems. It has only sewage lines that serve as wastewater conduits from the firm sites to the sea. As few firms in the zone have treatment facilities, a large percentage of the wastewater that passes through the sewage lines is untreated.

As in the case of wastewater, a firm causing air pollution is required to install an air pollution control device. In Metro Cebu, approximately 37 per cent of the BOI and MEPZ firms have installed these devices. While they are mainly found in plants manufacturing furniture, food and mixed products, some have been installed in other industry groups as well.

In the case of waste handling and disposal, the study found that untreated waste is usually dumped in drainage systems which eventually lead to the sea. Hazardous and toxic wastes are usually stored in containers and placed in safehouses, although indiscriminate disposal of such wastes in the waterways is occasionally reported.

With regard to post-operation regulations, the study discovered that environmental cleanups after firm closure have rarely taken place in Metro Cebu. Among the reasons put forward to explain this is the weak implementation of the relevant regulations by DENR. It is clear, however, that this part of pollution control is significant because the dynamic and competitive nature of the Metro Cebu economy will result in the closure of inefficient firms, and these will include some which are pollution intensive.

The DENR has been imposing penalties on violators. In 1995, 73 manufacturing firms were fined for not complying with administrative regulations, including the AC and PO. Most of these were located in the three cities, notably Mandaue City. These figures confirm the finding in the previous section that a significant number of manufacturing firms are not complying with the pre-operation environmental regulations. The study indicates that only a few firms in Metro Cebu have received a CDO for violating air and water standards, and none of these is located in MEPZ.

Also, the CDOs were effective only for a short time and sometimes did not lead to the closure of violating firms at all. In general, the use of the CDO as a deterrent has been weakened by the fact that firms can easily contest it, delaying its imposition.

The implementation of regulations is entrusted to the Environmental Quality Division (EQD) of the DENR. Unlike the Environmental Impact Assessment Division (EIAD), it is a regular division which has its own separate budget. But it is also faced with severe financial and human resource constraints, given the large and increasing number of industrial firms. It is estimated that present resources of the division need to be at least doubled for it to meet current demand for its services. As in other regions, industrial pollution monitoring is done in collaboration with PCOs hired by the firms but accredited by the DENR. Only one-third of the BOI and MEPZ firms in the area, however, have certified PCOs. Being dependent on their companies, the PCOs have raised questions about the validity of monitoring reports which lack water sampling carried out with proper sampling protocols, a result of inadequate laboratory facilities. Recent efforts to improve environmental monitoring, integrating the monitoring efforts of some government agencies and pooling laboratory facilities, are only at the experimental or discussion stage.

Finally, some other environment-related problems should be mentioned which have been identified by the Metro Cebu case study:

- With better environmental and pollution data (including cross-sectional and time series), such as on actual pollution intensities and violations of air and water quality standards, the case study could have been more specific and better pinpointed problems;
- The implementation of regulations concerning industrial pollution control in Metro Cebuis concentrated at the regional government level, and the provincial and municipal levels are not involved. Some environmental functions have, however, been devolved to the local level and environmental offices have been established in local governments. This offers a major opportunity to make industrial pollution control more effective.
- Implementation of RA 6969, the law governing hazardous and toxic wastes, has been slow to be implemented in Metro Cebu. So far, activities related to this law are mostly preliminary in nature (e.g., DENR staff briefings, preparation of an inventory of chemicals used by firms, etc.).
- The response of the authorities to industrial pollution accidents (e.g., large-scale wastewater and oil spills in marine waters) has generally been reactive instead of proactive. This is made worse by the confusion among the different government agencies as to who should take charge in the event of industrial pollution accidents.
- Questions related to the legal foundation of the program must be addressed to make effective implementation possible.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Industrial policy has affected the rate of growth, the sectoral composition and the location of industry in the Philippines. While recognizing that a host of other factors (fiscal, political, etc.) also influence the nature of manufacturing and the growth of the economy, there is no evidence that industrial policy has thus far played any significant role in determining the polluting character or general environmental impact of Philippine industry.

From the mid-1970's to 1996 the Philippine manufacturing sector showed low rates of growth, roughly comparable to those of overall economic growth and to growth rates in the industrial sector as a whole. Compared to the services sector, the manufacturing sector has been sluggish, and within the industrial sector its growth in most years was outstripped by other industrial activities. Also, the growth rates in Philippine manufacturing have been consistently lower in comparison to those of other ASEAN countries. In spite of the sluggish overall growth of the manufacturing sector, several factors suggest that the pollution potential of the manufacturing sector increased disproportionately during this period of over twenty years. The absolute level of manufacturing more than doubled during the period and the sectors with the greatest pollution potential grew the most. Also, as a direct result of industrial policy, manufacturing growth was concentrated in a few regions outside the national capital region. While this reduced the environmental pressure from industry in the Metro Manila area, it clearly accelerated the potential in other areas where less attention was paid to environmental impacts because of their perceived higher absorptive capacity.

Moreover, the distribution of pollution potential within the manufacturing sector remained relatively unchanged, whereas it improved over time in two other ASEAN countries (Singapore and Thailand) for which there are comparable data. In these countries the percentage of industry in the less polluting categories increased significantly over the twenty-year period. By contrast, the very limited shift of proportions among categories of industries in the Philippine manufacturing sector reflects the lack of a dynamic industrial policy.

A strong environmental regulatory program is essential to complement an environmentally concerned industrial policy in altering the overall pollution potential of industry. Unfortunately, the regulatory program in the Philippines has failed to respond to the continued presence of a number of manufacturing firms with high pollution potential and to the intensification of industrial activity in the geographic regions where industrial policy has focused recent growth. As shown in the two case studies summarized in this document, permits are not tailored to plant-specific discharges and environmental monitoring of facilities and enforcement are inadequate. Few firms in Cavite and Metro Cebu comply fully with environmental regulations and few have actually been penalized for their non-compliance.

There is unfortunately no comprehensive national plan integrating the many interested parties and resources needed to achieve the reduction of pollution through cleaner production.

6.2 Recommendations for Minimizing the Environmental Impact of Manufacturing

The environmental costs of the industrial sector in the Philippines so far remain moderate, but they are growing steadily. A very large proportion of the Philippine manufacturing sector consists of small and medium enterprises (SMEs), accounting for a major portion of industrial pollution, and most of these lack much of the skills and the resources which would enable them to produce more efficiently and minimize their impact on the environment. The SMEs are difficult to reach and often do not respond to either regulations or assistance programmes. Industrial and environmental policies should therefore pay special attention to this sector, and government agencies directly associated with the SMEs (such as the Bureau of Small and Medium Scale Enterprises under the Department of Trade and Industry) and affected local government units should work more closely with each other and with the DENR to address this growing problem.

To change the composition of the manufacturing sector progressively toward a less polluting mix and improve the efficiency and quality of processes used, there is a need for a clear national industrial policy which incorporates environmental objectives on a par with the more conventional economic objectives of increased employment, value added, import substitution and export promotion. It is regrettably often overlooked that the "environmental" objectives of sustainability of natural resources and protection of public health are also economic objectives, equally important to the long-term economic viability and competitiveness of a nation.

A step in this direction is the recently formulated 1999-2004 Medium Term Philippine Development Plan, which has been approved by the Board of the National Economic Development Authority in principle. Among the goals for the industrial sector in the Plan during this six-year period is the establishment and development of globally competitive industries consistent with sustainable development. To achieve this goal, industries will be encouraged to adopt practices the support sustainable development and to comply with environmental standards and regulations.

While the Plan is a step in the right direction, its basic policy thrust is to promote exporting industries and those with large employment and high value added and integrate the country into regional free-trade agreements. This collection of specific objectives falls short of a comprehensive industrial policy, however, and in practice has not addressed environment as one of the criteria to guide industrial growth. Other governments in the region, such as Taiwan, Korea and Singapore, have effectively addressed environmental objectives in their industrial policies, and their economic and trade growth have benefited from the resulting policies and national programs.

This document suggests that to minimize the impact of industrial development on the Philippine environment action is urgently needed in a number of specific areas. In order to maximise the effectiveness of these and the many related efforts, however, they must be viewed and co-ordinated within a national vision and plan for the achievement of cleaner production. Otherwise there will likely be both duplication of effort and critical gaps, and a failure to achieve the critical goal of a significant reduction in pollution by industry.

The key components of a comprehensive national program should include the following:

6.2.1 Information

An important task of the government will be to achieve greater transparency in the actions of industry as they impact the environment. They must improve access to information on environmental conditions, the ecological and health risks from industrial growth, the impact that they have on the economic future of a community or the nation, and the measures and their associated costs that can be taken by the firms, government, the business community and society as a whole to minimize those effects. This will require a strengthening of institutional capacity at the national and local government levels. Public availability of information would serve a number of functions, including educating the general public, making the formal monitoring and enforcement schemes more effective, and indicating compliance with international environmental agreements.

Elements of a comprehensive environmental management program might include:

- information in the media, community fora and public education on the risk to human health from industrial pollution;
- public information for industry on cleaner production both its environmental and financial advantages;
- required public reporting on the release of toxic and hazardous chemicals by firms; and public rating of the environmental performance of firms, both positive and negative.

While some companies may try to present data that show them to be performing better than they are or obscure the discharge of dangerous wastes, as the public and local governments become more sophisticated in understanding pollution issues they will be better able to determine the correctness of data reported by industry.

6.2.2 Standards and monitoring

The Philippine system of industrial effluent standards is unfortunately relatively insensitive to actual ambient conditions and to different cost structures due to their use of concentration-based standards. These allow polluters to meet standards by dilution and encourage the over-extraction of ground water in heavily industrialized areas. Air quality standards are also concentration-based and there is a duplication of emission and ambient standards. This sometimes imposes unnecessary costs when industries are penalized for exceeding emission standards which are well within ambient standards. The improvement and rationalization of these standards should therefore be undertaken to allow firms more flexibility in reaching more meaningful targets.

DENR's ability to monitor air and water pollution needs to be improved in terms of trained manpower and sampling and testing capability. The private sector should be more actively involved to reduce the pressure on the DENR's limited monitoring capacity, and private sector accredited laboratory capacity should be expanded.

Monitoring of industry should become a community concern, beyond the periodic formal visit of government officials to a facility. As those who will suffer the results of poorly controlled production and the resulting pollution, the members of the surrounding community have the most incentive to assure compliance and promote cleaner production. They need the information and training, however, to recognize industrial pollutants and to understand the extent to which they threaten the health and economic livelihood of the community. Broad-based public information programs and local governments willing to listen and act on community inputs will multiply the monitoring and enforcement capability of DENR many fold.

A possible application of this approach would be the development of a cadre of citizen monitors who receive basic training in pollution detection and cleaner production techniques, have access to all polluting facilities under the authority of the local government, and volunteer their time to randomly check on suspected polluters and report back to the official enforcement authority.

Elements of a comprehensive environmental management program might include:

- conversion of concentration-based standards to mass-based standards related to ambient standards;
- more flexible choices for firms in achieving pollutant reduction targets; establishing standards for government certified private sector compliance auditors;
- requirements for firms to retain certified auditors and report findings regularly;
- citizen monitoring programs to assist local government to detect non-compliance;
- community information programs on recognizing pollution and its threat to health;
- training for local government staff to recognize and understand industrial pollution;
- investment incentives and quality controls for private laboratory testing facilities;
- and training of DENR regional staff in sampling techniques and other monitoring skills.
-

6.2.3 Economic instruments

Efforts are already being made to complement regulations with economic instruments, including market-based instruments (e.g., increase in forest charges, increased aquiculture lease fees, and the pilot Laguna Lake water pollution charges program), but except for the revised forest charges the programs are too new or too limited for there to be any useful analysis of their impact. There is currently no system in the Philippines for pricing water on the basis of its scarcity and competing uses.

Higher input prices can ultimately help a firm to reduce its production costs by forcing it to find for more efficient ways of using resources, such as water. Fuel pricing policy could be changed to take into account of the adverse environmental impacts of high-sulphur fuels.

Pollution charges basically aim at inducing "behavioural" responses, forcing firms to internalize environmental costs. But they can also have a financial objective of generating funds to support environmental management programs of the government. Unfortunately there is no legal provision under the present fiscal system of the Philippines for earmarking taxes or revenues for special purposes. Efforts are being made to revise the Environment Code and to introduce provisions for earmarking of pollution charges.

Aside from the lack of legal provisions to earmark pollution charges for environmental programs, there is also a lack of understanding and capability among local governments to implement a pollution tax instrument. An industrial pollution charge scheme could be set up as a national policy by issuing guidelines and implementing rules, but the implementation (including the determination of the amount of the charge based on environmental conditions) is a location specific problem. Enforcement of a charge system depends much on the support of the local governments and is difficult to accomplish if industry is not largely cooperative.

The best way to get industry to support the system is if the revenues from the fees collected are cycled back for the use of industry, perhaps as a fund to finance environmental projects. It should be noted that economic instruments are not a replacement for traditional regulation, nor is the use of such instruments necessarily less demanding in terms of monitoring and coordination. Elements of a comprehensive environmental management program might include:

- public fora to promote the collaboration of business and government in selecting the most effective economic instruments;
- financial and operational analysis of the feasibility of selected economic instruments; training of local government to administer pilot programs of economic instruments;
- legislative changes to earmark revenue from charge systems for environmental uses;
- establishment of national and regional funds using charge revenues for loans to industry; a system of environmentally-based taxes on selected inputs to production;
- a national charge system for the use of ground or surface water based on scarcity and competing uses; and
- a pilot program of tradeable discharge permits within a watershed or airshed

6.2.4 Integrating environmental concerns in economic and spatial planning

Previously used solely on a project or site basis, the EIA in the Philippines can now be implemented in a "programmatic mode." An area-based EIA is made for a regional investment center or industrial estate and the planned facilities are evaluated as a whole instead of on their individual component projects. The use of such programmatic EIAs offers advantages for both industries and the DENR. For industry, securing environmental clearances are speeded up for firms locating inside industrial estates so long as they are within the parameters set out for the estate or area.

For DENR the programmatic EIAs reduce the review process required for individual facilities and, as they are based on analysis of the carrying capacity of the area, enable a more effective assessment of the impacts of industrial activities. The arrangement also enables the DENR to delegate environmental monitoring and control functions to the industrial estate operator.

Environmental management issues should be integrated into land use planning, which in turn should be linked to the programmatic EIAs. This would greatly simplify procedures. After local land use plans have been subjected to a programmatic EIA, individual projects would mainly need to demonstrate conformity with the approved land use.

The current programmatic EIA (DENR Department Order No. 94-11) has been a step in the right direction, but at this point in time its effectiveness needs to be reviewed by DENR. The scheme has not really been operational for a number of reasons, e.g. resolving issues such as the measurement of carrying capacity and area classification. The review could bring some resolution on outstanding issues and recommend measures, particularly concerning training for provincial and municipal levels of government that would improve implementation of the concept.

An alternate approach to the programmatic EIA could be to integrate the EIA process into municipal land use planning and develop incentives for local governments to secure environmental compliance for their land use plans. Municipal governments would prepare spatial environmental management plans based on their land use plans and subject these to EIA requirements. Local governments that pass the EIA review and obtain certification of the environmental soundness of their land use plans could be given incentives by DENR in the form of devolved authority to review project EIAs and recommend ECC issuance to DENR. Or they could receive devolved authority to issue discharge permits to industrial facilities, assuming that their environmental management plan takes into account pollutant carrying capacities of the receiving environment. This approach needs careful study because it would require significant strengthening of local government capacity for environmental management, perhaps even to the extent of using an environmental management systems approach involving policy, planning, review and commitment to continual improvement.

Elements of a comprehensive environmental management program might include:

- incorporating the economic costs of industrial pollution (e.g., human health, natural resources, trade competitiveness) in national and local economic planning;
- incentives for the use of the programmatic EIA and its enhancement to integrate economic and social concerns;
- training programs for industrial estate managers and regional and local planners on the use of the programmatic EIA and other spatial planning tools; and
- developing procedures, human skills and data resources to base both land use planning and individual ECCs on the carrying capacity of watersheds and airsheds.

6.2.5 Enforcement

The enforcement of environmental measures should to a large extent devolve to the local governments, and local capacities should be built up for this purpose. An important advantage would be the integration of discharge permits with location and business permits issued by the local governments. To prevent abuse, the DENR could review the situation at regular intervals. At a minimum, a local government should have an environmental management plan built into its land management system.

Formally incorporating environmental considerations in local land use plans and subsequent zoning ordinances could offer local governments the advantage of speeding up processing of environmental clearances (especially ECCs) for future industrial projects in their jurisdictions, and of making them more competitive in attracting new investment.

Enforcement should be a community concern. The most effective enforcement is the peer pressure placed on the polluter by an enlightened community, which throughout the developing world is much more effective than the existing formal system of fines. The most powerful tool is therefore the public disclosure of verifiable information on the discharges to the environment by industry.

Elements of a comprehensive environmental management program might include:

- capacity building for local governments in the interpretation and enforcement of environmental regulations to accelerate the devolution of authority;
- local governments developing environmental performance criteria for business permitting;
- training for local governments in cleaner production methods so that they can interpret the claimed efforts of industry to reduce pollution; and
- local governments establishing procedures for the collection and use of community-based information in an enforcement and public disclosure process.

6.3 Recommendations for UNIDO Services

6.3.1 Industrial policy advice

Industrial policy forms a key element of a national framework and program to promote cleaner production. Industrial policy can influence significantly both the mix of industries toward one with a lower pollution potential, and the production efficiency of those industries which are established. More efficient resource use by industrial enterprises will lead not only to cleaner production but also to increased competitiveness of the Philippine manufacturing sector in a global market. UNIDO is already involved in several projects intended to increase the international competitiveness of Philippine industries (e.g., total quality management training and promotion of international standards) and other projects have been proposed (e.g., technology management and technology transfer). A project to develop strategies for the crucially important SME sector is in the pipeline.

The present study indicates that recent trade reforms may favor some shift toward industries with a low-pollution potential. In order to achieve the full potential of policy measures it would be worthwhile to review the impact of the relevant measures and identify areas where further improvements are possible. Issues which may also be examined in this context are the needs of the Ministry of Trade and Industry to develop its capacity to design and implement such measures, and the relationship between policy makers and professional associations of industrialists. Industrial policy advice should also be linked with the assistance in capacity building. UNIDO can provide support in these areas as needed.

A continuous dialogue between the public and the private sectors and among the many concerned parties is essential to the development of realistic and implementable policy instruments. UNIDO would support the establishment of a national roundtable on industrial policy and environmental protection, focused on integrating environmental objectives into industrial policy and on creating an integrated and comprehensive national program to promote and achieve cleaner production.

6.3.2 Capacity building for industrial environmental management

UNIDO can provide assistance in all areas discussed in section 6.2, especially in order to ensure that these are implemented as part of a coherent program. It would be worthwhile investigating whether UNIDO's Area Wide Environmental Quality Management (AEQM) approach, which has been applied in India and Vietnam, could provide a useful service. Application of the AEQM approach would build capacity at the provincial level of government to make informed decisions about the real magnitude of industrial pollution in comparison with other sources of pollution, to determine realistic targets for pollution reduction based on benefits and costs, and to implement the more cost effective measures to reduce industrial pollution.

UNIDO can also help to promote industry awareness of the strategic importance of environmental management systems and of certification to the international standard ISO 14001 where appropriate for international competitiveness, and of course the important role of cleaner production in implementing an environmental management system.

6.3.3 Industrial self-regulation and private sector initiative

Industrial self-regulation and private sector initiatives can greatly enhance environmental protection efforts by national and local government. A public dialogue about regulatory objectives and ways of meeting these objectives, involving key government organizations (e.g., DTI, DENR and DOST) and the business community (e.g., industry associations and chambers of commerce), can help to bring about a broad consensus on sustainable development objectives and would help to ensure that these objectives are met. The dialogue at the national level should be complemented by a greater involvement of the business community in environmental issues at the provincial and local level.

Because of its neutral status, extensive international experience and access to relevant expertise, UNIDO can play an important role as a catalyst in this process. Specific issues addressed in the government-industry dialogue might include ensuring industry compliance with environmental standards and regulations and involving the industrial sector in the provision of environmental infrastructure and services.

6.3.4 Industrial estates

Firms benefit through industrial estates from land development, construction and common facilities such as power, security and communications. Industrial estates can also provide centralized environmental services such as sewage systems, effluent treatment,

pollution prevention assistance and energy conservation measures. Such infrastructure and services can be particularly valuable for SMEs, which often cannot afford them on an individual basis. In many countries, advisory services are attached to estates as well, and these can include service points for information on cleaner production and environmental management.

In the Philippines, industrial estates are proliferating and becoming increasingly important as locations for industry. The case studies show, however, that on most existing estates environmental infrastructure and services are not provided. UNIDO's wide experience in assistance to industrial estates can be used to:

- identify additional locations where estates would be an economical solution to the infrastructure needs of industries and where their developmental impact can be maximized and their environmental impact minimized;
- plan and establish estates, ensuring that environmental services and infrastructure are fully integrated in the design and operation of the estates;
- design and integrate infrastructure and services on existing estates;
- develop programs to promote industrial ecology within and among estates, including investment incentives for co-location of complimentary processes and design of processes to facilitate the cross use of wastes; and
- develop a national policy to regulate the number of industrial estates to correspond to the demand such that all are financially viable and can provide appropriate services and infrastructure for locating firms.

6.3.5 National Cleaner Production Center

While cleaner production has been encouraged by several international assistance projects, there is a need to build additional institutional capacity in this area. UNIDO proposes to expand the UNIDO/UNEP National Cleaner Production Centres Programme, currently active in fifteen countries, to include the Philippines. The program aims to create networks of institutions and individuals who promote cleaner production. Specifically, the national program for the Philippines would:

- carry out sectoral and cross-sectoral in-plant demonstrations;
- train a core group of national experts;
- establish information systems on cleaner production techniques and technologies;
- provide policy advice on integrating cleaner production in all aspects of industrial development; and
- identify if potential financing sources for capital-intensive cleaner production investments.

A National Cleaner Production Center would be the flagship program of UNIDO to promote cleaner production in the Philippines and would work cooperatively with the several local and donor efforts already under way to promote environmental management and cleaner

production. It is fortunate for the future of the Philippine people that many individuals and organizations are turning their attention to preventing industrial pollution. But the very proliferation of programs makes clear the need for comprehensive national policies and a national plan and framework to promote environmental management and cleaner production, within which the diverse programs can avoid duplication and achieve their combined potential.

Without a national vision, a plan and the strong backing of government and business, the many valuable efforts to promote environmental management and cleaner production will not gain their potential synergy and may thereby fail to achieve their critical common objective.

Bibliography

Abracosa, Ramon. 1996. "Industrial Policy and Environment in the Philippines, Case Study: Cavite Province." Draft Report submitted to UNIDO.

ASEAN 1994. Environmental Improvement Project, "A Review of Environmental Policies and Regulations of ASEAN Member Countries." USIAD, Philippines

de los Angeles, et. al. 1996. "ASEAN Sub-Program on Trade and Environment: Philippines." Final Report. Philippine Institute for Development Studies.

Industrial Environmental Management Project. 1994. *"Evaluation of Air, Water Quality and Waste Management Regulation in the Philippines.* " Department of Environment and Natural Resources.

IRS, Edgevale and REECS. 1996. The Philippine Environmental and Natural Resources Accounting Project (ENRAP Phase III). The Main Report, DENR and USAID, Philippines.

Israel, Danilo. 1996. *"Industrial Policy and Environment: The Case of the Manufacturing Sector in Metro Cebu, Philippines.* " Draft Report submitted to UNIDO.

Medalla, Erlinda M. 1996. "Philippine Industrial Policy." Draft Report submitted to UNIDO.

Medalla, Erlinda M. 1997. *"Trade and Industrial Policy Beyond 2000: An Assessment of the Philippine Economy.* " Revised Draft. Philippine Institute for Development studies.

Medalla, et. al. 1995. *Catching Up with Asia's Tigers. Vol. I & II.* Philippine Institute for Development Studies.

Montgomery Consulting Engineers., Inc., Dames & Moore, Faulkner Consultants, Inc. and Total Consultancy Services, Inc. The World Bank/Japan Grant Fund. 1992. *Industrial Efficiency and Pollution Control Program: Final Report and Appendices.* Report submitted to DENR.

Oposa, Antonio A. Jr. 1996. *"Environmental Policy and Legal Framework of the Philippines.* " Draft Report submitted to UNIDO.

Orbeta E.M. and A. L. Indabm 1996. *"Valuation of Direct Environmental Waste Disposal Services (Refinement* of *1988 estimate and 1992 update). " Volume* V Philippine Environment and Natural Resources Accounting Project (ENRAP Phase III): Refinement of Accounts. DENR and USAID, Philippines.

PIDS-ASEAN: *Results of the Workshop on Trade and Environment: Issues and Opportunities,* Manila, May 11-12, 1995.

Tan, Elizabeth. 1997. *"Economy-wide Effects of Uniform Five Percent Tariff Reforms using an I-O based Trade Model.* " Forthcoming PIDS Paper.

The World Bank, 1994. *"Economy-wide Policies and the Environment: Emerging Lessons from Experience. " Washington,* D.C.