

Israel, Danilo C.

Working Paper

Industrial Policy and the Environment: The Case of the Manufacturing Sector in Metro Cebu

PIDS Discussion Paper Series, No. 1997-02

Provided in Cooperation with:

Philippine Institute for Development Studies (PIDS), Philippines

Suggested Citation: Israel, Danilo C. (1997) : Industrial Policy and the Environment: The Case of the Manufacturing Sector in Metro Cebu, PIDS Discussion Paper Series, No. 1997-02, Philippine Institute for Development Studies (PIDS), Makati City

This Version is available at:

<https://hdl.handle.net/10419/187321>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

**Industrial Policy and the Environment:
The Case of the Manufacturing Sector
in Metro Cebu**

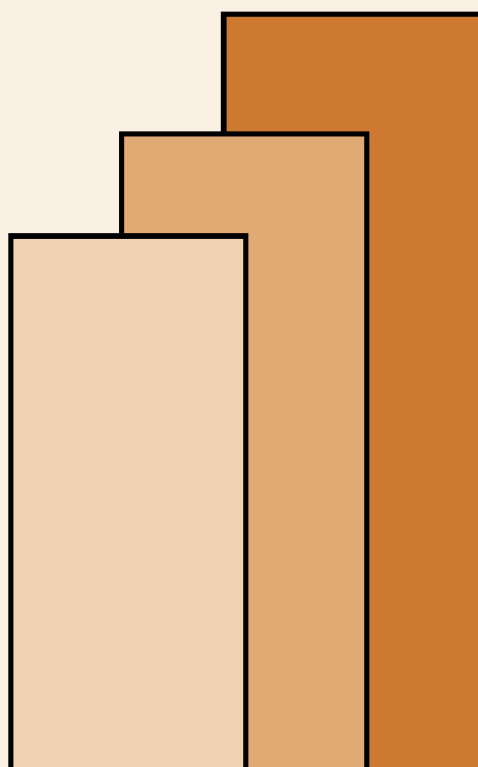
Danilo C. Israel

DISCUSSION PAPER SERIES NO. 97-02

The *PIDS Discussion Paper Series* constitutes studies that are preliminary and subject to further revisions. They are being circulated in a limited number of copies only for purposes of soliciting comments and suggestions for further refinements. The studies under the *Series* are unedited and unreviewed.

The views and opinions expressed are those of the author(s) and do not necessarily reflect those of the Institute.

Not for quotation without permission from the author(s) and the Institute.



January 1997

For comments, suggestions or further inquiries please contact:

The Research Information Staff, Philippine Institute for Development Studies
3rd Floor, NEDA sa Makati Building, 106 Amorsolo Street, Legaspi Village, Makati City, Philippines
Tel Nos: 8924059 and 8935705; Fax No: 8939589; E-mail: publications@pidsnet.pids.gov.ph
Or visit our website at <http://www.pids.gov.ph>

**INDUSTRIAL POLICY AND THE ENVIRONMENT: THE CASE OF THE
MANUFACTURING SECTOR IN METRO CEBU**

by

Danilo C. Israel

January 1997

Table of Contents

Chapter	Page
Abbreviations	
1. Introduction	1
2. Profile of Metro Cebu	2
2.1 Geographical Profile	2
2.2 Socioeconomic Profile	3
3. Profile of the Manufacturing Sector of Metro Cebu	3
3.1 Manufacturing Establishments Registered With the BOI	4
3.2 Manufacturing Establishments Located in the MEPZ	4
3.3 Scale of Operations of Manufacturing Establishments	5
4. Environmental and Pollution Profile	5
4.1 Environmental Profile	5
4.2 Pollution Profile	5
4.3 Pollution Potential of Manufacturing Establishments	6
5. Assessment of the Impacts of Industrial Policies on the Manufacturing Sector	7
5.1 Background of Foreign Trade Policies	7
5.2 Impacts of Foreign Trade Policies	8
5.3 Background of Investment Policies	8
5.4 Impacts of Investment Policies	9
5.5 Background of Regional Growth Policy	10
5.6 Impacts of Regional Growth Policy	10
5.7 Impacts on Industrial Structure	11
6. Assessment of the Impacts of Environmental Policy on the Manufacturing Sector	11
6.1 Background of the National Pollution Control Policy	11
6.2 The Environmental Impact Statement System	12
6.2.1 Management of the EIS System	12
6.2.2 Compliance to the ECC Requirement	12
6.2.3 Compliance to Other Requirements	13
6.3 The Water and Air Quality Standards	14
6.3.1 Management of the Standards	14

6.3.2	Monitoring of Environmental Quality	14
6.3.3	Compliance to WTF Requirements	15
6.3.4	Compliance to APCD Requirements	15
6.3.5	Waste Handling and Disposal	16
6.3.6	Violations of Water and Air Quality Standards	16
6.3.7	Compliance to Clean-up Regulation	17
7.	Land-Use and Water-Use Plans	17
7.1	Land-Use	17
7.2	Water-Use Plan	18
8.	Non-Regulatory Environmental Initiatives in the Manufacturing Sector	19
8.1	Foreign-Funded Projects on Industrial Pollution	19
8.2	Development of Waste-Reducing and Recycling Technologies	20
8.3	Establishment of Common Waste Treatment Plant	20
8.4	Development of Funds for Environmental Protection	20
9.	Conclusions and Recommendations	21
9.1	Conclusions	21
9.2	Recommendations	24
9.2.1	Regulation-Related Recommendations	24
9.2.2	Other Recommendations	26
	References	29
	Appendices	

Abbreviations

AC	Authority to Construct
APCD	Air Pollution Control Device
BP	Batas Pambansa
BOI	Board of Investments
CCCI	Cebu Chamber of Commerce and Industry
CDO	Cease and Desist Order
CEA	Cebu Electroplaters Association
CIADMP	Cebu Integrated Area Development Master Plan
CIPC	Cebu Investment Promotion Center
CVR	Central Visayas Region
DAO	Department Administrative Order
DENR	Department of Environment and Natural Resources
DOH	Department of Health
DOLE	Department of Labor and Employment
DTI	Department of Trade and Industry
ECC	Environmental Compliance Certificate
EIA	Environmental Impact Assessment
EIAD	Environmental Impact Assessment Division
EIS	Environmental Impact Statement
EO	Executive Order
EQD	Environmental Quality Division
GDP	Gross Domestic Product
GIS	Geographic Information System
IEMP	Industrial Environmental Management Project
MCWD	Metro Cebu Water District
MEPZ	Mactan Export Processing Zone
NCR	National Capital Region
NEDA	National Economic and Development Authority
NSCB	National Statistical Coordination Board
PEZA	Philippine Economic Zone Authority
PCO	Pollution Control Officer
PD	Presidential Decree
PGP-IPCC	Philippine German Project-Industrial Pollution Control Cebu
PIPOC	Process Integrated Pollution Control
PMA	Pollution Management Appraisal
PO	Permit to Operate
PSIC	Philippine Standard Industrial Classification
RA	Republic Act
SME	Small and Medium Enterprise
TRO	Temporary Restraining Order
TSP	Total Suspended Particulates
USAID	United States Agency for International Development
WTF	Wastewater Treatment Facility

INDUSTRIAL POLICY AND THE ENVIRONMENT: THE CASE OF THE MANUFACTURING SECTOR IN METRO CEBU¹

by

Danilo C. Israel²

1. Introduction

Traditionally, macroeconomic policy-making has been viewed as an indispensable tool in the quest for industrialization in the Philippines. Hence, over the years, it has been widely utilized by government. Medalla (1996) explains that, in particular, the industrial policies which have been implemented include those which are aimed at encouraging external trade, foreign and domestic investment and regional growth.

While industrialization remains an accepted notion of development, the government also recognizes that per se, it brings with it serious environmental problems which macroeconomic policies alone have failed to address. Foremost among these problems is industrial pollution. Thus, as a response, a national policy of pollution control to complement industrialization has been pursued. The objective is to bring about a more sustainable type of industrial development.

Currently, the policy of industrial pollution control is implemented mainly through the imposition of regulatory measures (e.g. Oposa 1996). For instance, before it operates, an industrial firm is required to go through the EIS system. Then, once in actual operation, it is made to adhere to certain environmental quality standards. Finally, once it closes shop, the firm is required to conduct environmental clean up.

The general objectives of this paper are to investigate the impacts of industrial policies on the manufacturing sector, on the one hand, and the interactions between the environmental policy of industrial pollution control and the same sector, on the other hand, using Metro Cebu as case study. The paper is intended to gather and analyze information useful for the identification of problems and the development of recommendations relevant to industrial pollution control in industrialized urban areas of the country.

This study starts out by profiling Metro Cebu, its manufacturing sector and the environmental and pollution problems facing the area. The first profile reviews the geographical and socioeconomic status of Metro Cebu. The second reviews the status and growth of its

¹This paper is part of the United Nations Industrial Development Organization (UNIDO) Project "Industrial Policy and the Environment in the Philippines" (NC/PHI/94/01D).

²Ph.D. in Natural Resource Economics and Research Fellow of the Philippine Institute for Development Studies (PIDS), NEDA sa Makati Bldg., 106 Amoroso St., Legaspi Village, Makati City, Metro Manila, Philippines.

manufacturing sector over the past two decades while the third discusses the environmental and pollution problems, especially those attributable to the manufacturing sector. The purpose of the profiles is to document the process of development in Metro Cebu and see how this contributes to environmental degradation and pollution.

The study proceeds by reviewing the different industrial policies implemented in the country over the years and analysing their impacts on the growth of the manufacturing sector. Here, shifts in policy directions are noted and their subsequent effects on parameters which have relevance to industrial pollution, i.e., exports, investment, regional dispersion, and industrial structure, are discussed. The goal is to trace not only the impacts of industrial policies on the growth of the manufacturing sector but also the likely implications of this growth on industrial pollution.

Once the relationship between the industrial policies and manufacturing sector are analyzed, the study continues by reviewing the national policy of industrial pollution control and evaluating its impacts on the manufacturing sector. Here, the administration of and the level of compliance to the different regulations implementing the pollution control policy and the problems related to administration and compliance are discussed. Also, to the extent possible, the effectiveness of the implementation of regulations in helping mitigate industrial pollution is analyzed. The purpose of this is to ascertain the level of enforcement and effectiveness of the pollution control policy in the manufacturing sector.

The remaining parts of the case study are a review of the land-use and water-use plans, a review of the non-regulatory environmental initiatives in the manufacturing sector, and the conclusions and recommendations. The first discusses land and water-use and evaluates their implications to the environment. The second reviews the current activities outside of the regulations and identifies environmental issues as well. Finally, the third provides a summary of findings of the paper, discusses the environmental problems identified in the previous sections and proposes recommendations related to the identified problems in particular and environmental management in general.

The study uses both primary and secondary data. Institutional secondary data sources include the national and/or regional offices of the DENR, NSCB, NEDA, BOI, MEPZ, DTI and CIPC and the project offices of the IEMP and PGP-IPCC. Published data and information were also had from various literature sources, the most notable of which is the CIADMP which provides an integrated development plan for Metro Cebu (see PCINKCL 1994a, 1994b, 1994c, 1994d, 1994e). To augment the information gathered from the abovesited sources, primary data from key government and industry informants were collected through personal interviews. The tables for the study are presented in *Appendix A* while the footnotes and list of key informants are given in *Appendices B and C*.

2. Profile of Metro Cebu

2.1 Geographical Profile

For this case study, Metro Cebu is defined as the area which covers the cities of Cebu, Mandaue and Lapu-lapu and the municipalities of Talisay and Consolacion (1). The Map of

Metro Cebu is shown in *Figure 1*. The area is located in the central part of the island province. Lapu-Lapu City is situated in Mactan Island while the rest of the cities and towns are located in the mainland. The Mactan bridge connects Mactan Island to the mainland.

2.2 Socioeconomic Profile

The population of Metro Cebu has been fast growing over the years, due to rapid growth in the resident population and in-migration. It was approximately three-fourths of a million in 1980 (*Table 1*). Then, it rose to about a million in 1990. By 2000, the population will be more than one and a quarter of a million and by 2030, it will reach 2 million. The three cities of Metro Cebu are classified as mainly urban areas. The two towns are mainly rural although portions of these areas are classified as urban.

The main dialect in Metro Cebu is Cebuano but a significant segment of the population can speak English, Tagalog and even Chinese (e.g. CIPC n.d.,b). The people are predominantly Roman Catholic and highly literate. Metro Cebu is the main educational center of the Visayas and Northern Mindanao regions. It also has the largest domestic and international seaport and airport south of Metro Manila.

There is little data on the economic status specific to Metro Cebu as defined in this study. However, the economic success of Cebu province and Metro Cebu, however defined, is widely narrated in the literature (see e.g. Villamor 1996; CRC 1995a, 1995b, 1995c, 1994, 1989, 1988; Clad 1988; PGP-IPCC, n.d.,b).

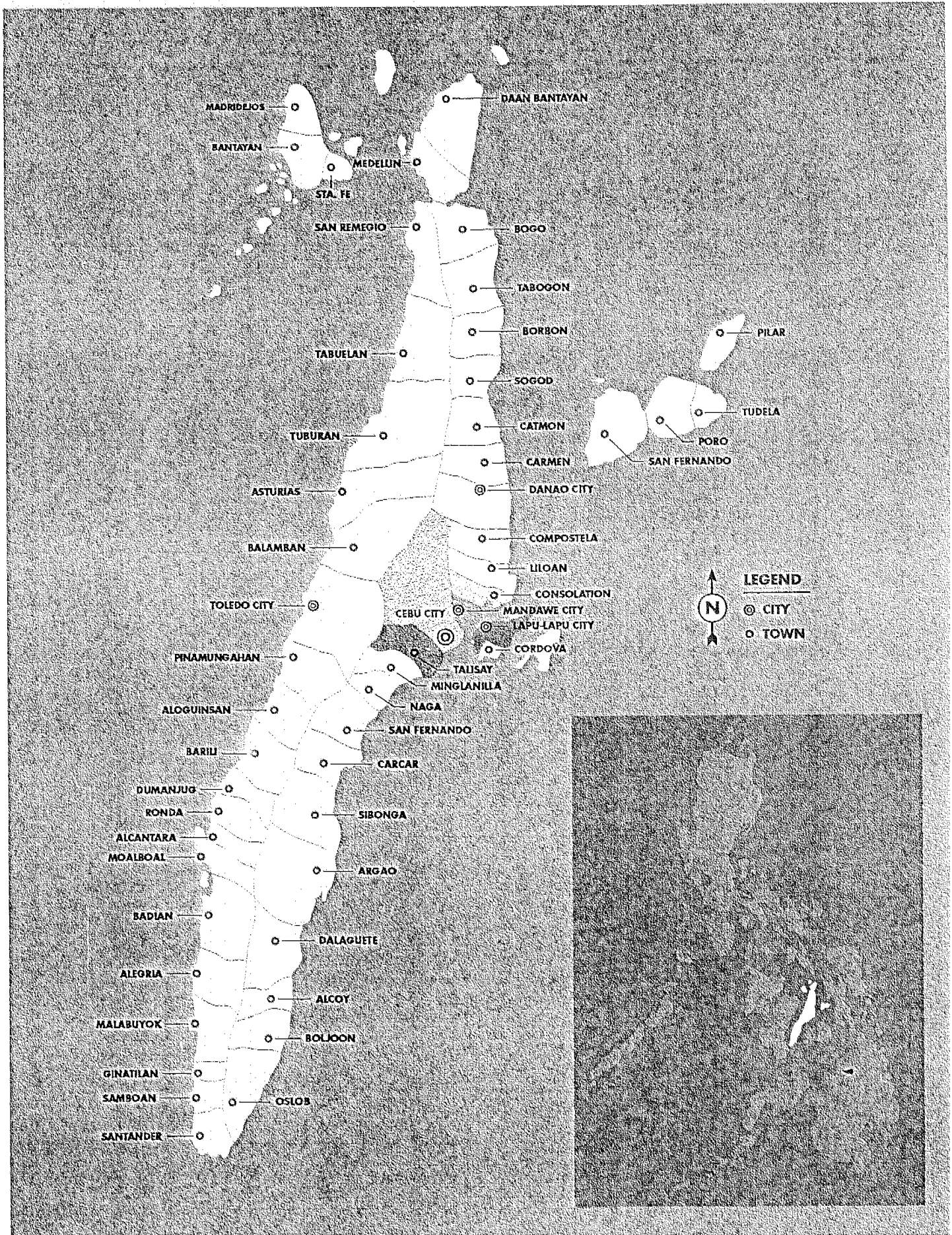
In regional terms, economic performance in the past 20 years has been encouraging for the CVR, where Cebu is located (*Table 2*). The GDP and the manufacturing sector rose in the second half of the seventies but declined in the first half of the eighties. In later years until 1995, the GDP and manufacturing sector registered healthy growth rates. Furthermore, the manufacturing sector has been the second most important subsector, contributing at least 20 percent to total output throughout the whole period.

The comparative data on the CVR vis a vis other regions provide further indication of how well it has performed economically (*Table 3*). In recent years, the CVR posted better annual growth rates in GDP, Inflation Rate and Average Compounded Growth Rate of Investment compared to the NCR and the Philippines as a whole. In 1994, it posted positive net exports while the two other areas experienced a trade deficit.

3. Profile of the Manufacturing Sector of Metro Cebu

Manufacturing establishments (2) in Metro Cebu can be classified into two groups: those located outside the industrial estate MEPZ and those located within. There are no available data on all manufacturing firms in Metro Cebu and so this study profiles only the BOI registered projects, representing the first group of firms, and the MEPZ firms, representing the second group (3). Incidentally, both the BOI projects and MEPZ firms are the direct results and beneficiaries of the industrial promotion policies of the government.

Figure 1: Map of Metro Cebu, Philippines



3.1 Manufacturing Establishments Registered With the BOI

From the period 1975 to 1996, a total of 318 manufacturing projects in Metro Cebu (4) have been registered with the BOI (*Table 4*). These projects fall under numerous industry groups, the biggest of which are furniture and fixtures manufacturing and food manufacturing. There is also a large number of projects falling under more than one industry group (5).

Over the same period, the number of BOI projects has grown phenomenally (*Table 5*). Growth was faster in the eighties than in the nineties but overall growth between sub-periods was very high on average. The share of furniture and fixtures manufacturing peaked in the early eighties and subsequently declined. On the other hand, 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.

As of 1996, 233, or 73 percent of the 318 BOI projects are operating (*Table 6*). About 10 percent are still in pre-operating stage while others have either ceased operating, not operated at all or no relevant data available. Furniture and fixtures manufacturing and food manufacturing are the biggest industry groups among the operating firms. The other bigger industries are the manufacturing of other non-metallic mineral products, wood and wood products, wearing apparel and other industries.

In terms of location, most of the projects are located in the three cities, notably Mandaue, while only a negligible number can be found in the towns (*Table 7*). It is interesting to note that most of the firms belonging to the largest industry groups, furniture and fixture manufacturing and food manufacturing, are also located in Mandaue City.

3.2 Manufacturing Establishments Located in the MEPZ

The present MEPZ is actually composed of two sites, MEPZ I and MEPZ II. The former has a total land area of 119.4 hectares while the latter has 62 hectares. There are 91 operating firms in MEPZ I as of this writing, of which 88 are manufacturing (6). On the other hand, there are 2 firms in MEPZ II and both are manufacturing.

The classifications of the manufacturing firms located in both MEPZ I and MEPZ II are summarized in *Table 8*. The largest industry groups are the manufacturing of wearing apparel, electrical machinery, and professional and scientific equipment. The other 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, machinery except electrical, transport equipment and others. Like the BOI projects, a good number of the MEPZ firms are classified as falling under more than one industrial category.

Since it commenced in 1979, the number of MEPZ firms have increased substantially (*Table 9*). The firms grew very slowly during the first half of the eighties and suddenly proliferated starting the second half. There were several reasons put forward regarding the abrupt development of the MEPZ in recent years. These include site specific factors such as improved infrastructure and services support, advantageous land rent and other incentives and safety and

security in the zone and more general factors such as the cheap and English-speaking labor force and better political climate that prevailed in Metro Cebu and the whole country after the political upheaval of 1986.

As of 1996, the MEPZ firms employed 28,324 workers (*Table 10*). The biggest employing industry groups are the manufacturing of wearing apparel, electrical machinery, and professional and scientific equipment. Firms under more than one industry also employ a lot of people.

3.3 Scale of Operations of Manufacturing Establishments

There are no adequate secondary data which can be used to classify the manufacturing establishments in terms of scale of operations. The CIADMP, however, had some classifications of industry groups in terms of scale (PCINKCL 1994c, p.2-5). Both furniture and fixtures manufacturing and food manufacturing, which are indicated above as the most important BOI industry groups, belong to the SME classification.

In the MEPZ, both SMEs and large-scale firms exist. The largest industry group in the MEPZ, manufacturing of wearing apparel, was classified as SME by the CIADMP (*Ibid*). Thus, even from these limited information, it can be concluded that a significant number of BOI and MEPZ firms are SMEs.

4. Environmental and Pollution Profile

4.1 Environmental Profile

The area of the province of Cebu that is classified as forest lands is about 32 percent of the total area. Currently, however, a great portion of the classified forest lands is already actually deforested, resulting in poor vegetative cover. At present, only about 18 percent of the total land area is free of erosion (UAP 1996).

In addition to deforestation, the soil of the province has been mismanaged over the years resulting to the present large unproductive croplands. Furthermore, Cebu is close to the typhoon belt and is at times affected by serious typhoons which devastate croplands.

As a major urban center, Metro Cebu is facing many of the environmental problems bugging similarly situated areas. The main problems which are partly caused by industrial activity are ground, surface and marine water pollution and air pollution.

4.2 Pollution Profile

Although there are no time-series data that can point to the worsening environmental pollution in Metro Cebu, cross-section data provide some indication of the seriousness of the problem. For ground water pollution, the situation is reflected in *Table 11*. In several places, the ground water already has high salinity and chloride content levels or has chemical quality which is characterized by dominant ions of alkaline earth and weak acids (PCINKCL 1994c, p.

7-5). The high salinity levels, in particular, already exceed established standards for drinking water.

The case of surface water pollution is no less serious. Water samples of major rivers in Metro Cebu contain heavy metals like lead, copper, cadmium, chromium, nickel, zinc and mercury and the toxic substance arsenic. In many cases, the concentration of heavy metals in rivers exceeds acceptable standards as well (Ibid).

There are indications likewise that the marine waters of Metro Cebu are as compromised as its ground and surface waters. A proof of this is the deteriorating beach waters in the town of Talisay. Data from numerous sampling stations (*Table 12*) indicate that in several instances, the coliform bacteria in said waters already far exceed permissible standards in many instances (Ibid).

It cannot be ascertained just how much of the ground, surface and marine water pollution is caused by industrial activity. It is clear, however, that industries add to the problem as some of them use deep well-extracted ground water in their operations and dump wastes into the river systems and coastal waters (see Ibid, pp. 10-21, 7-4).

In the case of air pollution, some data for air quality in Metro Cebu, measured in terms of TSP, are provided in *Table 13*. In several sampling stations in the area, air quality levels fail acceptable standards. Again, it is not known how much of the air pollution is caused by motor vehicles or industrial activity. It has been cited, however, that the latter is an important pollution source, specifically power plants and manufacturing firms (Ibid, p. 7-6).

4.3 Pollution Potential of Manufacturing Establishments

To ascertain what industry groups may have contributed substantially to pollution, the BOI projects and MEPZ firms profiled above are matched with the pollution potential classification of industries formulated by the EMB (1993). The outcomes are presented in *Table 14* and *Table 15*.

Of the BOI projects which are operating, 28 percent are classified as potentially highly pollutive, 10 percent are pollutive and 38 percent are non-pollutive. On the other hand, 4 percent are classified as extremely hazardous, 48 percent are hazardous and 25 percent are non-hazardous. Of two biggest industry groups, furniture manufacturing is considered non-pollutive but hazardous while food manufacturing is considered as highly pollutive but non-hazardous.

Of the MEPZ firms, 15 percent are classified as highly pollutive, 25 percent are pollutive and 38 percent are non-pollutive. Two percent are classified as extremely hazardous, 39 percent are hazardous and 38 percent are non-hazardous. Of the three biggest industry groups, wearing apparel manufacturing is considered non-pollutive and non-hazardous, electrical machinery manufacturing is pollutive and hazardous and professional equipment manufacturing is non-pollutive and non-hazardous.

From the above, it can be seen that a substantial number of BOI projects and MEPZ firms are pollutive and/or hazardous, including those belonging to the largest industry groups which

also have a large SME composition. Comparatively and as a group, BOI projects and MEPZ firms have relatively the same pollution intensity. It is also encouraging to note that some of the major industries in the MEPZ, i.e. wearing apparel and professional and scientific equipment manufacturing, are non-pollutive and non-hazardous.

To summarize, the following important observations can be made from the three profiles done above. First, Metro Cebu is highly populated and will continue to be so. Because of this, congestion will be a worsening problem as the population increases while the area is restricted to the narrow coastal plane. In spite of its physical limitations, however, Metro Cebu has been economically progressing at better rates compared to other regions.

Second, the profile of the manufacturing sector in Metro Cebu shows that there has been rapid growth of the sector in recent years. On the other hand, growth is concentrated only in the cities and just a minimal number of firms are located in the towns. The largest industry groups in the manufacturing sector are substantially comprised of SMEs.

Third, the environmental and pollution profile indicates that Metro Cebu is facing serious environmental problems including air and water pollution which may be partly caused by industrial activity. This positive relationship between pollution and industrial growth is suggested by the available past literature and by the fact that many of the manufacturing industry groups proliferating in the area, including those which are substantially composed of SMEs, are potentially pollutive and/or hazardous.

The above conclusions of the profiles have some environmental implications. The congestion of the population coupled with the concentration of industrial firms in the urban areas highlight the great risk that industrial pollution poses to human health and welfare. Also, the prevalence of pollutive and/or hazardous SMEs brings to the fore a major industrial pollution issue, how to conduct pollution management among firms whose maximum investment potential for pollution prevention may fall way short of minimum requirements.

5. Assessment of the Impacts of Industrial Policies on the Manufacturing Sector

5.1 Background of Foreign Trade Policies

An analysis of the long history of foreign trade policies of the Philippines highlights five distinct periods of major policy changes (Medalla 1996). The first of these periods was prior to 1980 when trade policies were generally restrictive and protectionist. This was then succeeded by the 1981-85 period when initial easing of the trade restrictions occurred. After that, the third and fourth periods, 1986-90 and 1991-95, followed when trade restrictions were further relaxed. Finally, the fifth period is the current time, 1996-2000, when the restrictions were reduced even further.

In terms of impacts, the easing of trade restrictions over the years is expected to generate positive developments to the economy. In particular, it is perceived to boost the growth of an export-oriented and highly competitive industrial sector that is less concentrated in large-scale and capital-intensive firms but deconcentrated to include more and more SMEs.

5.2 Impacts of Foreign trade Policies

As the data earlier indicate, the gradual easing of trade restrictions over the years has boosted industrial growth in Metro Cebu. Prior to the start of liberalization in 1980 for instance, the BOI registered projects were few (*Table 5*). After 1980, the number of firms grew, at periodic growth rates which were impressive. As earlier shown also, the number of MEPZ firms (*Table 9*) have similarly increased.

In addition, the relaxing of the trade restrictions has resulted to the growth of an export-oriented and, thus, highly competitive industrial sector. Over the entire 1975-96 period, an overwhelming majority of all the BOI-registered projects, 92 percent, have been export producers while only an insignificant number, about 6 percent, have catered to the domestic market (*Table 16*). Moreover, by their nature, the manufacturing firms in MEPZ have been export-oriented as well.

In terms of industrial deconcentration, as already indicated, the manufacturing sector includes SMEs that comprise the largest industry groups within the sector. In particular, BOI-registered furniture and food manufacturing industries and MEPZ located wearing apparel manufacturing firms are classified as SMEs..

The export-oriented nature of the manufacturing sector of Metro Cebu has implications of the environment. In general, as several of the exporting industry groups are pollutive and/or hazardous as well, then the expansion of trade as a result of the policy of export promotion raises the potential for worsening industrial pollution. Along this line, it can be argued that increased pollution is a negative result of industrial policy.

The expansion of exports coming from pollutive and/or hazardous industry groups also brings out the issue of implications of environmentally-related trade international agreements and regulations on these industries. For instance, how will environmentally-related standards set by some importing countries affect future exports? Will food manufacturing firms, many of which are SMEs, be able to meet product standards, e.g. reduced lead content of canned exports, and process standards, e.g. non-use of chemicals in certain production processes, and remain competitive? These are important concerns which the manufacturing sector will be facing as it continues to compete in international markets.

5.3 Background of Investment Policies

As in the case of foreign trade policies, investment policies aimed to stimulate industrial growth have been implemented for a long time. However, the institutionalization of the granting of investment incentives commenced only in 1967 (*Ibid*).

In summary, there are five major legislations implementing the granting of investment incentives. These are R.A. 5186 or The Investment Incentives Act of 1967; R.A. 6135 or The Export Incentives Act of 1970; P.D. 1789 or The Omnibus Investments Code of 1981; B.P. 391 or The Investment Incentive Policy Act of 1983; and E.O. 226 or The Omnibus Investments Code of 1987. These laws have afforded various incentives to industry, including the manufacturing sector.

Aside from encouraging investment per se, there has been an aggressive policy initiative to attract and promote foreign investments into the country. This policy has been operationalized via implementation of the Foreign Investment Act of 1992. Before this time, foreign investors were afforded investment incentives under the five aforementioned legislations.

The specific incentives provided by the legislations as well as their expected impacts were already summarized in Medalla (1996). In general, the desired impact of investment incentives is the increase in the number of and the levels of the investments by beneficiary firms, both local and foreign.

5.4 Impacts of Investment Policies

Looking into the manufacturing sector of Metro Cebu, over time and across the legislations granting the incentives, there has been an increase in the number of beneficiary firms. For instance, the BOI-registered projects in relation to the chronologically ordered incentive legislations have been increasing (*Table 17*). In terms of number, the rise is noticeably more since the late eighties until the present, during the implementation of E.O. 226.

There is no data on the actual levels of investments generated under the specific legislations. However, DTI reported that in 1994, BOI-approved investments in Cebu province totalled P20.03 billion and this investment has been rising rapidly in recent years (DTI 1996). This suggests that the granting of investment incentives has indeed led to the increase in industrial investment in Metro Cebu.

In terms of ownership, a substantial portion of the BOI-registered firms in Metro Cebu, about 40 percent, are fully owned by locals (*Table 18*). Only a very small part are fully owned by foreigners. However, about 21 percent of the firms are joint ventures between locals and foreigners.

In the MEPZ, the evidence regarding foreign investments is even more encouraging. Of the manufacturing firms, 17 percent, are owned by Filipinos while the great majority are foreign owned firms, mostly Japanese (*Table 19*). This means that to a large extent, the policy of promoting foreign investments into the country is already taking hold in Metro Cebu.

Reviewing briefly, some interesting environmentally-related issues are identified from the foregoing. First, the type of ownership of firms found above can influence prospects for industrial pollution management. For instance, foreign firms, many of which may be subsidiaries of large international corporations, may have better access to new technology as well as financial resources for combatting pollution. Along this line of reasoning, it can be assumed that pollution control among these firms, such as those in the MEPZ, may have a better chance of being funded and implemented.

Second, that there are many manufacturing firms outside of the MEPZ that are locally owned implies some contradicting possibilities related to the environment. On the one hand for instance, as *Table 18* shows, many of the BOI furniture and fixture manufacturing and food manufacturing firms which are SMEs are also owned by locals. Therefore, pollution control may be more difficult to implement within these firms as generating adequate environmental

investment can be a problem. On the other hand, however, local owners whose personal welfare as well as properties may be directly affected by the pollution their firms create can be more sensitive to and committed in addressing the problem.

5.5 Background of Regional Growth Policy

The policy of regional dispersion of industries, i.e. outside Metro Manila and into the provincial cities and towns, has been aggressively implemented by the government since the seventies. Toward this end, export processing zones have been put up and special incentives granted to those firms locating outside the capital region. Then, R.A. 7916 or the Special Economic Zone Act of 1995 was legislated which created the PEZA to administer the different special economic zones in the Philippines.

Currently, there are already 4 government-owned economic zones in the country, of which the MEPZ I is one, and eight privately-owned economic zones. In addition, there are 4 newly approved economic zones, MEPZ II among them. Simply put, the expected major impact of the economic zones should be the rise in the number and level of investment of firms located within it.

5.6 Impacts of Regional Growth Policy

Looking back at *Table 9*, in 1979-1980, there were only 4 manufacturing firms located in the MEPZ. The number of firms remained low in the early eighties. However, the late eighties and early nineties saw a very significant rise in the number of firms locating in the area.

Furthermore, the DTI reported that the total investment in MEPZ totalled about P329 million in 1994 alone (DTI 1996). This implies that to a large degree, the policy of regional dispersion through the development of economic zones have been successful in generating investments for Metro Cebu.

In addition, the MEPZ is arguably the most successful economic zone in the country. Figures indicate that compared to other export processing zones, it accomplishes more of its export, employment and trade balance targets (*Table 20*). These achievements reflect well the regional dispersion policy of the national government.

As in the case of the other industrial policies already discussed, the policy of regional growth promotion has implications on the environment. The concentration of industrial development in the MEPZ will favor proper pollution control as handling of wastes can be done easily in a contiguous area. The concentrated location also allows the possibility of inter-firm cooperation in the conduct of waste management. Furthermore, since MEPZ is run by the government, public-private sector cooperation in industrial pollution control will be showcased and the benefits from joint efforts can be maximized.

On the other hand, because MEPZ is located in Lapu-lapu City which is an urbanized area that is also developed for other purposes such as tourism, residential and services, it can have adverse impacts as well. For one, as the MEPZ is rapidly growing, it will be producing more and more wastes. Without proper control, these wastes may eventually compromise

beaches and residential areas and ruin the general ambience and standards in and around sensitive areas, e.g. the five-star hotels and international airport.

5.7 Impacts on Industrial Structure

The impacts of the industrial policies may be investigated further by comparing the industrial structure of the manufacturing sector in Metro Cebu between the last two decades. Looking back at *Table 5 and Table 9*, in the 1975-1985 period, there were only 14 industry groups existing among BOI firms. By 1986-1996, there were already 23 industry groups. Similarly, for the MEPZ, there were only 6 industry groups in the 1975-85 period. This number rose to 18 groups in 1986-96. Hence, it can be argued that the pursuance of industrial policies has led to the proliferation of the industry groups in the manufacturing sector.

In terms of pollution, a closer look at the data (see also *Table 14 and Table 15*) shows that many of the industry groups which crop up after 1980 were potentially pollutive and/or hazardous for both BOI and MEPZ firms. This again means that industrial policies did not only result to the growth of a diverse manufacturing sector but also in the rise of pollutive and/or hazardous industry groups within the sector.

The change in industrial structure over the years has its own implications in terms of industrial growth and the environment. Industrial diversity, by itself, is a sign of a healthy sector which is becoming less dependent on a few activities that can be subjected to fluctuations in the general economy. On the other hand, because it also has the potential to cause additional pollution, it has a clear serious downside. This implies that diversification must be accompanied by efforts to contain its negative environmental side-effects. Also, since various industry groups have varying pollution propensity potentials, the approach of looking at pollution management at the industry level, and not only at the firm level, must be seriously considered.

6. Assessment of the Impacts of Environmental Policy on the Manufacturing Sector

6.1 Background of The National Pollution Control Policy

Several laws addressing industrial pollution have been promulgated beginning as early as the 1960s. A complete listing of the major legislations on pollution control is contained in IEMP (1995) while a review of the laws is provided by Oposa (1996).

The main legislation dealing on air and water pollution is P.D. 984 or the National Pollution Control Decree of 1976 as amended by E.O. 192 of 1987. This is the law that stipulates as national policy the prevention, abatement and control of pollution. Its implementing rules and regulations are stipulated in DENR DAO No. 34 and 35 which established the air and water quality standards for to be adhered to by polluting industries. .

Another piece of legislation relevant to industry is P.D. 1586 of 1978 which established the EIS system in the Philippines. Still another important piece of legislation is R.A. 6969 or the Toxic Substances and Hazardous Wastes Control Act of 1990 which regulates the production, use and trade of toxic and hazardous wastes.

6.2 The Environmental Impact Statement System

6.2.1 Management of the EIS System

As mentioned in the introduction, before the firm can operate, it has to comply with the EIS system. The main requirement for firms under the system is to get an ECC from the DENR before it can start operations.

The management of the EIS system in general and the ECC in particular is handled by the EIAD, a division of the DENR. In the CVR, this division is an ad hoc division that does not have its own separate budget. Moreover, it has serious constraints in financial and manpower resources in relation to the large number of firms it is handling. At present, to partially address operational problems, the EIAD is merged with another division, the EQD, under one head.

6.2.2 Compliance to the ECC Requirement

If the law is to be strictly followed, environmentally critical projects have to get an ECC before they can operate. In reality, many firms in Metro Cebu which may classify as environmentally critical have been operating over the years without an ECC.

The available data from the regional DENR (which include both BOI/MEPZ firms as well as non-BOI/non-MEPZ firms), show that so far, only a small portion of the operating firms in the area have ECCs (*Table 21*). Of the BOI/MEPZ firms, only 16 percent have ECCs (7). The industry groups with the highest percentage of ECCs are the manufacturing of transport equipment, metal basic industries, iron and steel basic industries, electrical machinery and wearing apparel.

There are non-BOI/non-MEPZ firms which have ECCs although it is not known how much these are in terms of percentage to the total. All in all, 205 firms already have ECCs. It must be noted that the food and furniture industries, which have a large number of SMEs, are among the industry groups with the lowest percentage with ECCs.

The reasons put forward for firms not having an ECC are mainly related to the conduct of the EIA study, the main basis for its granting. Either the firms are still in the process of conducting the study, the study has been submitted to the DENR but was found inadequate and thus returned, or the study has been submitted but was not yet acted on due to non-compliance of other administrative requirements.

There are also many reasons put forward why a firm takes time to submit an EIA study. These include the technical and time-consuming nature of the study, lack of financial capability especially among SMEs to seek consultancy assistance in study preparation, difficulty of putting up a study for a plant that has already been in existence, and lack of knowledge or sheer disregard by firms of the existing environmental regulations.

At present, the DENR has already required all industrial firms to acquire an ECC in light of nationwide efforts to expand the EIS system coverage to all development projects. Along this line, the agency has been penalizing firms which are caught intentionally disregarding the

regulation and operating without an ECC. In 1995, 15 manufacturing firms were meted fines for ECC violation. Most of the firms are located in Mandaue City and Lapu-Lapu City (*Table 22*). This number, however, is clearly insignificant in relation to the total number of manufacturing firms in Metro Cebu without ECCs.

More than half of the firms meted fines have already 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, through negotiations, were able to reduce their fines sometimes to even as low as a fifth of the maximum amount.

There have been recent initiatives and suggestions at the national level to improve compliance to the ECC requirement among firms in particular and the effectiveness of the EIS system in general (e.g. Oposa 1996; IEMP 1995). Among the initiatives put forward are the raising of the penalty fee for firms without an ECC to P200,000, commencement of the EIS system in the pre-investment stage instead of the design stage of the project, enforcement of the ban on project construction before ECC issuance, expansion of the coverage of the EIS system to all new development projects except in special cases, clarification of roles and responsibilities and creation of funds for monitoring ECC compliance, requirement of PMAs for single projects, and securing of firm statutory basis for PMAs.

Another recent development which may have great relevance in Metro Cebu is the issuance of DENR DAO No. 11 of 1992 which allows the use of the programmatic EIA. This is a type of EIA that applies a common environmental assessment for congregated development areas such as industrial estates and zones. The use of the programmatic EIA is expected to reduce greatly the costs associated to EIA compliance and improve as well pollution management under a common area authority. At present, the approach is pilot-tested and, if proven effective, will be applied for future industrial zones and similar sites.

6.2.3 Compliance to Other Requirements

Aside from the ECC, the DENR requires additional permits, the AC and the PO, before firms can operate. The AC is a permit for the construction of pollution-related facilities, i.e. WTF or APCD. On the other hand, the PO is a permit to operate the facilities. As in the case of the ECC, a violation of any of these two requirements results to fines imposed by the DENR.

In 1995, there were 73 manufacturing firms meted fines for not complying with administrative regulations, including the AC and PO (*Table 23*). Most of the firms are located in the three cities, notably Mandaue City. The figures here coupled with those for ECC violations imply that there is a significant number of manufacturing firms which are not complying with the pre-operation environmental regulations of the government.

Apparently, the most common reasons why firms violate the AC, PO and other administrative requirements are that the owners believe that there is a reasonable chance that they do not get caught and, even if they do, the cost of the fines is low.

6.3 The Water and Air Quality Standards

6.3.1 Management of the Standards

The implementation of water and air quality standards during the operational stage of the firms falls in the hands of the EQD division of the DENR. Unlike the EIAD, the EQD is a regular division which has its own separate budget. However, it also faces severe financial and resource constraints given the large and increasing number of industrial firms in the CVR. It is estimated that present resources of the division need to be at least doubled for it to meet current demand for its services.

6.3.2 Monitoring of Environmental Quality

As in other regions of the country, industrial environmental quality monitoring in the CVR is done by the EQD in collaboration with PCOs hired by the firms but accredited by the DENR. Only a few of the BOI/MEPZ firms however, about 19 percent, have certified PCOs (*Table 24*). In terms of percentage, the industry groups with the most PCOs are the manufacturing of pottery, transport equipment, non-ferrous metal basic industries, and professional equipment. Some non-BOI/non-MEPZ firms also have PCOs. All in all, 107 firms have PCOs. Again, it is interesting to note that food and furniture manufacturing are among the industry groups which have a low percentage with PCOs.

In actual monitoring, the EQD only periodically visits the firms while the PCOs do the regular monitoring and submit quarterly reports to the agency. Because of this arrangement, the main responsibility of environmental quality monitoring within firms lies in the hands of the PCOs. This situation may lead to potential problems. Full veracity of reports, for instance, cannot be assured as PCOs are expected to be more beholden to their companies than the government whenever conflict of interests arise.

Another problem in environmental quality monitoring related to the issue of reliability of monitoring reports was cited by IEMP (1995, p. 11). This relates to the unclarified water sampling protocols followed by the DENR in monitoring. This problem has led at times to questions about the representativeness of samples, causing disputes regarding monitoring results.

Still another problem in monitoring is the inadequacy of laboratory services in Metro Cebu. At present, the laboratory of the DENR is already hard pressed to meet the demand for its services both from within and the outside private sector. The private sector demand, in particular, has been growing rapidly due to the growth in the number of firms, especially SMEs which do not have their own laboratory facilities.

To address some of the constraints in environmental monitoring, a new approach, the JIT, has been developed for Metro Cebu. The purpose of the JIT is to synchronize the various activities of government agencies including DENR, DOLE and DOH so that monitoring can be made more effective. At present, the JIT concept is pilot-tested in an industrial firm.

6.3.3 Compliance to WTF Requirements

In Metro Cebu, all manufacturing firms which produce wastewater that can potentially exceed standards are required to establish a WTF. About 4 percent of BOI/MEPZ firms have WTFs while 30 of the other type of firms have WTFs (*Table 25*). Percentage wise, most of the BOI/MEPZ firms with the facility belong to the chemical products, fabricated metal products, and other industries manufacturing subsectors. Since the WTF are a requirement, it follows that these subsectors are also the most problematic manufacturing subsectors in terms of wastewater generation.

For most of the firms with WTFs, their facilities are capable of doing both primary and secondary treatment and only a few firms have WTFs that can handle only primary treatment or tertiary treatment (in addition to primary and secondary treatment). The ability to conduct treatment up to the secondary level indicates the relatively higher level of sophistication with which firms in Metro Cebu handle their wastewater.

A closer look at the disaggregated data for *Table 25* indicate that there is a low number of firms within MEPZ that have WTFs. This may signal a potential problem in the environmental management of the export zone. The MEPZ at present neither have a common WTF for resident firms nor a zone PCO and unit to handle pollution-related problems. The only provisions it has now are sewage lines that serve as wastewater conduits from the firm sites to the sea. With the few number of firms doing water treatment in the zone, it is likely that a large percentage of the wastewater that passes through the sewage lines is untreated.

6.3.4 Compliance to APCD Requirements

As in the case of wastewater, a firm whose plant causes air pollution that exceed government standards is required to put up a containment facility. About 37 percent of BOI/MEPZ firms and 182 of the other category of firms have APCDs (*Table 26*). Percentage wise, the groups with the most APCDs are the manufacturing of pottery, fabricated metal products, furniture, electrical machinery, transport equipment, and food. It follows, that these may be the subsectors which are the most problematic in terms of industrial air pollution.

Aside from the control of air pollution, noise pollution is being addressed by some firms through the setting up of mufflers in noise-producing machines. This equipment is used by 75 firms.

From the above, it can be seen that air pollution control appears to receive relatively more attention among firms compared to water pollution. A major reason for this may be that the APCDs are much cheaper to install than the WTFs. In addition, air pollution can directly affect the health and well-being of firm personnel and their productivity. It is to the self-serving interests of the firms then that they tackle the problem.

Although air pollution may be addressed in a substantial way among firms, it remains a problem in industrial sites, especially those close to population centers. In particular, it has been noted that current regulations on industrial air emissions may not guarantee achievement of air quality standards where industries are overly concentrated. In this case, it is likely that

industry cumulative effects can still exceed acceptable limits and remain dangerous although firm individual effects do not (IEMP 1995).

6.3.5. Waste Handling and Disposal

Currently, the procedures for the handling and disposal of industrial wastes produced are similar across manufacturing firms. For both treated and untreated wastewater, the disposal is usually done by draining the water into the drainage systems constructed by firms, or the government in the case of MEPZ. Eventually, these wastes flow into canals, river systems and the sea.

In the case of sludge and chemical wastes which are hazardous/toxic, the procedure for handling followed by firms, especially larger ones, are also similar. The wastes are usually stored in drums and other durable containers and placed in safehouses within plant sites. In general, the drums are kept above ground instead of buried. It is not known what plans the firms to dispose these stored wastes over the long-term or when they close shop.

There have been reports that the handling of hazardous/toxic wastes among small firms are not as organized as among big firms. In some cases, wastes may have been carelessly stored in open containers which eventually resulted to ground spillage. In other cases, wastes may have been thrown directly into the ground or even water bodies (see e.g. Ricana 1992).

From the above, it is obvious that the search for a final destination of the stored hazardous/toxic wastes is a pollution management concern in Metro Cebu. In addition, the reported problem of indiscriminate disposal of wastes by small firms must be addressed as well.

6.3.6 Violations of Water and Air Quality Standards

There is no tabulated records on the number of manufacturing firms which violated water or air quality standards and were either asked to upgrade their treatment and control facilities or imposed penalties. Furthermore, the available data on violating firms which were imposed a CDO were only for the period starting 1995.

Since 1995 until June 1996, only five manufacturing firms in Metro Cebu were imposed a CDO (*Table 27*). Two were furniture manufacturing firms which violated air quality standards while three were food manufacturing firms which failed water quality standards. Four of the firms are located in Mandaue City while one is in Cebu City. No manufacturing firm located in MEPZ has been imposed a CDO so far.

The data shows that for all firms, the imposed CDOs either took effect only for a short period or were unable to close down the violating firm. The firms which were closed down reopened soon thereafter once they obtained a TRO. One firm was issued a CDO in June 1996 but remains operating up to the present because the owner filed a motion for reconsideration of the case.

It has been reported that the imposition of CDOs as a deterrent against firms violating environmental quality standards has been weakened by structural weaknesses in the system.

These structural weaknesses allow many firms to draw out the process, e.g. prolong the imposition of a CDO by contesting it (Ibid).

In Metro Cebu particularly, the above problem is exacerbated by the fact that the legal arm of the DENR is greatly limited. At present, the agency only has two lawyers to attend to the legal aspects of the implementation of regulations. Although more positions are available, there has been a dearth in qualified applicants because of the non-competitive salaries of offered positions.

6.3.7 Compliance to Clean-up Regulation

As mentioned, when the firm closes down, it is obliged to clean up its plant and restore it to environmentally acceptable standards. There are no available records from the EQD, the division presumably tasked to implement post-operation regulations, of manufacturing firms in Metro Cebu which closed shop and ordered to clean up. From key informants, however, it was learned that this portion of environmental regulations has not been implemented at all. The reasons forwarded are that most firms closed because they were losing, hence, could not afford the substantial cost of clean-up, the authorities are not religiously implementing the regulations, and some closed plants are sold to new owners who took along with ownership the responsibility of clean-up.

Particularly since some firms store hazardous/toxic wastes in their plants, post-operation clean-up is important and must be addressed in industrial pollution management. In Metro Cebu, this work has added relevance because of the dynamic nature of the industrial sector, i.e.. some inefficient firms can be driven out of competition by more efficient ones over the long term. For instance, *Table 6* shows that, 6 percent of the total BOI projects in the area over the years has stopped operating.

7. Land-Use and Water-Use Plans

7.1 Land-Use Plan

For many years in the past, the industrial development in Metro Cebu suffered from the absence of a comprehensive land-use plan. This failing resulted to the disorganized growth of industries, especially in the cities of Cebu and Mandaue (see PCINKCL 1994c, p. 2-8).

With the conduct of the CIADMP, an integrated and GIS-based land-use plan finally came into being for Metro Cebu. Basically, this land-use plan follows a policy of decentralization that brings industrialization away from the city centers into the outlying areas. For the Metro Cebu area defined in this study, among the industrial projects proposed are the further development of the MEPZ, relocation of factories from the downtown areas to other areas, redevelopment of the waterfront area, development of other industrial estates, and establishment of research parks and academic institutes (Ibid p. 2-31).

Some data from a local development arm of LGUs in Metro Cebu show that the CIADMP land-use plan has been generally followed by local authorities (*Table 28*). for instance, Mactan Island is further developed with the operation of MEPZ II and the proposed construction of a

science park. Development of the waterfront area will also be pursued with the implementation of the South Reclamation Project in Cebu City and the proposed reclamation projects in Consolacion and Northern Mactan.

Looking into the above developments, the planned land-use in Metro Cebu by the CIADMP generally augurs well not only with industrialization but also with environmental protection. First and as earlier indicated, concentrating future industrial development in organized zones such as MEPZ makes pollution control physically less costly and allows a zone and inter-firm approach to the job. Second, the relocation of industries away from downtown areas reduces the risks of occurrence of pollution-related health cases and related problems. Third, the reclamation of areas for industrial purposes frees the inland areas from additional industries. Finally, the establishment of research parks enhances firm knowledge on pollution control, thus increasing chances of decreased pollutive waste generation.

On the other hand, since additional land will be made available for industrialization, the threat of increasing volumes of industrial wastes remains. Also, an environmental problem that may arise is the potential negative impact that reclamation poses to marine ecosystems. This point must be noted as the integrity of the marine environment is a prime basis for the survival of the marine fisheries and tourism industries in the area, e.g. in Consolacion, Talisay and Northern Mactan.

7.2 Water-Use Plan

Like land-use, there had been no integrated plan in the past to address the long-term water-use situation in Metro Cebu. This is manifested by the acute water shortage already facing the area at present. Estimates show that as of 1995, the total supply of water in Metro Cebu amounted to 214,014 cubic meters, of which 72 percent came from the wells and 28 percent were provided by the MCWD (*Table 29*). On the other hand, total demand also amounted to 214,014 cubic meters, of which 86 percent were by domestic users, 12 percent were by industrial and commercial users and a minimal 2 percent were by other users.

The above indicate that total demand for water in Metro Cebu could not be met by supply coming from the MCWD and the safe extraction through the wells. An overextraction of groundwater resources at substantial levels was necessary to fully meet demand. Furthermore, over time, minus major projects that can adequately raise supply, the overwithdrawal of ground water resources will only get worse and continue well into the next century.

It is not known how much industrial development has contributed to the over-extraction of groundwater in Metro Cebu. Inside the MEPZ, most factories source their water from the MCWD as water of acceptable quality cannot be extracted from the wells. It is certain, however, that some factories outside the MEPZ use wells to source their water (PCINKCL 1994c, p. 10-21). With this and the expected industrial development in the years ahead, the total demand for water by industrial firms will certainly rise and add to the likelihood of continued overextraction of groundwater.

There are also no available data to indicate whether industrial firms have grown more efficient over time in the consumption of water. For instance, it is possible that with their

growing consciousness of the water shortage problem and the need to comply to water-related environmental standards, firms will practice water-saving processes over time. Information on this will have been useful in computing possible reductions in industrial water demand related to efficiency in use over time, e.g. thorough the re-use of treated wastewater and the practice of water saving activities.

Given the problem of water shortage, integrated water-use planning for Metro Cebu was afforded utmost attention by the CIADMP. Its water-use plan centers on the development of water projects, namely, a large-scale water dam in Cebu, a water transmission pipeline that will bring in water to Cebu from Inabanga town the neighboring province of Bohol, and a combined water system with small and medium-scale projects in several river basins.

Reflecting on the above, the thrust of the CIADMP to develop new water projects is generally in line with the industrialization and development objectives for the area. However, it is deficient in that it concentrates only on the supply side of the water equation to solve the problem. In particular, it has been silent on projects that can help control the excessive demand for water, e.g. through the promotion of water-saving activities among households and the treatment and re-use of wastewater and other waste-saving activities among industries.

Furthermore, the impacts of new water projects need to be assessed vis a vis the environment. For one, building a large-scale dam will have repercussions on ecosystems in the project vicinity and in the lowland areas. This and similar concerns will have to be considered in the formulations of formal feasibility studies for the proposed water projects.

8. Non-Regulatory Environmental Initiatives in the Manufacturing Sector

In addition to regulatory instruments, there have been recent initiatives developed to enhance attainment of industrial pollution control in Metro Cebu. These initiatives are reviewed below to identify problems related to their implementation.

8.1 Foreign-Funded Projects on Industrial Pollution

In Metro Cebu, the DENR, with the aid of international donors organizations, have been undertaking projects that address the industrial pollution problem. These projects are the USAID-funded IEMP and the German government funded PGP-IPCC.

The IEMP is a nationwide project which started in 1992 and will terminate this year. Its objective is to create broadly-based partnership between sectors that will encourage sustained industrial growth and at the same time reduce pollution and environmentally related health problems (see PRCEMI 1996). On the other hand, the PGP-IPCC is a Cebu-specific project that aims to promote industrial pollution control with a view to create a mechanism for the environment-friendly disposal and management of toxic and hazardous waste from industry and trade. It has an original timetable of five years, with the first phase conducted in 1991-93 and the second phase in 1993-96.

Sectorally, the PGP-IPCC has been concentrating its efforts on the electroplating industry because it found it to be the most environment-unfriendly. In a survey done during its first phase,

the project found that the industry discharges toxic and hazardous wastes which it improper handles (PGP-IPCC 1995c, n.d.,c). The electroplating industry serves the needs of various industries, including the manufacturing of electronics, furnitures, fashion accessories and other activities. Many of the electroplaters are SMEs. Some of the firms are organized, with project assistance, into an organization called the CEA.

8.2 Development of Waste-Reducing and Recycling Technologies

At present, the IEMP runs a PMA activity nationwide for purposes of providing technical assistance and advice to firms on waste reduction and pollution control. The PMA now covers more than 130 volunteer industrial firms in the whole country, including 17 firms in Cebu province. On the firms in the province, 11 are manufacturing firms located in the Metro Cebu area.

Of the IEMP volunteer manufacturing firms in Metro Cebu , 3 are located in Cebu City and 8 are in Mandaue City (*Table 30*). Seven of the firms are in food manufacturing, 1 is in beverage manufacturing, 1 is in the manufacturing of industrial chemicals and 2 are in the manufacturing of fabricated metal products.

For its part, the PGP-IPCC is also assisting firms develop low-waste technologies for their production processes. Currently, the project is demonstrating the technology known as the PIPOC in two electroplating firms (see PGP-IPCC 1995a, 1995b, 1995c and Labrador 1993).

Another potential waste reduction approach that has been touted by the DENR and other environmental groups in the Philippines is waste recycling. This initiative, however, has seen minimal practice among Metro Cebu firms (*Table 31*). For its part, the PGP-IPCC has started promotional activities about recycling, specifically of used oil coming from the transportation sector, e.g. shipping and the other large-scale and oil-intensive industries (Aragonés 1993a, 1993b, 1992; Llanto 1993).

8.3 Establishment of Common Waste Treatment Plant

The PGP-IPCC will be establishing a common industrial waste treatment facility in Metro Cebu which will eventually service not only the electroplaters but also other waste producing industries (see e.g. PGP-IPCC 1995c, 1995d; Faensen-Thieves 1992). At present, the plans for the plant are already completed and a site has been located in Mandaue City . The Federal Republic of Germany will provide, as grant, the major facilities for the common treatment plant while the government provides the land and personnel. The plant will be operated by a new corporation which is a common venture of the CCCI, an umbrella organization of businesses, and the CEA.

8.4 Development of Funds for Environmental Protection

Starting this 1996, the DENR made the establishment of an EGF one of the conditions stipulated in the ECC. This means that all manufacturing firms granted an ECC since the start of the year must set up its EGF.

So far, mostly real estate firms have set up the EGF as these are the type of firms which were newly granted ECCs (*Table 32*). It is expected that in the future, as manufacturing firms acquire ECCs, they would also be establishing EGFs to meet the condition.

Aside from the EGF, another type of a fund for environmental fund which is currently being developed by the PGP-IPCC is the "Revolving Fund" for electroplating firms. This fund will be set up primarily for the purpose of providing association members low-interest financial assistance in the purchase of low-waste and environment-friendly technologies.

Summarizing from the above discussion on other initiatives for industrial pollution control management in Metro Cebu, the following are observed. There are two projects which deal on industrial pollution but either this concentrates only on an industry group or has limited coverage. Hence, although these projects contribute to industrial pollution control, there remains the job of extending activities, such as the development of waste reducing and recycling technologies, common treatment plants and EGFs beyond current coverage.

The EGF, in particular, is worth specific attention. Since the firms which have put up the EGF so far are non-manufacturing, there is the need to put up the mechanism to hasten the implementation of the program in the manufacturing sector, particularly among potentially pollutive and/or hazardous firms. The IEMP (1995) has listed several problems associated to the implementation of the EGF program that need to be addressed, among which is the questionable legal foundation of the EGF. This and other problems must be tackled for the EGF program to expand.

9. Conclusions and Recommendations

9.1 Conclusions

To recapitulate, this paper investigates the interactions between the industrial policies of export, investment and regional dispersion promotion on the manufacturing sector and between the environmental policy of industrial pollution control and the manufacturing sector, using Metro Cebu as case study. It uses secondary data gathered from government agencies, private organizations and other sources as well as primary data solicited through personal interviews with key informants from the government, industry and other sectors.

The review of Metro Cebu shows that the region is one of the most economically progressive in the country. It also has a fast rising population which is brought about by natural growth and in-migration. This, coupled with the narrow coastal location, has led to congestion in city centers. The profile of the manufacturing sector indicates that it has been growing rapidly over the years although growth is concentrated in the cities. Furthermore, some of the biggest industry groups in the sector are comprised mainly of SMEs. Environmentally, the congestion of both population and industries in cities highlights the potential great risk that industrial pollution poses to human health and welfare.

The environmental and pollution profile shows that Metro Cebu is now faced with serious problems, including air and water pollution which are partly a result of industrial growth. The profile also indicates that several of the industry groups, including the largest which have

substantial SME composition, are potentially pollutive and/or hazardous. In environmental terms, this situation brings out an important issue: how to undertake pollution control management among firms who may not have the resources to finance it.

The analysis of the impacts of the industrial policies on the manufacturing sector shows that, in general, the policies have been successful in promoting industrial growth. Success, however, is tempered by the concomitant rise of industry groups which are potentially pollutive and/or hazardous. This implies that increased industrial pollution is a consequence, albeit unwanted, of industrial policies.

In terms of specific policies, the study found that the easing of trade restrictions over time resulted to the growth of an export-oriented and deconcentrated manufacturing sector, both inside and outside the industrial zone. Again, however, this growth includes potentially pollutive and/or hazardous exporting firms. Thus a major trade and environment issue arises: how the environmentally-related international trade agreements and standards will influence the growth of the export-oriented manufacturing sector in the years ahead.

As in the case of trade policy, investment policy was also found to be successful in promoting foreign and domestic investment. Environmentally, the influx of foreign firms may be favorable as they may have access to advanced technology and financial resources for pollution management. On the other hand, the growth of local firms open up conflicting possibilities and, thus, their likely impacts on pollution management are difficult to predict.

The policy of regional dispersal, i.e. through the setting up of industrial zones, was likewise found successful as manifested by the highly favorable performance of the MEPZ in recent years. In terms of positive impacts on the environment, the export zone allows easier environmental management, such as in the handling of industrial wastes and conduct of inter-firm activities. On the downside, the location of MEPZ close to residential, tourism and service centers makes it a serious threat to the maintenance of acceptable and required environmental quality standards in these areas.

In terms of industrial structure, the study found that the policies of promotion of trade, investment and regional development have resulted to the proliferation of several industry groups in Metro Cebu, a generally positive development. As many of the new industries are potentially pollutive and/or hazardous as well, however, there are environmental implications of this industrial diversity. In particular, the varying pollution propensity potentials between groups necessitate a pollution management approach that goes down from the level of the manufacturing sector into the level of specific industries.

Moving on to the analysis of the impacts of the national policy of industrial pollution control on the manufacturing sector, the study found that at the varying stages of implementation of the regulatory measures, some problems have been encountered. Among others, at the pre-operation stage, the division administering the EIS system is an ad hoc unit that has no separate budget yet tasked to deal with a large and growing of firms. Also, a majority of manufacturing firms have not been able to comply to the ECC and other administrative requirements. Furthermore, many firms which were fined for violations were able to reduce the amount of the fine substantially through negotiations.

Problems were also identified in the implementation of pollution control regulations during the operation stage. In particular, although the division tasked to implement environmental quality standards is a regular division with its own separate budget, it is faced with severe financial and resource constraints given its coverage. Questions are also raised about the veracity of the monitoring reports coming from the PCOs who are beholden to their companies and the unclarified water sampling protocols followed in monitoring. Furthermore, the inadequacy of laboratory services to meet the growing demands from industries is cited.

In terms of pollution control facilities, the study found that some manufacturing firms in Metro Cebu already have WTFs and most of these facilities are capable of doing both primary and secondary treatment. In the MEPZ, however, only a few firms have water treatment facilities and the only zone-provided infrastructure for handling wastes is a sewage line. In addition, the zone does not have a PCO or specific pollution control unit to address environmental concerns.

In the aspect of air pollution control, on the other hand, it was found that some firms already have APCDs as well as noise control devices. These facilities, however, do not ensure that air pollution is no longer a problem in industrial sites. This is because as the devices are installed on a firm-basis, individual pollution emissions may be low although cumulative emissions remain high, posing continued danger to nearby residents.

In the case of waste handling and disposal, the study found that untreated wastewater is usually disposed by firms into drainage systems which eventually lead to the sea. On the other hand, hazardous and/or toxic wastes are stored in containers and placed in safehouses. Some incidence of indiscriminate throwing of wastes into the waterways have been reported. Environmentally, the disposal of untreated wastewater and toxic and/or hazardous wastes into waterways is a major problem because this will greatly damage the marine environment. Furthermore, looking for a viable permanent site for the container-stored wastes must be addressed.

In terms of violations of air and quality standards, results indicate that only a few firms were imposed a CDO and none of these is located in MEPZ. The CDOs imposed took effect only for a short time or were ineffective in closing down violating firms. In general, the use of the CDO as deterrent has been weakened by structural weaknesses that allow firms to draw out the process, such as by contesting it. Furthermore, the legal arm of the DENR to pursue cases related to violations is greatly hindered by its limited legal arm.

In the case of post-operation regulations, the study indicated that in general, environmental clean-up has not been practiced in Metro Cebu. There were reasons put forward to explain this, including the half-hearted implementation by the authorities. It is important then that this part of pollution control management is addressed because the dynamic and competitive nature of the Metro Cebu economy will surely result to inefficient and toxic and/or hazardous firms closing shop.

In the case of land-use, the study found that in the past, not much integrated planning was done. At present, however, a long-term development plan in Metro Cebu, the CIADMP, is already in place. Among others, this document provides a strategy for industrial land-use in the area. In general, this plan is environment-friendly although some issues need to be addressed,

including the need to analyze the environmental impacts of land reclamation on the marine environment, in light of the alternative critical uses of the sea to the Metro Cebu economy.

In addition to land-use, a long-term water-use plan was formulated by the CIADMP for Metro Cebu. Again, this plan is generally favorable to the environment although it has its own share of constraints. Overall, the plan concentrates only supply to address the water shortage and is lacking in projects that tackle demand. Environmentally, since building a large-scale water dam is an option to raise water supply, this will have implications on the ecosystems in vicinity and lowland areas that must be thoroughly studied.

In the case of non-regulatory initiatives, the study found that there are internationally funded projects ongoing on industrial pollution in Metro Cebu. These, however, either concentrate only on an industry group or have limited coverage, i.e. IEMP which only covers 11 firms belonging to only four industry groups. Thus, there remains the work of extending activities the activities of the projects to a larger scope.

Finally, in addition to all that has been mentioned, there are other environmentally-related problems which are identified in the course of the case study. First, across industries, there are inadequate cross-section and time-series environmental and pollution data available, e.g. actual pollution intensities, actual violations of air and water quality standards, etc., the use of which would have made this work more specific and accurate. Second, in terms of implementation of regulations, industrial pollution control in Metro Cebu is concentrated only at the regional level of the government and does not expand into the provincial and municipal levels. In light of the devolution of some environmental functions and the establishment of environmental offices in local governments, e.g. municipal and provincial ENROs, this is a missed opportunity as local resources can be tapped to make industrial pollution control more effective, e.g. in industrial monitoring. Third, there has been slow implementation of R.A 6969 in Metro Cebu. The related activities done so far are mostly preliminary in nature, e.g. DENR staff briefings, preparation of an inventory of chemicals used by firms, etc. Finally, the response of the authorities to industrial pollution accidents, e.g. large-scale wastewater and oil spills in marine waters, has been reactive instead of proactive in Metro Cebu. This slow reaction is made worse by the confusion among the different agencies of government as to which should take primary charge.

Wrapping up, this case study concludes that although industrial policies have been successful in promoting industrial development in Metro Cebu, they have also resulted to the proliferation of potentially pollutive and/or hazardous firms which contribute to industrial pollution. The policy of industrial pollution control has led to the implementation of environmental regulations across firms but problems have been encountered which hindered the full attainment of success. Given the projected rapid expansion of industrialization in the future, these problems must be addressed.

9.2 Recommendations

9.2.1 Regulation-Related Recommendations

To address the problems identified above directly related to the implementation of the industrial pollution-related regulations of the government, the following are suggested:

a. Transformation of the EIAD division of the regional DENR from an ad hoc division to a regular division. This new division must be afforded a separate budget and staffed with adequate and competent personnel beyond the current level.

b. Streamlining of the EIS system, EIA study and other administrative requirements. The system must be modified, i.e., along the lines suggest by the IEMP (1995) and Oposa (1996). Also, the integration and simplification of the AC and PO, e.g. into just one requirement, must be considered.

c. Strengthening the EQD division of the regional DENR. At present, this divisions suffers from resource constraints, especially given the magnitude of its monitoring and other tasks. Its staff and budget must be enhanced proportional to the ever increasing number of client firms it is handling.

d. Decentralization of some CDO management functions. In general, the CDO system is highly centralized and takes a long time to implement. A decentralization, e.g. delegation of of the powers of the PAB to the regional office in handling SMEs, may result to a more effective administration.

e. Enhancement of the legal arm of DENR. Action in this area is critical as the success in the implementation of regulations depend largely on the number of court cases won against erring firms. There is the need to study ways to enhance the number of quality lawyers in the DENR.

f. Strengthening of the monitoring function through networking. The networking with agencies through the JIT can be expanded to include other agencies such as the DTI and BOI which also periodically monitors environmental compliance among firms. More frequent monitoring visits by DENR personnel in firms and active involvement of PCOs in the JIT. Frequent monitoring will be needed to check on the veracity of reports submitted by the PCOs. Also, the PCOS must be made more active, e.g. not just in the report preparation, but also in the activities of the JIT.

g. Requirement of a zone-wide PCO and environmental management office for MEPZ. This action will enhance possibilities for pollution control beyond the firm level into the inter-firm and zone-wide level.

h. Active monitoring of and response to industrial pollution accidents. As there have been highly publicized incidents of industrial pollution, a strong response by the DENR to this problem is needed. For starters, it can organize an inter-agency and multi-sectoral task force that deals specifically on industrial pollution accidents.

i. Conduct of a study and plan for the long-term handling and disposal of toxic wastes produced by industry. As time goes on, the volume of temporarily stockpiled toxic wastes by firms will certainly rise. In the end, the necessity of finding a permanent and safe storage site for these wastes will be unavoidable.

j. Emphasis on post-operation clean-up by DENR. The agency must implement the requirement of clean-up by assigning this as a task of a specific group within the agency, e.g. sub-unit within EQD. A separate budget for the implementation of the task must be afforded.

k. Use of the EGF as tool for post-operation clean-up. An approach that can be applied to ensure clean-up is to make it an integral component of the EGF put up by firms. The EGF should not emphasize only on reserving firm resources for pollution-related damages during its operations but also for post-operation clean-up.

l. Conduct of programmatic EIAs in industrial zones. This is an option that must be seriously considered for future industrial zones. For the current MEPZ, preparation of a post-establishment programmatic EIA can be done for purposes of inter-firm and zone-based management. This programmatic EIA may be prepared by the new environmental management unit to be established in the zone.

m. Strict implementation of existing industrial pollution laws, including R.A. 6969. In general, the problem of the environment in the Philippines lies more not in the absence of laws but in the loose implementation of laws. Lack of financial resources may be a main culprit of this. However, there are areas that can be explored to address the implementation aspect better. Deputization of LGUs in law enforcement is one possibility. Other approaches that can potentially help are the active involvement of the traditional law and order units, such as the PNP and the PCG in the enforcement of pollution laws in specific areas.

9.2.2 Other Recommendations

To address the other more general problems identified in the study, the following recommendations are suggested:

a. Conduct of an environmental profile for the industrial sector in particular and Metro Cebu in general. Lack of comprehensive data is a constraining factor in the environmental planning and management of the area. This problem can be addressed by conducting an environmental profile which will generate both primary and secondary data.

b. Expansion of the development of waste reducing/recycling technologies and treatment plants. Current efforts along this line must be expanded to cover more industry groups, i.e. other than the electroplating industry. Also, an industry-wide PMA project can be initiated to promote waste reduction technologies among industrial firms.

c. Granting of financial assistance to SMEs for the establishment of waste reducing and treating equipment. For instance, the development of a waste technology-specific revolving fund such as that for the electroplating industry can be considered for other firms as well.

d. Active involvement of the LGUs in industrial pollution control. With the implementation of the LGC and the devolution of some previously centralized powers, the LGUs has become a potent force in environmental management. In general, the newly formed provincial and municipal natural resources and environment committees and offices must be made active in industrial pollution control, such as in monitoring activities. In addition, the

government must explore avenues through which LGUs can help assist in pollution law enforcement.

e. Training of LGUs in environmental legislation. Also with the advent of the LGC, the LGUs can potentially assist in pollution control via the formulation of local ordinances that supplement national pollution laws. Local legislative officials, such as provincial board members and city and municipal councillors, must be trained in the relevant environmental sciences so that they can gain the necessary technical knowledge for the formulation of environmental legislation for local areas.

f. Sharing of environmental resources between national and regional offices. The problem of sharing of financial resources for industrial pollution control has been a long-running issue between the national and regional levels of government. For instance, the DENR has been collecting funds from industries as penalties for pollution related infractions but these are remitted to the national government. To help address the problem of funding, the partial or full retaining of collected fines in the regional offices and earmarking them for pollution control must be considered.

g. Conduct of public awareness campaign targeted at exposed populations. While environmental awareness in the area in general may be high, public education is needed especially among people living close to industrial sites which are the most potentially at risk to industrial pollution. Public education campaigns by the DENR and DOH in coordination with the LGUs can be done to lessen the likelihood of industrial pollution-related health problems.

h. Conduct of a study on the environmental impacts of future industrial land-use. Although in general, the future land-use plan appears environmentally sound, the continued industrial expansion in Metro Cebu will mean additional waste generation. How to address this additional pollution load from industry and other land-use related problems must be studied.

i. Conduct of a study on the environmental impacts of future water-use. In a similar vein, the environmental impacts of future water-use must be examined. The different options for increasing water demand must be evaluated in light of their impacts on the general environment.

j. Conduct of a project that will immediately address the overextraction of groundwater problem. As found in the review, the groundwater of Metro Cebu is already overused and seepage is now a serious resource and environmental issue. Relying alone on grand-scale water projects that will be developed still long into the future will not solve this current pressing problem. A project that will have an immediate impact is needed.

k. Study of the use of market based instruments. As mentioned, pollution control in the Philippines has been centered on the use of regulatory instruments. The theoretical development in recent years point to the validity of market-based instruments as potentially more effective measures for pollution control. Furthermore, in some developed countries, market-based instruments have already been tried. The use of at least some of these instruments in tandem with the regulatory instruments already in place must be contemplated for Metro Cebu.

1. Study of the impacts of international environmental agreements and standards. As mentioned in this study, these agreements and standards will likely impact on the international trade situation of Metro Cebu given the potentially pollutive/hazardous nature of some of the exporting industries in the area. Thus, an analysis of these implications, e.g. on competitiveness and market access, is desirable.

To end, it has been said that governance in the Philippines is highly legalistic and that major improvements in environmental management can only be pursued by first adhering to the national legislative process. For instance, amendments to existings laws or new laws may be necessary to effect the devolution of CDO powers, the sharing of resources between the national and regional offices of the DENR, the implementation of the programmatic EIA and other proposed changes. Suffice it to say here that the DENR should strongly spearhead efforts to put in place the needed legislation to support improved environmental management.

REFERENCES

- Aragones, A. (1993a). "Getting Rid of Waste Oil". In Industrial Pollution Control-Cebu Bulletin. Vol. 2, No 2. pp. 2.
- _____ (1993b). "Waste Oil". In Industrial Pollution Control-Cebu Bulletin. Vol. 2, No 1. p. 4.
- _____ (1992). "Figuring Out Waste Oil in the Environment". In Industrial Pollution Control-Cebu Bulletin. Vol. 1, No 4. p. 8.
- Cebu Investment Promotions Center (n.d.,a). "Doing Business in Cebu". Suite 1102-B Metrobank Plaza, Osmeña Boulevard, Cebu City. 48 p.
- _____ (n.d.,b). "Cebu, the Philippines' Bestseller". Suite 1102-B Metrobank Plaza, Osmeña Boulevard, Cebu City. 48 p.
- Center for Research and Communications (1995a). "Sprinting Ahead of the Competition". In Regional Monitor, No.4 1995. pp. 6-8.
- _____ (1995b). "Steering Cebu's Affairs". In Regional Monitor, No.3 1995. pp. 7-10.
- _____ (1995c). "Keeping Track of Cebu's Domestic and International Trade". In Regional Monitor, No.2 1995. pp. 1-8.
- _____ (1994). "Cebu's Quest for Progress May Soon Be Over". In Regional Monitor, No.4 1994. pp. 1-7.
- _____ (1989). "Cebu's Business Boom: A Tough Act to Follow". In Spurring Growth at the Grass Roots , Vol. 0, No. 0. pp. 63-71.
- _____ (1988). "NIC Fever on Fiesta Island (And the Many Other Reasons Why I Hope to See You in Cebu)". In The Making of a Vibrant Economy, Vol. 0, No. 0. pp. 41-49.
- Clad, James (1988). "Cebu Sets the Pace". In Far Eastern Economic Review, Vol.142, No. 45. pp. 82-84.
- Department of Trade and Industry (1996). "Comparative Trade and Industry Indicator Cebu Province 1990-1995" 1 p.
- Environmental Management Bureau (1993). "Environmental Impact Assessment Handbook". Department of Environment and Natural Resources.

Faensen-Thiebes, A. (1992). "Treatment Facility for Toxic Wastes in Cebu". In Industrial Pollution Control-Cebu Bulletin. Vol. 1, No 4. p.1-2.

Industrial Environmental Management Project (1995). "Analysis of Current Regulatory Programs for Pollution Management. Policy Study No. 2/10. 34 p.

Labrador, R. (1993). "Process Optimization and Waste Minimization in the Electroplating Industry". In Industrial Pollution Control-Cebu Bulletin. Vol. 1, No. 5-6. pp.1-3.

Llanto, R. B. (1993). "Used Oil Processing in Cebu City". In Industrial Pollution Control-Cebu Bulletin. Vol. 2, No 2. pp. 1-2.

Medalla, E. M. (1996). "Industrial Policy". Revised Draft. 29 p.

National Economic and Development Authority (1978). "Philippine Standard Industrial Classification". Manila. 356 p.

_____ (n.d.). "Population Projections for the Philippines and Its Regions, Provinces and Cities/Municipalities 1980-2030. Pasig, Metro Manila. 434 p.

Oposa, A. A., Jr. (1996). "Environmental Policy and Legal Framework of the Philippines". Draft. Makati City, Philippines. 22 p.

Pacific Consultants International Nippon Koei Co., Ltd. (1994a). "Cebu Master Plan 2010 A Scenario for Sustainable Development. An Outline of the JICA Study". Regional Development Council Region VII, Republic of the Philippines and Japan International Cooperation Agency. 22 p.

_____ (1994b). "The Study on the Cebu Integrated Area Development Master Plan, Final Report, Executive Summary". Regional Development Council Region VII, Republic of the Philippines and Japan International Cooperation Agency.

_____ (1994c). "The Study on the Cebu Integrated Area Development Master Plan, Final Report, Vol. 2: Sector Studies". Regional Development Council Region VII, Republic of the Philippines and Japan International Cooperation Agency.

_____ (1994d). "The Study on the Cebu Integrated Area Development Master Plan, Final Report, Vol. 3: A Profile of Proposed Projects and Programs". Regional Development Council Region VII, Republic of the Philippines and Japan International Cooperation Agency.

_____ (1994e). "The study on the Cebu Integrated Area Development Master Plan, Draft Final Report, Vol. 2: Sector Studies". Regional Development Council VII, Republic of the Philippines and Japan International cooperation Agency.

Philippine-German Project-Industrial Pollution Control Cebu (1995a). "Low Waste Technology: The Process Integrated Pollution Control Approach". In Earthbound. Vol. 1, No. 1. pp. 5-6.

_____ (1995b). "Clean Technology: Its Time Has Come". In Earthbound. Vol. 1, No. 1. pp.10-8-9.

_____ (1995c). "The Philippine-German Project Industrial Pollution control-Cebu". Brief. DENR, Banilad, Mandaue City.

_____ (1995d). "Common Treatment Facility for the Electroplating Industries of Metro Cebu". In Earthbound. Vol. 1, No. 1. pp. 6-8.

_____ (n.d.,a). "Toxic Waste - A Problem of Industrialization". PGP-IPCC Brochure. Department Of Environment and Natural Resources, Greenplains Subdivision, Banilad, Mandaue City.

_____ (n.d.,b). "An Optimism for Metro Cebu's Continued Industrial Growth". PGP-IPCC Brochure. Department Of Environment and Natural Resources, Greenplains Subdivision, Banilad, Mandaue City.

_____ (n.d.,c). "Electroplating". Factsheet. DENR, Banilad, Mandaue City.

PRC Environmental Management, Inc. (1996). "Philippine Industry's Response to Waste Minization: Pollution Prevention Success Stories". Prepared for the Environmental Management Bureau, Department of Environment and Natural Resources. 16 p.

Ricana, M. V. (1992). "An Approach to Toxic Waste Management for Small and Medium Scale Industries in Cebu". In Industrial Pollution Control-Cebu Bulletin. Vol. 1, No. 2. pp. 1, 6.

Terosa, C. (1995). "Cebu's Power Play in the Philippine Economy: Are We Number One?" Paper Presented at the 1996 Business Prospects for the Philippine and the Global Markets, December 15, 1995 at the Cebu Plaza Hotel, Cebu City. 12 p.

University of Asia and the Pacific (1996). "Assessing Metro Cebu's Development Strategy". In Regional Monitor, No.1 1996. pp. 8-10.

Villamor, J. (1996). "Setting Up Shop in Cebu". In Sun-Star Weekend, March 24, 1996. pp. 6-8.

Appendix A: Tables

Table 1: Population Estimates for Cities and Municipalities of Metro Cebu, 1980-2030.

Cities/Municipalities	1980	1990	2000	2010	2020	2030
<i>Cebu City</i>						
Urban	492,056	627,124	761,826	874,673	971,651	1,056,086
Rural	-	-	-	-	-	-
Total	492,056	627,124	761,826	874,673	971,651	1,056,086
<i>Mandaue City</i>						
Urban	110,990	176,065	257,451	344,032	430,029	508,351
Rural	-	-	-	-	-	-
Total	110,990	176,065	257,451	344,032	430,029	508,351
<i>Lapu-Lapu City</i>						
Urban	99,080	126,104	153,013	175,511	194,827	211,646
Rural	-	-	-	-	-	-
Total	99,080	126,104	153,013	175,511	194,827	211,646
<i>Talisay</i>						
Urban	22,073	34,159	52,961	75,342	100,159	127,963
Rural	47,899	57,600	61,229	58,373	50,672	37,769
Total	69,972	91,759	114,190	133,715	150,831	165,732
<i>Consolacion</i>						
Urban	6,428	9,947	15,422	21,939	29,166	37,262
Rural	21,125	25,907	28,906	29,691	28,832	26,278
Total	27,553	35,854	44,328	51,630	57,998	63,540
<i>Metro Cebu</i>						
Urban	799,651	973,399	1,240,673	1,491,497	1,725,832	1,941,308
Rural	69,024	83,507	90,135	88,064	79,504	64,047
Total	799,651	1,056,906	1,330,808	1,579,561	1,805,336	2,005,355

Source: NEDA (n.d.).

Table 2: Gross Regional Domestic Product of the Central Visayas Region, Constant Prices, 1975-95 (Thousand Pesos).

	1975		1980		1985		1990		1995	
	Value	%	Value	%	Value	%	Value	%	Value	%
1. AGRICULTURE, FISHERY, FORESTRY	4,261,165		5,629,609		5,676,378		6,914,538		7,600,818	
a. Agriculture	4,184,543	14.99	5,567,850	14.84	5,639,488	15.77	6,914,491	14.65	7,600,809	14.43
b. Forestry	76,622	0.27	61,759	0.16	36,890	0.10	47	0.00	9	0.00
2. INDUSTRY SECTOR	10,095,716		14,162,945		11,842,405		15,409,411		15,968,321	
a. Mining and Quarrying	1,423,136	5.10	2,266,533	6.04	2,058,270	5.76	2,161,741	4.58	1,019,179	1.93
b. Manufacturing	6,908,679	24.75	8,302,703	22.14	7,709,207	21.56	9,905,726	20.99	10,693,549	20.30
c. Construction	1,411,120	5.05	3,103,358	8.27	1,224,139	3.42	2,416,561	5.12	2,690,002	5.11
d. Electricity, Gas, Water	352,781	1.26	490,351	1.31	850,789	2.38	925,383	1.96	1,565,591	2.97
3. SERVICE SECTOR	13,562,099		17,715,517		18,235,292		24,869,320		29,110,518	
a. Transport., Comm., Storage	1,672,169	5.99	2,204,203	5.88	2,021,387	5.65	2,697,753	5.72	3,123,636	5.93
b. Trade	6,842,012	24.51	9,069,179	24.18	9,475,882	26.50	13,374,544	28.34	15,806,029	30.00
c. Finance	568,557	2.04	893,968	2.38	543,480	1.52	942,574	2.00	1,079,916	2.05
d. O. Dwellings & Real Estate	2,190,766	7.85	2,429,297	6.48	2,483,431	6.95	3,177,188	6.73	3,533,127	6.71
e. Private Services	1,473,000	5.28	2,064,513	5.50	2,612,701	7.31	3,361,744	7.12	3,780,361	7.18
f. Government Services	815,595	2.92	1,054,357	2.81	1,098,411	3.07	1,315,517	2.79	1,787,449	3.39
GROSS DOMESTIC PRODUCT	27,918,980	100.00	37,508,071	100.00	35,754,075	100.00	47,193,269	100.00	52,679,657	100.00
<i>Periodic Growth Rate of Manufacturing</i>	-		20.18		-7.15		28.49		7.95	
<i>Periodic Growth Rate of GDP</i>	-		34.35		-4.68		32.00		11.63	

Source: NSCB.

Table 3: Comparative Economic Indicators Between the CVR, NCR and the Philippines.

Indicator	Philippines	NCR	CVR
Average Annual Growth Rate of the Gross Regional Domestic Product (1988-94)	3.2%	3.4%	3.5%
Average Annual Inflation Rate (1990-95)	10.53%	12.34%	10.23%
Average Compounded Growth of Investment (1990-94)	39.9%	25.3%	82.8%
Balance of Trade (1994)			
Exports (Million US\$)	13,516	9,157	1,146
Imports (Million US\$)	28,317	20,357	964
Net Exports (Million US\$)	(14,801)	(11,200)	(182)

Source of Basic Data: Various agencies as cited in Terosa (1995).

Table 4: BOI Registered Manufacturing Projects in Metro Cebu, by Industry Group, 1975-1996.

PSIC CODE	Industry Group	Number of Projects	Percent to Total
311 & 312	Food	54	16.98
313	Beverages	-	-
314	Tobacco	-	-
321	Textile	9	2.83
322	Wearing apparel except footwear	11	3.46
323	Leather and leather products, leather substitutes & furs, except footwear and wearing apparel	1	0.31
324	Footwear, except rubber, plastic or wood furniture	2	0.63
331	Wood, wood and cork products, except furniture	13	4.09
332	Furniture and fixtures, except primarily of metal (including repairs)	85	26.73
341	Paper and paper products	4	1.26
342	Printing, publishing and allied industries	-	-
351	Industrial chemicals	3	0.94
352	Other chemical products	9	2.83
353	Petroleum refineries	-	-
354	Miscellaneous products of petroleum and coal	-	-
355	Rubber products	1	0.31
356	Plastic products, n.e.c.	6	1.89
361	Pottery, china and earthenware	2	0.63
362	Glass and glass products	-	-
363	Cement	-	-
369	Other non-metallic mineral products	20	6.29
371	Iron and steel basic industries	4	1.26
372	Non-ferrous metal basic industries	-	-
381	Fabricated metal products, except machinery and equipment, furniture and fixtures primarily of metal	7	2.20
382	Machinery except electrical	3	0.94
383	Electrical machinery, apparatus, appliances and supplies	3	0.94
384	Transport equipment	3	0.94
385	Professional and scientific and measuring and controlling equipment, n.e.c. and photographic and optical instrument	1	0.31
386	Furniture and fixtures primarily of metal (including repairs)	8	2.52
390	Other industries	10	3.14
400	Mixed Industries	59	18.55
	TOTAL	318	100.00

Source: BOI Makati Office Data Files.

Table 5:BOI Registered Manufacturing Projects in Metro Cebu, By Industry Group and Period of Registration, 1975-1996.

PSIC CODE	Industry Group	Period of Registration (Number of Projects)									
		1975-1980		1981-1985		1986-1990		1991-1996		No Data	
		No.	%	No.	%	No.	%	No.	%	No.	%
311 & 312	Food	6	20.00	10	20.41	15	11.54	23	21.30	-	-
313	Beverages	-	-	-	-	-	-	-	-	-	-
314	Tobacco	-	-	-	-	-	-	-	-	-	-
321	Textile	-	-	1	2.04	5	3.85	3	2.78	-	-
322	Wearing apparel except footwear	2	6.67	2	4.08	2	1.54	5	4.63	-	-
323	Leather and leather products, leather substitutes & furs, except footwear and wearing apparel	-	-	-	-	1	0.77	-	-	-	-
324	Footwear, except rubber, plastic or wood footwear	1	3.33	-	-	-	-	1	0.93	-	-
331	Wood, wood and cork products, except furniture	-	-	2	4.08	6	4.62	5	4.63	-	-
332	Furniture and fixtures, except primarily of metal (including repairs)	9	30.00	27	55.10	35	26.92	13	12.04	1	100.00
341	Paper and paper products	-	-	-	-	3	2.31	1	0.93	-	-
342	Printing, publishing and allied industries	-	-	-	-	-	-	-	-	-	-
351	Industrial chemicals	-	-	-	-	3	2.31	-	-	-	-
352	Other chemical products	2	6.67	-	-	2	1.54	5	4.63	-	-
353	Petroleum refineries	-	-	-	-	-	-	-	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-	-	-	-	-	-	-	-
355	Rubber products	-	-	-	-	-	-	1	0.93	-	-
356	Plastic products, n.e.c.	-	-	-	-	2	1.54	4	3.70	-	-
361	Pottery, china and earthenware	-	-	-	-	1	0.77	1	0.93	-	-
362	Glass and glass products	-	-	-	-	-	-	-	-	-	-
363	Cement	-	-	-	-	-	-	-	-	-	-
369	Other non-metallic mineral products	-	-	1	2.04	16	12.31	3	2.78	-	-
371	Iron and steel basic industries	2	6.67	-	-	2	1.54	-	-	-	-
372	Non-ferrous metal basic industries	-	-	-	-	-	-	-	-	-	-
381	Fabricated metal products, except machinery & equipment, furniture and fixtures primarily of metal	1	3.33	-	-	1	0.77	5	4.63	-	-
382	Machinery except electrical	-	-	-	-	1	0.77	2	1.85	-	-
383	Electrical machinery, apparatus, appliances and supplies	1	3.33	-	-	1	0.77	1	0.93	-	-
384	Transport equipment	1	3.33	-	-	1	0.77	1	0.93	-	-
385	Professional and scientific and measuring & controlling equipment, n.e.c. and photographic & optical instrument	-	-	-	-	-	-	1	0.93	-	-
386	Furniture and fixtures primarily of metal (including repairs)	-	-	-	-	1	0.77	7	6.48	-	-
390	Other industries	1	3.33	1	2.04	2	1.54	6	5.56	-	-
400	Mixed Industries	4	13.33	5	10.20	30	23.08	20	18.52	-	-
	TOTAL	30	100.00	49	100.00	130	100.00	108	100.00	1	100.00
	<i>Cumulative Total</i>	<i>30</i>		<i>79</i>		<i>209</i>		<i>317</i>		<i>318</i>	
	<i>Periodic Growth Rate (%)</i>			<i>163.00</i>		<i>165.00</i>		<i>51.67</i>			
	<i>Periodic Average Growth Rate</i>							<i>76.00</i>			

Source: BOI Makati Office Data Files.

Table 6: BOI Registered Manufacturing Projects in Metro Cebu, By Industry Group and Current Status of Operation, 1975-1996.

PSIC CODE	Industry Group	Status of Operation					Total
		Operating	Pre-Operating	Stopped Operating	Cancelled/ Never Operated	No Data	
311 & 312	Food	39	6	1	5	3	54
313	Beverages	-	-	-	-	-	-
314	Tobacco	-	-	-	-	-	-
321	Textile	7	1	-	1	-	9
322	Wearing apparel except footwear	6	2	2	1	-	11
323	Leather and leather products, leather substitutes & furs, except footwear and wearing apparel	-	-	1	-	-	1
324	Footwear, except rubber, plastic or wood footwear	1	1	-	-	-	2
331	Wood, wood and cork products, except furniture	7	3	1	1	1	13
332	Furniture and fixtures, except primarily of metal (including repairs)	69	2	4	5	5	85
341	Paper and paper products	3	-	1	-	-	4
342	Printing, publishing and allied industries	-	-	-	-	-	-
351	Industrial chemicals	3	-	-	-	-	3
352	Other chemical products	6	3	-	-	-	9
353	Petroleum refineries	-	-	-	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-	-	-	-
355	Rubber products	-	1	-	-	-	1
356	Plastic products, n.e.c.	3	-	-	2	1	6
361	Pottery, china and earthenware	1	1	-	-	-	2
362	Glass and glass products	-	-	-	-	-	-
363	Cement	-	-	-	-	-	-
369	Other non-metallic mineral products	14	2	2	2	-	20
371	Iron and steel basic industries	1	-	2	1	-	4
372	Non-ferrous metal basic industries	-	-	-	-	-	-
381	Fabricated metal products, except machinery and equipment, furniture and fixtures primarily of metal	5	1	1	-	-	7
382	Machinery except electrical	3	-	-	-	-	3
383	Electrical machinery, apparatus, appliances and supplies	-	1	1	1	-	3
384	Transport equipment	3	-	-	-	-	3
385	Professional and scientific and measuring and controlling equipment, n.e.c. and photographic and optical instrument	1	-	-	-	-	1
386	Furniture and fixtures primarily of metal (including repairs)	6	2	-	-	-	8
390	Other industries	8	-	-	2	-	10
400	Mixed Industries	47	6	5	-	1	59
	TOTAL	233	32	21	21	11	318
	<i>Percent to Total</i>	<i>73.27</i>	<i>10.06</i>	<i>6.60</i>	<i>6.60</i>	<i>3.46</i>	<i>100.00</i>

Source: BOI Makati Office Data Files.

Table 7: BOI Registered Manufacturing Projects in Metro Cebu, By Industry Group and Plant Location, 1975-1996.

PSIC CODE	Industry Group	Plant Location					No Data	Total
		Cebu City	Mandaue City	Lapu-Lapu City	Consolacion	Talisay		
311 & 312	Food	6	40	2	2	3	1	54
313	Beverages	-	-	-	-	-	-	-
314	Tobacco	-	-	-	-	-	-	-
321	Textile	2	5	-	-	2	-	9
322	Wearing apparel except footwear	6	5	-	-	-	-	11
323	Leather and leather products, leather substitutes & furs, except footwear and wearing apparel	-	-	1	-	-	-	1
324	Footwear, except rubber, plastic or wood footwear	2	-	-	-	-	-	2
331	Wood, wood and cork products, except furniture	6	7	-	-	-	-	13
332	Furniture and fixtures, except primarily of metal (including repairs)	16	56	-	-	10	3	85
341	Paper and paper products	2	2	-	-	-	-	4
342	Printing, publishing and allied industries	-	-	-	-	-	-	-
351	Industrial chemicals	2	1	-	-	-	-	3
352	Other chemical products	2	6	-	-	-	1	9
353	Petroleum refineries	-	-	-	-	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-	-	-	-	-
355	Rubber products	-	-	-	1	-	-	1
356	Plastic products, n.e.c.	1	5	-	-	-	-	6
361	Pottery, china and earthenware	-	2	-	-	-	-	2
362	Glass and glass products	-	-	-	-	-	-	-
363	Cement	-	-	-	-	-	-	-
369	Other non-metallic mineral products	4	13	3	-	-	-	20
371	Iron and steel basic industries	2	2	-	-	-	-	4
372	Non-ferrous metal basic industries	-	-	-	-	-	-	-
381	Fabricated metal products, except machinery and equipment, furniture and fixtures primarily of metal	-	6	1	-	-	-	7
382	Machinery except electrical	1	1	-	-	1	-	3
383	Electrical machinery, apparatus, appliances and supplies	2	1	-	-	-	-	3
384	Transport equipment	-	3	-	-	-	-	3
385	Professional and scientific and measuring and controlling equipment, n.e.c. and photographic and optical instrument	1	-	-	-	-	-	1
386	Furniture and fixtures primarily of metal (including repairs)	1	6	1	-	-	-	8
390	Other industries	5	4	-	-	1	-	10
400	Mixed Industries	17	36	5	-	-	1	59
	TOTAL	78	201	13	3	17	6	318
	<i>Percent to Total</i>	<i>24.53</i>	<i>63.21</i>	<i>4.09</i>	<i>0.94</i>	<i>5.35</i>	<i>1.89</i>	<i>100.00</i>

Source: BOI Makati Office Data Files.

Table 8: Manufacturing Firms in the MEPZ, By Industry Group, 1996.

PSIC CODE	Industry Group	Number of Firms	Percent to Total
311 & 312	Food	2	2.22
313	Beverages	-	-
314	Tobacco	-	-
321	Textile	-	-
322	Wearing apparel except footwear	19	21.11
323	Leather and leather products, leather substitutes & furs, except footwear and wearing apparel	3	3.33
324	Footwear, except rubber, plastic or wood footwear	-	-
331	Wood, wood and cork products, except furniture	1	1.11
332	Furniture and fixtures, except primarily of metal (including repairs)	-	-
341	Paper and paper products	1	1.11
342	Printing, publishing and allied industries	1	1.11
351	Industrial chemicals	2	2.22
352	Other chemical products	-	-
353	Petroleum refineries	-	-
354	Miscellaneous products of petroleum and coal	-	-
355	Rubber products	-	-
356	Plastic products, n.e.c.	3	3.33
361	Pottery, china and earthenware	-	-
362	Glass and glass products	-	-
363	Cement	-	-
369	Other non-metallic mineral products	-	-
371	Iron and steel basic industries	4	4.44
372	Non-ferrous metal basic industries	2	2.22
381	Fabricated metal products, except machinery and equipment, furniture and fixtures primarily of metal	4	4.44
382	Machinery except electrical	7	7.78
383	Electrical machinery, apparatus, appliances & supplies	10	11.11
384	Transport equipment	3	3.33
385	Professional and scientific and measuring & controlling equipment, n.e.c. and photographic & optical instrument	9	10.00
386	Furniture & fixtures primarily of metal (including repairs)	-	-
390	Other industries	6	6.67
400	Mixed Industries	13	14.44
	TOTAL	90	100.00

Source of Basic Data: MEPZ Office Data Files.

Table 9: Manufacturing Firms in the MEPZ, By Industry Group and Period of Registration, 1975-1996.

PSIC CODE	Industry Group	Period of Start of Operations							
		1979-1980		1981-1985		1986-1990		1991-1996	
		No.	%	No.	%	No.	%	No.	%
311 & 312	Food	-	-	1	50.00	-	-	1	1.72
313	Beverages	-	-	-	-	-	-	-	-
314	Tobacco	-	-	-	-	-	-	-	-
321	Textile	-	-	-	-	-	-	-	-
322	Wearing apparel except footwear	1	25.00	-	-	5	19.23	13	22.41
323	Leather and leather products, leather substitutes & furs, except footwear and wearing apparel	1	25.00	-	-	-	-	2	3.45
324	Footwear, except rubber, plastic or wood footwear	-	-	-	-	-	-	-	-
331	Wood, wood and cork products, except furniture	-	-	1	50.00	-	-	-	-
332	Furniture and fixtures, except primarily of metal (including repairs)	-	-	-	-	-	-	-	-
341	Paper and paper products	-	-	-	-	-	-	1	1.72
342	Printing, publishing and allied industries	-	-	-	-	-	-	1	1.72
351	Industrial chemicals	-	-	-	-	1	3.85	1	1.72
352	Other chemical products	-	-	-	-	-	-	-	-
353	Petroleum refineries	-	-	-	-	-	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-	-	-	-	-	-
355	Rubber products	-	-	-	-	-	-	-	-
356	Plastic products, n.e.c.	-	-	-	-	-	-	3	5.17
361	Pottery, china and earthenware	-	-	-	-	-	-	-	-
362	Glass and glass products	-	-	-	-	-	-	-	-
363	Cement	-	-	-	-	-	-	-	-
369	Other non-metallic mineral products	-	-	-	-	-	-	-	-
371	Iron and steel basic industries	-	-	-	-	1	3.85	3	5.17
372	Non-ferrous metal basic industries	-	-	-	-	-	-	2	3.45
381	Fabricated metal products, except machinery & equipment, furniture and fixtures primarily of metal	-	-	-	-	2	7.69	2	3.45
382	Machinery except electrical	-	-	-	-	2	7.69	5	8.62
383	Electrical machinery, apparatus, appliances and supplies	1	25.00	-	-	4	15.38	2	3.45
384	Transport equipment	-	-	-	-	1	3.85	7	12.07
385	Professional and scientific and measuring & controlling equipment, n.e.c. and photographic & optical instrument	1	25.00	-	-	1	3.85	-	-
386	Furniture and fixtures primarily of metal (including repairs)	-	-	-	-	-	-	-	-
390	Other industries	-	-	-	-	4	15.38	2	3.45
400	Mixed Industries	-	-	-	-	5	19.23	8	13.79
	TOTAL	4	100.00	2	100.00	26	100.00	58	100.00
	<i>Cumulative Total</i>	<i>4</i>		<i>6</i>		<i>32</i>		<i>90</i>	
	<i>Periodic Growth Rate (%)</i>	<i>-</i>		<i>50.00</i>		<i>433.33</i>		<i>181.25</i>	
	<i>Periodic Average Growth Rate</i>							<i>166.15</i>	

Source: MEPZ Office Data Files.

Table 10: Manufacturing Firms in the MEPZ, By Industry Group and Employment, 1996.

PSIC CODE	Industry Group	Number of Firms	Total Employment	Percent to Total
311 & 312	Food	2	41	0.14
313	Beverages	-	-	-
314	Tobacco	-	-	-
321	Textile	-	-	-
322	Wearing apparel except footwear	19	4,248	15.00
323	Leather and leather products, leather substitutes & furs, except footwear and wearing apparel	3	2,348	8.29
324	Footwear, except rubber, plastic or wood footwear	-	-	-
331	Wood, wood and cork products, except furniture	1	86	0.30
332	Furniture and fixtures, except primarily of metal (including repairs)	-	-	-
341	Paper and paper products	1	62	0.22
342	Printing, publishing and allied industries	1	-	-
351	Industrial chemicals	2	40	0.14
352	Other chemical products	-	-	-
353	Petroleum refineries	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-
355	Rubber products	-	-	-
356	Plastic products, n.e.c.	3	403	1.42
361	Pottery, china and earthenware	-	-	-
362	Glass and glass products	-	-	-
363	Cement	-	-	-
369	Other non-metallic mineral products	-	-	-
371	Iron and steel basic industries	4	552	1.95
372	Non-ferrous metal basic industries	2	57	0.20
381	Fabricated metal products, except machinery & equipment, furniture & fixtures primarily of metal	4	542	1.91
382	Machinery except electrical	7	161	0.57
383	Electrical machinery, apparatus, appliances & supplies	10	8,753	30.90
384	Transport equipment	3	702	2.48
385	Professional and scientific and measuring & controlling equipment, n.e.c. & photographic & optical instrument	9	5,590	19.74
386	Furniture and fixtures primarily of metal (including repairs)	-	-	-
390	Other industries	6	654	2.31
400	Mixed Industries	13	4,085	14.42
	TOTAL	90	28,324	100.00

Source of Basic Data: MEPZ Office Data Files.

Table 11: Ground Water Quality in Metro Cebu (Mg/L).

Cation	Permissible Level	Talisay	Pardo	Lahug-Guadalupe	Talamban	Consolacion	Mactan
Ca ²⁺	75	104-160	52-125	87-104	80-116	88-121	88-174
Mg ²⁺	50	22-34	4-46	15-30	7-280	2-14	-
Na ⁺	-	-	-	-	-	-	-
NH ₄ ⁺	-	-	-	-	-	-	-

Anions							
NO ₃ ⁻	30	4-7	7-30	7-36	7-13	4-13	9-1
Cl ⁻	200	4-17	17-61	14-55	15-36	14-130	43-757
SO ₄ ²⁻	200	50-55	<0.02-30	7-29	17-34	<0.02-28	10-37

Parameter							
TDS	-	492-256	350-646	414-584	384-508	326-700	354-1800
TSS	-	4-56	2-32	4-34	2-38	2-18	6-104

Source: MCWD as cited in PCINKCL (1994c).

Table 12: Coliform Bacteria in Talisay Beaches, 1992.

Station	Pook	Sawsawan	Cogon	Duljo	Ludo
Sampling Date					
4/21	490	49	46	13,000	24,000
5/19	33	46	47	13,000	24,000
6/17	-	23	23	490	350
7/14	2,400	49	8	350	540
8/31	-	240,000	13,000	-	5
9/29	130	54,000	790	4,900	240,000
10/20	-	27	-	-	920
11/25	49	1	1,600	540	2,400

Source: PCINKL (1994c).

Note: Standard is 1,000 MPN/100ml.

Table 13: Air Quality TSP (PM-10) Monitoring Values and Evaluation in Metro Cebu, 1992.

Sampling Station & Location	7/1/92	8/6/92	9/18/92	10/6/92	11/01/92	12/18/92
DENR Region 7 Office Banilad, Mandaue	117.14 (P)	113.94 (P)	55.30 (P)	70.70 (P)	105.80 (P)	70.10 (P)
San Miguel Corp. Highway, Mandaue	594.85 (F)	149.36 (P)	248.20 (F)	252.70 (F)	367.00 (F)	220.20 (F)
Marine Colloids Philippines Looc, Mandaue	193.23 (F)	33.6 (P)	136.0 (P)	92.94 (P)	146.50 (P)	117.20 (P)
Ludo & Luym Corp. Tupas St., Cebu	53.88 (P)	91.88 (P)	146.75 (P)	81.86 (P)	179.60 (F)	135.20 (P)
O. Cabando's Residence Sudlon, Lahug, Cebu	110.87 (P)	59.46 (P)	226.25 (F)	67.50 (P)	-	764.64 (F)
Engr. Abangan's Residence Pardo, Cebu	96.97 (P)	20.84 (P)	64.12 (P)	149.00 (P)	169.96 (F)	No Sampling

Source: PCINKL (1994c).

Note: TSP: Total Suspended Particulates (PM-10) = High Volume with 10 micron particle-size inlet; Gravimetric.

TSP: Standard Value (Short term) = 15- ug/cu. cm.

Evaluation: (P) denotes "Passed"; (F) "Failed"

Table 14: BOI Registered and Operating Manufacturing Projects in Metro Cebu, By Industry Group and Pollution Potential, 1996.

PSIC Code	Major Industry Group	Pollution Potential	No. of Firms	Percent to Total
311 & 312	Food	Highly Pollutive/Non-Hazardous	39	16.74
313	Beverages	-	-	-
314	Tobacco	-	-	-
321	Textile	Pollutive/Hazardous	7	3.00
322	Wearing apparel except footwear	Non-Pollutive/Non-Hazardous	6	2.58
323	Leather and leather products, leather substitutes & furs, except footwear and wearing apparel	-	-	-
324	Footwear, except rubber, plastic or wood footwear	Non-Pollutive/Non-Hazardous	1	0.43
331	Wood, wood and cork products, except furniture	Non-Pollutive/Hazardous	7	3.00
332	Furniture & fixtures, except primarily of metal (including repairs)	Non-Pollutive/Hazardous	69	29.61
341	Paper and paper products	Highly Pollutive/Hazardous	3	1.29
342	Printing, publishing & allied industries	-	-	-
351	Industrial chemicals	Highly Pollutive/Extremely Hazardous	3	1.29
352	Other chemical products	Highly Pollutive/Extremely Hazardous	6	2.58
353	Petroleum refineries	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-
355	Rubber products	-	-	-
356	Plastic products, n.e.c.	Pollutive/Hazardous	3	1.29
361	Pottery, china & earthenware	Pollutive/Hazardous	1	0.43
362	Glass & glass products	-	-	-
363	Cement	-	-	-
369	Other non-metallic mineral products	Highly Pollutive/Hazardous	14	6.01
371	Iron & steel basic industries	Highly Pollutive/Hazardous	1	0.43
372	Non-ferrous metal basic industries	-	-	-
381	Fabricated metal products, except machinery and equipment, furniture & fixtures primarily of metal	Non-Pollutive/Non-Hazardous	5	2.15
382	Machinery except electrical	Pollutive/Hazardous	3	1.29
383	Electrical machinery, apparatus, appliances & supplies	Pollutive/Hazardous	-	-
384	Transport equipment	Pollutive/Hazardous	3	1.29
385	Professional & scientific & measuring & controlling equipment, n.e.c. & photographic & optical instrument	Non-Pollutive/Non-Hazardous	1	0.43
386	Furniture & fixtures primarily of metal (including repairs)	Pollutive/Non-Hazardous	6	2.58
390	Other industries	Mixed	8	3.43
400	Mixed industries	Mixed	47	20.17
	TOTAL		233	100.00

Source: BOI Makati Office Data Files.
EMB (1993).

Table 15: Manufacturing Firms in the MEPZ, By Industry Group and Pollution Potential, 1996.

PSIC Code	Major Industry Group	Pollution Potential	No. of Firms	Percent to Total
311 & 312	Food	Highly Pollutive/Non-Hazardous	2	2.22
313	Beverages	-	-	-
314	Tobacco	-	-	-
321	Textile	-	-	-
322	Wearing apparel except footwear	Non-Pollutive/Non-Hazardous	19	21.11
323	Leather and leather products, leather substitutes & furs, except footwear and weaing apparel	Highly Pollutive/Hazardous	3	3.33
324	Footwear, except rubber, plastic or wood footwear	-	-	-
331	Wood, wood and cork products, except furniture	Non-Pollutive/Hazardous	1	1.11
332	Furniture & fixtures, except primarily of metal (including repairs)	-	-	-
341	Paper and paper products	Highly Pollutive/Hazardous	1	1.11
342	Printing, publishing & allied industries	Non-Pollutive/Hazardous	1	1.11
351	Industrial chemicals	Highly Pollutive/Extremely Hazardous	2	2.22
352	Other chemical products	-	-	-
353	Petroleum refineries	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-
355	Rubber products	-	-	-
356	Plastic products, n.e.c.	Pollutive/Hazardous	3	3.33
361	Pottery, china & earthenware	-	-	-
362	Glass & glass products	-	-	-
363	Cement	-	-	-
369	Other non-metallic mineral products	-	-	-
371	Iron & steel basic industries	Highly Pollutive/Hazardous	4	4.44
372	Non-ferrous metal basic industries	Highly Pollutive/Hazardous	2	2.22
381	Fabricated metal products, except machinery and equipment, furniture & fixtures primarily of metal	Non-Pollutive/Non-Hazardous	4	4.44
382	Machinery except electrical	Pollutive/Hazardous	7	7.78
383	Electrical machinery, apparatus, appliances & supplies	Pollutive/Hazardous	10	11.11
384	Transport equipment	Pollutive/Hazardous	3	3.33
385	Professional & scientific & measuring & controlling equipment, n.e.c. & photographic & optical instrument	Non-Pollutive/Non-Hazardous	9	10.00
386	Furniture & fixtures primarily of metal (including repairs)	-	-	-
390	Other industries	Mixed	6	6.67
400	Mixed industries	Mixed	13	14.44
	TOTAL		90	100.00

Sources: MEPZ Office Data Files.
EMB (1993).

Table 16: BOI Registered Manufacturing Projects in Metro Cebu, By Industry Group and Type of Producers, 1975-1996.

PSIC CODE	Industry Group	Type of Producer			Total
		Export Producer	Domestic Producer	No Data	
311 & 312	Food	46	7	1	54
313	Beverages	-	-	-	-
314	Tobacco	-	-	-	-
321	Textile	8	1	-	909
322	Wearing apparel except footwear	11	-	-	1100
323	Leather & leather products, leather substitutes & furs, except footwear and wearing apparel	1	-	-	99
324	Footwear, except rubber, plastic or wood footwear	2	-	-	2
331	Wood, wood and cork products, except furniture	13	-	-	13
332	Furniture and fixtures, except primarily of metal (including repairs)	83	1	1	85
341	Paper and paper products	4	-	-	4
342	Printing, publishing and allied industries	-	-	-	-
351	Industrial chemicals	2	1	-	3
352	Other chemical products	8	1	-	9
353	Petroleum refineries	-	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-	-
355	Rubber products	1	-	-	1
356	Plastic products, n.e.c.	6	-	-	6
361	Pottery, china and earthenware	2	-	-	2
362	Glass and glass products	-	-	-	-
363	Cement	-	-	-	-
369	Other non-metallic mineral products	20	-	-	20
371	Iron and steel basic industries	2	2	-	4
372	Non-ferrous metal basic industries	-	-	-	-
381	Fabricated metal products, except machinery & equipment, furniture & fixtures primarily of metal	3	4	-	7
382	Machinery except electrical	1	2	-	3
383	Electrical machinery, apparatus, appliances & supplies	3	-	-	3
384	Transport equipment	2	1	-	3
385	Professional and scientific and measuring & controlling equipment, n.e.c. and photographic & optical instrument	1	-	-	1
386	Furniture and fixtures primarily of metal (including repairs)	8	-	-	8
390	Other industries	10	-	-	10
400	Mixed Industries	57	-	2	59
	TOTAL	294	20	4	318
	<i>Percent to Total</i>	<i>92.45</i>	<i>6.29</i>	<i>1.26</i>	<i>100.00</i>

Source: BOI Makati Office Data Files.

Table 17: BOI Registered Manufacturing Projects in Metro Cebu, By Industry Group and Industrial Incentives Legislation, 1975-1996.

PSIC CODE	Industry Group							Total
		RA 5186 (1967)	RA 6135 (1970)	PD 1789 (1981)	BP 391 (1983)	EO 226 (1987)	No Data	
311 & 312	Food	1	3	7	10	33	-	33
313	Beverages	-	-	-	-	-	-	-
314	Tobacco	-	-	-	-	-	-	-
321	Textile	-	-	1	1	7	-	7
322	Wearing apparel except footwear	-	2	2	-	7	-	7
323	Leather and leather products, leather substitutes & furs, except footwear and wearing apparel	-	-	-	-	1	-	1
324	Footwear, except rubber, plastic or wood furniture	-	1	-	-	1	-	1
331	Wood, wood and cork products, except furniture	-	-	-	2	11	-	11
332	Furniture and fixtures, except primarily of metal (including repairs)	-	10	12	24	38	1	39
341	Paper and paper products	-	-	-	-	4	-	4
342	Printing, publishing and allied industries	-	-	-	1	-	-	0
351	Industrial chemicals	-	-	-	-	3	-	3
352	Other chemical products	-	2	-	-	6	-	6
353	Petroleum refineries	-	-	-	-	1	-	1
354	Miscellaneous products of petroleum and coal	-	-	-	-	-	-	-
355	Rubber products	-	-	-	-	-	-	-
356	Plastic products, n.e.c.	-	-	-	-	6	-	6
361	Pottery, china and earthenware	-	-	-	-	2	-	2
362	Glass and glass products	-	-	-	-	-	-	-
363	Cement	-	-	-	-	-	-	-
369	Other non-metallic mineral products	-	-	-	3	17	-	17
371	Iron and steel basic industries	2	-	-	-	2	-	2
372	Non-ferrous metal basic industries	-	-	-	-	-	-	-
381	Fabricated metal products, except machinery and equipment, furniture and fixtures primarily of metal	1	-	-	-	6	-	6
382	Machinery except electrical	-	-	-	1	2	-	2
383	Electrical machinery, apparatus, appliances and supplies	-	1	-	-	2	-	2
384	Transport equipment	1	-	-	-	2	-	2
385	Professional and scientific and measuring and controlling equipment, n.e.c. and photographic and optical instrument	-	-	-	-	1	-	1
386	Furniture and fixtures primarily of metal (including repairs)	-	-	-	-	8	-	8
390	Other industries	-	-	-	2	8	-	8
400	Mixed Industries	-	4	1	11	43	-	43
	TOTAL	5	23	23	55	211	1	318
	<i>Cumulative Total</i>	<i>5</i>	<i>28</i>	<i>51</i>	<i>106</i>	<i>317</i>	<i>318</i>	
	<i>Growth Rate (%)</i>	<i>-</i>	<i>460.00</i>	<i>82.14</i>	<i>107.84</i>	<i>199.06</i>		
	<i>Average Growth Rate</i>					<i>169.81</i>		

Source: BOI Makati Office Data Files.

Table 18: BOI Registered Manufacturing Projects in Metro Cebu, By Industry Group and Nationality of Owner, 1975-1996

PSIC CODE	Industry Group	Nationality of Owner						No Data	Total
		Full Filipino	Full American	Full Japanese	Full South Korean	Filipino-Foreign	Others		
311 & 312	Food	24	-	-	-	8	-	22	54
313	Beverages	-	-	-	-	-	-	-	-
314	Tobacco	-	-	-	-	-	-	-	-
321	Textile	2	-	-	-	4	-	3	9
322	Wearing apparel except footwear	6	-	-	-	2	-	3	11
323	Leather and leather products, leather substitutes & furs, except footwear and wearing apparel	-	-	-	-	-	-	1	1
324	Footwear, except rubber, plastic or wood footwear	1	-	-	-	1	-	-	2
331	Wood, wood and cork products, except furniture	5	-	-	-	4	-	4	13
332	Furniture and fixtures, except primarily of metal (including repairs)	33	-	-	-	8	-	44	85
341	Paper and paper products	3	-	-	-	1	-	-	4
342	Printing, publishing and allied industries	-	-	-	-	-	-	-	-
351	Industrial chemicals	3	-	-	-	-	-	-	3
352	Other chemical products	1	-	-	-	3	1	4	9
353	Petroleum refineries	-	-	-	-	-	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-	-	-	-	-	-
355	Rubber products	-	-	-	-	1	-	-	1
356	Plastic products, n.e.c.	2	-	-	-	3	-	1	6
361	Pottery, china and earthenware	1	-	-	-	1	-	-	2
362	Glass and glass products	-	-	-	-	-	-	-	-
363	Cement	-	-	-	-	-	-	-	-
369	Other non-metallic mineral products	9	-	-	-	4	1	6	20
371	Iron and steel basic industries	2	-	-	-	1	-	1	4
372	Non-ferrous metal basic industries	-	-	-	-	-	-	-	-
381	Fabricated metal products, except machinery and equipment, furniture and fixtures primarily of metal	4	-	-	-	2	-	1	7
382	Machinery except electrical	1	-	-	-	1	-	1	3
383	Electrical machinery, apparatus, appliances and supplies	-	-	-	-	1	-	2	3
384	Transport equipment	1	-	-	-	1	-	1	3
385	Professional and scientific and measuring and controlling equipment, n.e.c. and photographic and optical instrument	1	-	-	-	-	-	-	1
386	Furniture and fixtures primarily of metal (including repairs)	6	-	-	-	-	-	2	8
390	Other industries	2	-	2	-	3	-	3	10
400	Mixed Industries	21	1	-	1	19	-	17	59
	TOTAL	128	1	2	1	68	2	116	318
	<i>Percent to Total</i>	<i>40.25</i>	<i>0.31</i>	<i>0.63</i>	<i>0.31</i>	<i>21.38</i>	<i>0.63</i>	<i>36.48</i>	<i>100.00</i>

Source: BOI Makati Office Data Files.

Table 19: Manufacturing Firms in the MEPZ, By Industry Group and Ownership, 1996

PSIC Code	Industry Group	OWNERSHIP						TOTAL
		Filipino	Japanese	American	Italian	Taiwanese	Others	
311 & 312	Food	1	1	-	-	-	-	2
313	Beverages	-	-	-	-	-	-	-
314	Tobacco	-	-	-	-	-	-	-
321	Textile	-	-	-	-	-	-	-
322	Wearing apparel except footwear	5	12	-	-	1	1	19
323	Leather and leather products, leather substitutes & furs, except footwear and wearing apparel	1	-	1	-	-	1	3
324	Footwear, except rubber, plastic or wood footwear	-	-	-	-	-	-	-
331	Wood, wood and cork products, except furniture	-	-	-	1	-	-	1
332	Furniture and fixtures, except primarily of metal (including repairs)	-	-	-	-	-	-	-
341	Paper and paper products	-	1	-	-	-	-	1
342	Printing, publishing and allied industries	-	1	-	-	-	-	1
351	Industrial chemicals	2	-	-	-	-	-	2
352	Other chemical products	-	-	-	-	-	-	-
353	Petroleum refineries	-	-	-	-	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-	-	-	-	-
355	Rubber products	-	-	-	-	-	-	-
356	Plastic products, n.e.c.	-	3	-	-	-	-	3
361	Pottery, china and earthenware	-	-	-	-	-	-	-
362	Glass and glass products	-	-	-	-	-	-	-
363	Cement	-	-	-	-	-	-	-
369	Other non-metallic mineral products	-	-	-	-	-	-	-
371	Iron and steel basic industries	-	4	-	-	-	-	4
372	Non-ferrous metal basic industries	-	1	1	-	-	-	2
381	Fabricated metal products, except machinery and equipment, furniture and fixtures primarily of metal	-	4	-	-	-	-	4
382	Machinery except electrical	3	3	-	-	-	1	7
383	Electrical machinery, apparatus, appliances and supplies	-	7	1	-	-	2	10
384	Transport equipment	-	2	1	-	-	-	3
385	Professional and scientific and measuring and controlling equipment, n.e.c. and photographic and optical instrument	-	8	-	-	-	1	9
386	Furniture and fixtures primarily of metal (including repairs)	-	-	-	-	-	-	-
390	Other industries	1	5	-	-	-	-	6
400	Mixed Industries	2	7	-	-	2	2	13
	TOTAL	15	59	4	1	3	8	90
	<i>Percent to Total</i>	<i>16.67</i>	<i>65.56</i>	<i>4.44</i>	<i>1.11</i>	<i>3.33</i>	<i>8.89</i>	<i>100.00</i>

Source of Basic Data: MEPZ Office Data Files.

Table 20: Economic Performance of Export Processing Zones, 1994-95.

	Percent Accomplishment of Target	
	1994	1995*
Exports		
Bataan	88.84	75.04
Baguio	131.13	108.50
Mactan	104.84	84.10
Cavite	82.47	84.96
Employment		
Bataan	98.42	113.48
Baguio	99.15	97.25
Mactan	123.10	87.44
Cavite	118.30	97.08
Net Trade Balance		
Bataan	143.89	99.32
Baguio	49.55	35.35
Mactan	272.67	204.89
Cavite	104.64	122.80

* First 10 months of 1995.

Source: PEZA as lifted from Terosa, (1995).

Table 21: Manufacturing Establishments in Metro Cebu, By Issuance of an Environmental Clearance Certificate, 1995.

PSIC CODE	Industry Group	BOI/MEPZ			Non BOI/ Non MEPZ	Total With ECC
		Issued ECC	Total Operating	Percent to Total		
311 & 312	Food	4	41	9.76	48	52
313	Beverages	-	-	-	1	1
314	Tobacco	-	-	-	-	-
321	Textile	1	7	14.29	-	1
322	Wearing apparel except footwear	10	25	40.00	-	10
323	Leather and leather products, leather substitutes & furs, except footwear and wearing apparel	1	3	33.33	-	1
324	Footwear, except rubber, plastic or wood furniture	-	1	0.00	-	-
331	Wood, wood and cork products, except furniture	-	8	0.00	13	13
332	Furniture and fixtures, except primarily of metal (including repairs)	1	69	1.45	24	25
341	Paper and paper products	1	4	25.00	-	1
342	Printing, publishing and allied industries	-	1	0.00	-	-
351	Industrial chemicals	1	5	20.00	3	4
352	Other chemical products	-	6	0.00	2	2
353	Petroleum refineries	-	-	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-	-	-
355	Rubber products	-	-	-	11	11
356	Plastic products, n.e.c.	1	6	16.67	4	5
361	Pottery, china and earthenware	-	1	0.00	-	-
362	Glass and glass products	-	-	-	-	-
363	Cement	-	-	-	14	14
369	Other non-metallic mineral products	-	14	0.00	5	5
371	Iron and steel basic industries	2	5	40.00	4	6
372	Non-ferrous metal basic industries	1	2	50.00	6	7
381	Fabricated metal products, except machinery & equipment, furniture and fixtures primarily of metal	3	9	33.33	-	3
382	Machinery except electrical	1	10	10.00	-	1
383	Electrical machinery, apparatus, appliances & supplies	4	10	40.00	2	6
384	Transport equipment	5	6	83.33	3	8
385	Professional and scientific and measuring & controlling equipment, n.e.c. & photographic and optical instrument	1	10	10.00	-	1
386	Furniture and fixtures primarily of metal (including repairs)	-	6	0.00	1	1
390	Other industries	5	14	35.71	3	8
400	Mixed Industries	10	60	16.67	9	19
	TOTAL	52	323	16.10	153	205

Source: DENR Region VII, EIAD Files.

Table 22: Manufacturing Establishments in Metro Cebu Imposed an ECC Fine for Non-Compliance, 1995.

Location	No. of Manufacturing Firms		
	Imposed and Paid Fine	Imposed but Fine Still Unsettled	Total
Cebu City	-	-	-
Mandaue City	6	1	7
Lapu-Lapu City	2	5	7
Talisay	-	-	-
Consolacion	-	1	1
<i>Total</i>	<i>8</i>	<i>7</i>	<i>15</i>

Source: DENR Region VII, EIAD Files

Table 23: DENR Monitored Manufacturing Establishments in Metro Cebu Imposed Administrative Fines (a) for Non-Compliance, 1995.

Location	No. of Manufacturing Firms
Cebu City	11
Mandaue City	43
Lapu-Lapu City	12
Talisay	5
Consolacion	2
<i>Total</i>	73

Source: DENR Region VII, Revenue Generation Files.

(a) Administrative fines are imposed on non-compliance of AC, PO and other administrative requirements. All the fines above have paid for by the firms already.

Table 24: Manufacturing Establishments in Metro Cebu, By Presence of Certified Pollution Control Officer, 1995.

PSIC CODE	Industry Group					
		BOI/MEPZ			Non BOI/ Non MEPZ	Total With PCO
		With PCO	Total Operating	Percent to Total		
311 & 312	Food	5	41	12.20	11	16
313	Beverages	-	-	-	3	3
314	Tobacco	-	-	-	-	-
321	Textile	2	7	28.57	-	2
322	Wearing apparel except footwear	1	25	4.00	-	1
323	Leather and leather products, leather substitutes & furs, except footwear and wearing apparel	1	3	33.33	-	1
324	Footwear, except rubber, plastic or wood furniture	-	1	0.00	-	-
331	Wood, wood and cork products, except furniture	1	8	12.50	3	4
332	Furniture and fixtures, except primarily of metal (including repairs)	18	69	26.09	7	25
341	Paper and paper products	-	4	0.00	1	1
342	Printing, publishing and allied industries	-	1	0.00	-	-
351	Industrial chemicals	-	5	0.00	2	2
352	Other chemical products	1	6	16.67	1	2
353	Petroleum refineries	-	-	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-	-	-
355	Rubber products	-	-	-	3	3
356	Plastic products, n.e.c.	1	6	16.67	3	4
361	Pottery, china and earthenware	1	1	100.00	-	1
362	Glass and glass products	-	-	-	-	-
363	Cement	-	-	-	-	-
369	Other non-metallic mineral products	2	14	14.29	2	4
371	Iron and steel basic industries	1	5	20.00	2	3
372	Non-ferrous metal basic industries	1	2	50.00	-	1
381	Fabricated metal products, except machinery and equipment, furniture and fixtures primarily of metal	1	9	11.11	1	2
382	Machinery except electrical	2	10	20.00	-	2
383	Electrical machinery, apparatus, appliances and supplies	4	10	40.00	1	5
384	Transport equipment	3	6	50.00	1	4
385	Professional and scientific and measuring and controlling equipment, n.e.c. and photographic and optical instrument	4	10	40.00	-	4
386	Furniture and fixtures primarily of metal (including repairs)	-	6	0.00	-	-
390	Other industries	5	14	35.71	-	5
400	Mixed Industries	7	60	11.67	4	11
	TOTAL	61	323	18.89	45	106

Source: DENR Region VII, EIAD Files.

Table 25: Manufacturing Establishments in Metro Cebu, By Type of Water Treatment Facility, 1995.

PSIC CODE	Industry Group	BOI/MEPZ			Non BOI/ Non MEPZ	Total With WTF	Type of WTF		
		With WTF	Total Operating	Percent to Total			Primary Treatment	Secondary Treatment	Tertiary Treatment
311 & 312	Food	3	41	7.32	15	18	18	18	1
313	Beverages	-	-	-	2	2	2	2	-
314	Tobacco	-	-	-	-	-	-	-	-
321	Textile	-	7	0.00	-	-	-	-	-
322	Wearing apparel except footwear	1	25	4.00	-	1	1	1	-
323	Leather and leather products, leather substitutes & furs, except footwear and wearing apparel	-	3	0.00	-	-	-	-	-
324	Footwear, except rubber, plastic or wood furniture	-	1	0.00	-	-	-	-	-
331	Wood, wood and cork products, except furniture	-	8	0.00	1	1	1	1	-
332	Furniture and fixtures, except primarily of metal (including repairs)	-	69	0.00	-	-	-	-	-
341	Paper and paper products	-	4	0.00	-	-	-	-	-
342	Printing, publishing and allied industries	-	1	0.00	-	-	-	-	-
351	Industrial chemicals	-	5	0.00	2	2	2	1	-
352	Other chemical products	1	6	16.67	-	1	1	1	-
353	Petroleum refineries	-	-	-	-	-	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-	-	-	-	-	-
355	Rubber products	-	-	-	-	-	-	-	-
356	Plastic products, n.e.c.	-	6	0.00	-	-	-	-	-
361	Pottery, china and earthenware	-	1	0.00	-	-	-	-	-
362	Glass and glass products	-	-	-	-	-	-	-	-
363	Cement	-	-	-	-	-	-	-	-
369	Other non-metallic mineral products	1	14	7.14	5	6	6	-	-
371	Iron and steel basic industries	-	5	0.00	1	1	1	1	-
372	Non-ferrous metal basic industries	-	2	0.00	-	-	-	-	-
381	Fabricated metal products, except machinery & equipment, furniture and fixtures primarily of metal	1	9	11.11	-	1	1	-	-
382	Machinery except electrical	-	10	0.00	-	-	-	-	-
383	Electrical machinery, apparatus, appliances & supplies	1	10	10.00	-	1	1	-	-
384	Transport equipment	-	6	0.00	1	1	1	-	-
385	Professional and scientific and measuring & controlling equipment, n.e.c. & photographic and optical instrument	-	10	0.00	-	-	-	-	-
386	Furniture and fixtures primarily of metal (including repairs)	-	6	0.00	-	-	-	-	-
390	Other industries	3	14	21.43	-	3	2	1	-
400	Mixed Industries	2	60	3.33	3	5	3	1	-
	TOTAL	13	323	4.02	30	43	40	27	1

Source: DENR Region VII, EQD Files.

Table 26: Manufacturing Establishments in Metro Cebu, By Air Pollution Control Device, 1995.

PSIC CODE	Industry Group	BOI/MEPZ			Non BOI/ Non MEPZ	Total With APCD	Total Firm With Noise Pollution Device
		With APCD	Total Operating	Percent to Total			
311 & 312	Food	20	41	48.78	50	70	25
313	Beverages	1	-	0.00	-	1	3
314	Tobacco	-	-	-	-	-	-
321	Textile	1	7	14.29	-	1	1
322	Wearing apparel except footwear	1	25	4.00	-	1	2
323	Leather and leather products, leather substitutes & furs, except footwear and wearing apparel	1	3	33.33	-	1	-
324	Footwear, except rubber, plastic or wood furniture	-	1	0.00	1	1	-
331	Wood, wood and cork products, except furniture	3	8	37.50	21	24	5
332	Furniture and fixtures, except primarily of metal (including repairs)	39	69	56.52	38	77	8
341	Paper and paper products	1	4	0.00	1	2	-
342	Printing, publishing and allied industries	-	1	0.00	-	-	-
351	Industrial chemicals	1	5	0.00	2	3	-
352	Other chemical products	-	6	0.00	2	2	-
353	Petroleum refineries	-	-	-	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-	-	-	-
355	Rubber products	-	-	-	11	11	6
356	Plastic products, n.e.c.	1	6	16.67	-	1	2
361	Pottery, china and earthenware	1	1	100.00	-	1	-
362	Glass and glass products	-	-	-	-	-	-
363	Cement	-	-	-	-	-	-
369	Other non-metallic mineral products	6	14	42.86	20	26	4
371	Iron and steel basic industries	-	5	0.00	8	8	2
372	Non-ferrous metal basic industries	-	2	0.00	4	4	1
381	Fabricated metal products, except machinery & equipment, furniture and fixtures primarily of metal	8	9	88.89	3	11	1
382	Machinery except electrical	-	10	0.00	-	-	-
383	Electrical machinery, apparatus, appliances & supplies	6	10	60.00	1	7	2
384	Transport equipment	3	6	50.00	4	7	1
385	Professional and scientific and measuring & controlling equipment, n.e.c. & photographic and optical instrument	4	10	40.00	-	4	-
386	Furniture and fixtures primarily of metal (including repairs)	-	6	0.00	-	-	-
390	Other industries	6	14	42.86	5	9	4
400	Mixed Industries	16	60	26.67	13	29	8
	TOTAL	119	323	36.84	182	301	75

Source: DENR Region VII, EQD Files.

Table 27: DENK Monitored Manufacturing Establishments in Metro Cebu Imposed a CDO, January 1995-June 1996.

Type and No. of Firm	Location	Violation	CDO Extension Date	Comments
Furniture Manufacturing Firm (1)	Cebu City	Air Pollution	Issued a CDO-PAB Resolution Date 6/18/96	Firm is still operating at present as the owner filed a motion for reconsideration.
Food Manufacturing Firm (1)	Mandaue City	Water Pollution	Issued a CDO-PAB Resolution Date 10/13/95	Temporary Restraining Order (TRO) issued on 11/20/95.
Food Manufacturing Firm (1)	Mandaue City	Water Pollution	Issued a CDO-PAB Resolution Date 9/7/95	Temporary Restraining Order (TRO) issued on 9/13/95.
Furniture Manufacturing Firm (1)	Mandaue City	Air Pollution	Reimposed a CDO-PAB Resolution Dated 5/19/95	Temporary Restraining Order (TRO) issued (Date Unknown).
Food Manufacturing Firm (1)	Mandaue City	Water Pollution	Reimposed a CDO-PAB Resolution Dated 2/28/95	Temporary Restraining Order (TRO) issued on 4/11/95.

Source: DENR Region VII (Various Dates). "Pollution Adjudication Board Cases Status Monitoring Report."

Table 28: Industrial Land in Cebu Province, 1996.

INDUSTRIAL LAND	
Location	# HAS.
☞ Existing/Fully Occupied a. MEPZ I, Mactan Island	149
☞ Available for Lease/Ongoing Construction a. MEPZ II, Mactan Island b. New Cebu Ownership, Naga, Cebu c. CIPD: Balamban, Cebu	62 150 150
☞ Ready: 3 - 5 years a. Cebu South Reclamation Project Cebu City b. San Lorenzo Ind'l. Park Compostela, Cebu c. Mactan Science Park, Mactan Island	330 100 150
☞ Proposed Projects a. Consolacion Reclamation Project, Consolacion, Cebu b. Liloan, Cebu c. Bago, Cebu d. Northern Mactan Reclamation Project, Mactan Island e. Toledo, Cebu	100 110 100 300 600

Source: CIPC.

Table 29: Projected Water Supply and Demand Balance in Metro Cebu, 1995-2010 ('000 Pesos).

Description	1995	2000	2005	2010
1. Water Supply	214,014	264,539	315,534	376,343
a. MCWD (For Consumption)	59,048	85,668	157,360	157,360
b. Wells (Safe Yield)	83,900	83,900	83,900	83,900
c. Wells (Over withdrawal)	71,066	94,971	74,274	135,083
2. Water Demand	214,014	264,539	315,534	376,343
a. Industrial/Commercial	26,532	29,974	31,049	32,168
b. Domestic	184,209	230,387	279,153	337,370
c. Others	3,273	4,178	5,332	6,805

Source: PCINKCL (1994c). Data are based on "moderate" consumptions.

Table 30: PMA Volunteers of the IEMP in Metro Cebu.

PSIC CODE	Industry Group	Number of Firms					Total	Percent to Overall Total
		Cebu City	Mandaue City	Lapu-Lapu City	Consolacion	Talisay		
311	Food	2	5	-	-	-	7	63.64
313	Beverages	-	1	-	-	-	1	9.09
351	Industrial Chemicals	1	-	-	-	-	1	9.09
381	Fabricated metal products, except machinery and equipment, furniture and fixtures primarily of metal	-	2	-	-	-	2	18.18
	Total	3	8	0	0	0	11	100.00
	Percent to Overall Total	27.27	72.73	0.00	0.00	0.00	100.00	

Source of Basic Data: IEMP Office Data Files.

fn: c:\unido\iemp.wk4

Table 31: Manufacturing Establishments in Metro Cebu, By Practice of Recycling, 1995.

PSIC Code	Industry Group	Number of Firms Practicing Recycling			
		BOI	MEPZ	Non-BOI/ Non-MEPZ	TOTAL
311 & 312	Food	4	-	15	19
313	Beverages	-	-	-	-
314	Tobacco	-	-	-	-
321	Textile	2	-	-	2
322	Wearing apparel except footwear footwear & wearing apparel	1	5	-	6
323	Leather & leather products, leather substitutes & furs, except footwear & wearing apparel	-	-	-	-
324	Footwear, except rubber, plastic or wood footwear	-	-	-	-
331	Wood, wood and cork products, except furniture	1	-	13	14
332	Furniture & fixtures, except primarily of metal (including repairs)	17	-	22	39
341	Paper and paper products	1	-	1	2
342	Printing, publishing and allied industries	-	-	-	-
351	Industrial chemicals	-	1	2	3
352	Other chemical products	1	-	1	2
353	Petroleum Refineries	-	-	-	-
354	Miscellaneous products of petroleum and coal	-	-	-	-
355	Rubber products	-	-	11	11
356	Plastic products	-	1	6	7
361	Pottery, china and earthenware	1	-	-	1
362	Glass and glass products	-	-	-	-
363	Cement	-	-	-	-
369	Other non-metallic mineral products	3	-	17	20
371	Iron and steel basic industries	-	-	7	7
372	Non-ferrous metal basic industries	-	-	5	5
381	Fabricated metal products, except machinery & equipment, furniture & fixtures primarily of metal	-	-	5	5
382	Machinery except electrical	-	-	-	-
383	Electrical machinery, apparatus, appliances & supplies	-	1	-	1
384	Transport equipment	1	-	2	3
385	Professional & scientific & measuring & controlling equipment, & photographic & optical instrument	-	-	-	-
386	Furniture & fixtures primarily of metal (including repairs)	-	-	1	1
390	Other industries	2	1	2	5
400	Mixed industries	6	3	9	18
	TOTAL	40	12	119	171
	Total DENR Monitored	54	55	196	305
	Percent to Total	74.07	21.82	60.71	56.07

Source: DENR Region VII, EIAD Files.

Table 32: Establishments in Metro Cebu with EGF, as of June 1996.

Location	No. of Firms			Total
	Real Estate	Manufacturing	Others	
Cebu City	13	-	1	14
Mandaue City	-	-	-	-
Lapu-Lapu City	8	-	-	8
Talisay	4	-	-	4
Consolacion	2	-	-	2
Total	27	0	1	28
Percent to Total	96.43	0.00	3.57	100.00

Source: DENR Region VII, EIAD Files.

Appendix B. Footnotes

1. Unlike Metro Manila, Metro Cebu is not an administrative regional subdivision but a development area centered around Cebu City. The CIADMP defined "Metro Cebu" as encompassing the cities of Cebu, Mandaue and Lapu-lapu and the towns of Talisay, Minglanilla, Naga, Compostela, Liloan, Cordova and Consolacion. In this study, the coverage is reduced to the cities of Cebu, Mandaue and Lapu-lapu and the towns of Talisay and Consolacion because manufacturing sector growth in the past twenty years centers only in the cities. The two towns were included since they border the cities and, thus, may be directly affected by the environmental impacts of the manufacturing sector. This more restricted definition is also the one of main interest to the commercial and industrial sectors in Metro Cebu at present (eg. CIPC nd,a p. 41; CRC 1995a, p.8).

2. This study follows the PSIC definition of "Manufacturing" (NEDA 1978, p. 32). Manufacturing is defined as the mechanical or chemical transformation of inorganic or organic substances into new products whether work is performed by power-driven machines or by hand, whether it is done in a factory or in the home, and whether the products are sold at wholesale or retail.

The secondary data available from the sources originally do not classify firms and projects by PSIC group but only provided information on their products. The author classified the firms and projects by PSIC group based on products and with assistance from the BOI, MEPZ and even DENR staff. The PSIC was used to group the firms and projects to make the study consistent with previous environmentally-related industry studies which also use the classification.

3. There are no data available to the study on the establishments not registered with the BOI or not located in MEPZ. Actually, however, data on this type of firms may be tediously generated individually from local municipal records and other sources. Since this is a consuming activity that may take weeks or even months, this was not done in this study. Also, it is assumed that these firms are either not affected by industrial policy or affected only indirectly.

4. The BOI data classify establishments in terms of "projects" instead of "firms". A project may be viewed as a single production-based activity (e.g. furniture production project, fruit juice production project, etc.) or type of investment of a single firm (e.g. new project, expansion project, etc.). A firm can have many projects, each of which are separately counted in this study.

5. The PSIC classification does not have an industry group that takes account of firms whose products can be classified under more than one industry. To solve this problem, a new group named "Mixed Industries" and given the "PSIC Code" of 400 was invented to take account of such firms.

6. In contrast to BOI data, MEPZ data classifies establishments as "firms" instead of "projects". This study follows the standard definition of a "firm". It means a single business enterprise, be it a sole proprietorship, partnership or corporation. It can have more than one projects.

7. In the case of DENR data, the BOI establishments are now classified in terms of firms and not projects, thus, the shift from the earlier treatment of BOI establishments.

Appendix C. Persons Interviewed

I. Private Sector

Mr. Miguel Angelo V. Lucero
Executive Director
Cebu Chamber of Commerce and Industry
CCCI Center, Cor. 11th and 13th Avenues
North Reclamation Area
Cebu City

Engr. Floretta S. Del Fierro
Executive Director
Cebu Investment Promotions Center
Suite 2B, 11th Floor
Metro Bank Plaza, Osmena Blvd.
Cebu City

Mr. Ronald C. Gamban
President
Cebu Electroplaters Association
CCCI Center, Cor. 11th and 13th Avenues
North Reclamation Area
Cebu City

II. Local Government Units

Hon. Apolonio A. Abines, Jr.
Vice Governor
Province of Cebu
Cebu Provincial Capitol
Cebu City

Hon. Victor A. Maambong
Board Member/Chairman of the Committee
of Natural Resources and Envi. Protection
Province of Cebu
Cebu Provincial Capitol
Cebu City

III. National Government Agencies

Mr. Romeo Escandor
Regional Director
National Economic and Development Authority
Region VII, 3F Leonisa Bldg., Escario St.
Cebu City

Engr. Jeremias L. Dolino
Regional Executive Director
Department of Environment and Natural
Resources-Region VII
Greenplains Subdivision, Banilad
Mandaue City

Engr. Gregorio T. Estrada
Regional Technical Director
Department of Environment and Natural
Resources-Region VII
Greenplains Subdivision, Banilad
Mandaue City

Engr. Allan C. Arranguez
Chief
Environmental Quality Division
Department of Environment and Natural
Resources-Region VII
Greenplains Subdivision, Banilad
Mandaue City

Engr. Nelia Enriquez
Staff
Environmental Quality Division
Department of Environment and Natural
Resources-Region VII
Greenplains Subdivision, Banilad
Mandaue City

Engr. Angeli T. Apilan
Staff
Environmental Impact Assessment Division
Department of Environment and Natural
Resources-Region VII
Greenplains Subdivision, Banilad
Mandaue City

Engr. Jun Erasmo Villafane
Senior Environmental Management Specialist
Department of Environment and Natural
Resources-Region VII
Greenplains Subdivision, Banilad
Mandaue City

Atty. Josh Carol T. Ventura
Chief, Regional Trade and Industry Regulatory Division
Department of Trade and Industry-Region VII
Rm. 203 WDC Bldg.
Corner P. Burgos-Osmena Blvd.
Cebu City

Mr. Jesus Medardo Y. Uy
Trade and Industry Development Specialist
Department of Trade and Industry
Cebu Provincial Office
Rm. 203 WDC Bldg.
Corner P. Burgos-Osmena Blvd.
Cebu City

Mr. Edwin Banquerigo
Trade and Industry Development Specialist
Department of Trade and Industry
Cebu Provincial Office
Rm. 203 WDC Bldg.
Corner P. Burgos-Osmena Blvd.
Cebu City

Mr. Ernesto Pintac
Chief
Board of Investments-Cebu
3F Trans-Asia Bldg.
Osmena Blvd.-J. Cuenco Ave.
Cebu City

Mr. Philip Lionel T. Torres
Investment Specialist-Cebu
Board of Investments
3F Trans-Asia Bldg.
Osmena Blvd.-J. Cuenco Ave.
Cebu City

Atty. Merle P. Cunanan
Officer-in-Charge
Securities and Exchange Commission
Cebu Office
4th Floor Danaque Bldg., Osmena Blvd.
Cebu City

Atty. Rosalinda Fontanosa
Assistant OIC
Securities and Exchange Commission
Cebu Office
4th Floor Danaque Bldg., Osmena Blvd.
Cebu City

V. Other Offices

Dr. Jochen Kraft
GTZ Project Manager
Philippine-German Project Industrial
Pollution Control Cebu
Department of Environment and Natural
Resources-Region VII
Greenplains Subdivision, Banilad
Mandaue City

Engr. Ma. Victoria F. Ricana
DENR Project Manager
Philippine-German Project Industrial
Pollution Control Cebu
Department of Environment and Natural
Resources-Region VII
Greenplains Subdivision, Banilad
Mandaue City

Mr. Rhoel P. Orillaneda
Information Officer
Philippine-German Project Industrial
Pollution Control Cebu
Department of Environment and Natural
Resources-Region VII
Greenplains Subdivision, Banilad
Mandaue City

Ms. Michelle T. Baluyos
Staff
University of Asia and the Pacific
Suite 301
Centro Maximo Bldg.
D. Jakosalem St.
Cebu City

Engr. Roberto P. Veloso
Industrial Safety Officer
Mactan Export Processing Zone
Lapu-lapu City

Ms. Evelyn Lao
Information and Promotion Officer
Mactan Export Processing zone
Lapu-Lapu City