

Japan International Cooperation Agency (JICA)
Board of Investments (BOI)
of Department of Trade and Industry(DTI)

The Study on Environmental Management with Public and Private Sector Ownership (EMPOWER) in the Republic of the Philippines Final Report



September 2003

EX Corporation

Preface

In response to a request from the Government of Republic of the Philippines, the Government of Japan decided to conduct the Study on Environmental Management with Public and Private Sector Ownership (EMPOWER) in the Republic of the Philippines and the study was implemented by the Japan International Cooperation Agency (JICA).

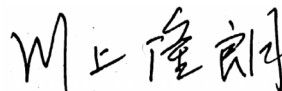
JICA sent a study team, led by Mr. Masato Ohno of EX CORPORATION and organized by EX CORPORATION to the Republic of the Philippines 7 times from February 2002 to September 2003.

The team held discussion with the officials concerned of the Government of the Philippines, and conducted related field surveys. After returning to Japan, the team conducted further studies and compiled the final results in this report.

I hope this report will contribute to the promotion of environmental management in the Philippines and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Philippines for their close cooperation throughout the study.

September 2003



Takao Kawakami
President
Japan International
Cooperation Agency

Waste Minimization Pilot Project



Kemwerke (Chemical)



AMIC (Foundry)



Workshop in Manila

Waste Minimization Pilot Project



Workshop in Cebu

Ecolabeling Program Pilot Project



Launching Event, March 10, 2003



Former First Lady Amelita Ramos,
Chairperson of Clean and Green Foundation

Seminar and Round Table



Top Management Seminar(Manila Peninsula Hotel)



Action Plan Round Table

IEM Exhibit



Exhibit (Manila Peninsula Hotel)

IEM Exhibit



Exhibit (SM Megamall)



Exhibit (SM Megamall)



Lunching of IEM Knowledge Network

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Exchange Rate: PHP \approx 2.2 yen
 US\$ \approx 118.58 yen

Abbreviations

A	ACDI-VOCA	Agricultural Cooperative Development International-Volunteer Overseas Cooperative Agency
	ADB	Asian Development Bank
	APO	Asian Productivity Organization
	APRCP	Asia Pacific Roundtable for Cleaner Production
	ARMM	Autonomous Region of Muslim Mindanao
B	BAC	Bids and Awards Committee
	BEMP	Best Environmental Management Practices
	BEMS	Building Energy Management Systems
	BFAD	Bureau of Food and Drugs
	BOI	Board of Investments
		Bureau of Product Standards
	BPS/DTI	of the Department of Trade and Industry
	BSMBD/DTI	Bureau of Small and Medium Business Development/DTI
C	C&GF	Clean and Green Foundation Inc
	CAA	Clean Air Act
	CAMPI	Chamber of Automotive Manufacturers of the Philippines
	CAR	Cordillera Autonomous Region
	CBR	Confidential Business Report
	CDC	Clark Development Corporation
	CEOs	Chief Executive Officer
	CP	Cleaner Production
D	DA	Department of Agriculture
	DAO	Department Administrative Order
	DAP	Development Academy of the Philippines
	DBM	Department of Budget and Management
	DBP	Development Bank of the Philippines
	DENR	Department of Environment and Natural Resources
	DFE	Design for Environment
	DILG	Department of Interior and Local Government
	DOE	Department of Energy
	DOF	Department of Finance
	DOH	Department of Health
	DOST	Department of Science and Technology
	DTI	Department of Trade and Industry
	E	EAPS
ECC		Environmental Compliance Certificate
ECOP		
		Evaluation of Environmental Standards for
EESSIS		Selected Industrial Sub-Sectors
EIA		Environmental Impact Assessment
EIS		Environmental Impact Statement
EISCP		Environmental Infrastructure Support Credit Program
ELP		Eco-labeling Program for the Philippines
EMA		Environmental Management Accounting
		Environmental Management Bureau/
EMB/DENR		Department of Environment and Natural Resources
EMS		Environmental Management Systems

E	EMSAP	Environmental Management System Accreditation Program	
	ENMAP	Energy Management Association of the Philippines	
	ENRAP	Environmental and Natural Resources Accounting Project	
	EPA	Environmental Protection Agency	
	EPE	Environmental Performance Evaluations	
	EPIC	Environmental Management Program for Industrial Competitiveness	
		Environmental Protection and Monitoring Division	
	EPMD/DOE	/Department of Energy	
	ERA	Environmental Risk Analysis	
	ESCO	Energy Service Company	
	ESP	Environmental Service Provider	
ESWMA	Ecological Solid Waste Management Act		
F	F.O.B.	Free On Board	
	FDIs	Foreign Direct Investments	
	FPA	Fertilizer and Pesticide Authority	
G	GDP	Gross Domestic Product	
	GEC	Global Environment Center Foundation	
	GIS	Geographic Information System	
	GNP	Gross National Product	
	GOP	the Government of the Philippines	
H	HEEM	Highly Energy Efficient Motors	
	HW	Hazardous Wastes	
	HWM	Hazardous Waste Management	
I	IEC	Information, Education, Communication	
	IEM	Industrial Environment Management	
	IEMP	Industrial Environmental Management Project	
	IEPC	Industrial Efficiency and Pollution Control Program	
	IISE	Industrial Initiatives for a Sustainable Environment	
	ILO		
	IPCT	Integrated Program on Cleaner Production Technologies	
	IPP	Investment Priority Plan	
	IRR	Implementing Rule and Regulations	
	ISO	International Organization for Standardization	
		Industrial Technology Development Institute/	
ITDI/DOST	Department of Science and Technology		
J	JICA	Japan International Cooperation Agency	
L	LBP	Land Bank of the Philippines	
	LCA	Life Cycle Assessment	
	LGU	Local Government Unit	
	LLDA	Laguna Lake Development Authority	
	LLES	Laguna Lake Environmental Study	
M	MAP	Management Association of the Philippines	
	MBIs	Market-Based Instruments	
	MISSI	Monthly Integrated Survey of Selected Industries	
	MNC	Multinational Companies	
	MOA	Memorandum of Agreement	
N	NCR	National Capital Region	
	NEDA	National Economic Development Authority	
	NRIPS	National/Regional Industry Prioritization Strategy	
	NSCB	National Statistical Coordination Board	
O	OECF	Overseas Economic Cooperation Fund of Japan	
	OIP-BOI	Office for Industrial Policy	
P	P2	Pollution Prevention	
	PAB	Pollution Adjudication Board	
	PAEAP	Philippine Association of Environmental Assessment	
	PATLEFAM	Philippine Association of Tertiary Level Educational Institutions	

P	PBE	Philippine Business for the Environment
	PCA	Pollution Control Assessment
	PCAPI	Pollution Control Association of Philippine Industry
	PCO	Pollution Control Officer
	PCSD	Palawan Council for Sustainable Development
	PD	Presidential Decree
	PEIA	Philippine Environmental Industries Association
	PEMAS	Philippine Environmental Management System
	PEPP	Philippine Environmental Partnership Program
	PEZA	Philippine Economic Zone Authority
	PHILFOODEX	Philippine Food Processors and Exporters Organization, Inc.
	PICPA	The Philippine Institute of Certified Public Accountants
	PIP	Packaging Institute of the Philippines
	PMAI	Philippine Metalcasting Association Inc.
	PMA	Pollution Management Appraisal
	PMS	Performance Monitoring System
	PNS	Philippine National Standard
	POA	Philippine Oil chemistry Association
	PPCI	Philippine Chamber of Commerce and Industry
		Pollution Reduction and Environmental Management Information System
	PREMIS	
	PRIME	Private Sector Participation in Managing the Environment
	PSIC code	Philippines Standard for Industrial Category code
	PSMA	Philippine Sugar Millers Association
	PSSD	Philippine Strategy for Sustainable Development
	PULPAPEL	Pulp and Paper Manufacturers Association
	PVR	Public Version Report
PWPA	Philippine Wood Producers Association	
S	SBMA	Subic Bay Metropolitan Authority
	SEIPI	Semi-conductor and Electronics Industries of the Philippines
	SKEM	Survey of Key Manufacturing Establishments
	SMEs	Small and Medium Enterprises
	SPIK	Samahan sa Pilipinas ng mga Industriyang Kimika
	SS	Suspended Substances
	SW	Solid Wastes
T	THW	Toxic and Hazardous Waste
	TLRC	Technology Livelihood Resource Center
	TOC	Total of Organically bound Carbon
	TSD	Treatment, Storage and Disposal
	TSP	Total Suspended Particles
U	UNDP	United Nations Development Programme
	UNIDO	United Nations Industrial Development Organization
	URBAIR	Urban Air Quality Program
	USAID	United States Agency for International Development
V	VA	Value Analysis
	VOCs	Volatile Organic Compounds
	VSMD	Variable Speed Motor Drives
W	WB/PEM	World Bank: Philippines Environment Monitor
	WHO	World Health Organization
	WHRS	Waste Heat Recovery Systems

Executive Summary

Executive Summary

1 Current Status and Issues of IEM

1.1 Current Status and Issues of IEM by Individual Companies

Many enterprises recognize the necessity of complying with the environmental regulations. However, managers' main interest is the improvement in productivity and product quality. Their interest in IEM is low. It was found that only a small number of the companies surveyed have established EMS and that 60 % of them have inadequate system.

The essential issue of voluntary IEM promotion by individual companies is that business owner/top management recognizes necessity of integrating environmental measures into business management from a viewpoint of management improvement. It is hoped that those who have sound business management and have reached a certain IEM level should further improve IEM to an international level, strengthen their competitiveness. On the other hand, those without sound business management and adequate IEM level need to start with reforming company management and production management, and then further extend their efforts to improvement of resource productivity.

1.2 Current Status and Issues of IEM Promotion by Industry Associations and Others

Among the NGOs promoting IEM, the PBE plays a central role in provision of IEM information and seminars on IEM. However the PBE is hampered by an extremely fragile financial base and is unable to secure or deploy sufficient project funds or high-level specialist staff for the provision of services. Although 83 industry associations participated in development of Business Agenda 21 (industry version of Agenda 21) showing industry-wide actions for sustainable development; many member companies are not so enthusiastic about BA21 implementation.

It is necessary to identify an organization to lead the IEM promotion. That organization then should be strengthened in terms of organizational, financial, and functional capacity. Furthermore, networking with relevant NGOs and industry association, as well as increasing quality and quantity of services provided to those corporations who intend to implement IEM. At the same time, industry associations need to develop and implement their IEM action plans based upon Business Agenda 21.

1.3 Current Status of and Issues of IEM Promotion by Government Organizations

Current status and issues of government IEM policies are summarized below.

Table 1.3.1 Activities that related to IEM and their Policy Issues

		Measures	Efforts Made	Future Agenda
Measures to promote company's voluntary actions	Awareness-raising, capacity building of business owners and industry associations	Seminars	Many seminars have been held by PBE, MAP, and APRCP.	<ul style="list-style-type: none"> • Coordination of IEM seminars and integration of information
		Recognition system	Award system is in place such as DTI's Philippine Quality Award.	<ul style="list-style-type: none"> • Establishment of a recognition system that promotes SME's environmental management
		Information Provision	Manuals and leaflets on waste minimization, EMS, and other IEM related topics have been developed and published. An environmental information center for Philippine industry has been set up in PBE.	<ul style="list-style-type: none"> • Establishment of a system to continuously improve contents and provision methods of IEM information • Establishment of a clearing house of IEM information
		Training of production / environmental management auditors	Trainings for PCOs have been held.	<ul style="list-style-type: none"> • Training of technical experts who can audit production and environmental management • Enhancement of training on cleaner production
	Promotion of IEM tools	Development and implementation of voluntary action plan	84 industry associations declared to participate in Business Agenda 21 for sustainable development.	<ul style="list-style-type: none"> • Implementation
		Technical assistance to Waste Minimization	IEMP & IISE projects provided technical assistance to individual companies for introducing waste minimization and developed manuals on waste minimization. Private company's cooperation at ITDI was realized for technical development.	<ul style="list-style-type: none"> • Approach from resource productivity improvement • Increase in business owners / executives support to IEM • IEM promotion by industry associations
		Introduction of EMS	Awareness raising, technical assistance, trainings for local consultants, and development of relevant manuals for introduction of EMS have been conducted in IISE and PRIME projects.	<ul style="list-style-type: none"> • Reduction in procedure costs for EMS certification (establishment of local accreditation body) • Incentives to introduce EMS • Promotion of environmental report preparation and disclosure
		Environmental Accounting	PICPA commenced trainings on environmental accounting	<ul style="list-style-type: none"> • Promotion of introduction of environment accounting to individual companies
		Ecolabel	Secretariat has been established for introduction of an ecolabeling program	<ul style="list-style-type: none"> • Establishment of standard procedures for management of the Ecolabeling program • Accreditation of the ecolabel and promotion of ecolabeled products
		Green procurement	None	<ul style="list-style-type: none"> • Dissemination of supply chain management
		Recycling promotion	None. Each factory takes its own action for recycling promotion.	<ul style="list-style-type: none"> • Promotion of recycling and DFE
	Support for legal	Emission control (including Monitoring)	Emission and effluent regulations as well as regulation on hazardous waste management have been set.	<ul style="list-style-type: none"> • Introduction of voluntary monitoring
		Appointment of Pollution Control Officers	According to factory type and size, appointment of PCOs is mandated.	<ul style="list-style-type: none"> • Accreditation of PCO's technical levels

	Measures	Efforts Made	Future Agenda
	Promotion of recycling used products	DTI is mandated to formulate measures to expand the recycling market by RA9003.	<ul style="list-style-type: none"> • Development and implementation of policies to develop recycling industry • Clarification of industry's roles in recycling
Economic measures	Tax exemption	Tax exemption is given for investment in environmental projects (including energy saving) listed in "Investment Priority Plan".	<ul style="list-style-type: none"> • Increase the use of the exemption system
	Low interest loan	DBP and LBP provide low interest loans for environmental investment.	<ul style="list-style-type: none"> • Increase the use of the loan system
	Environmental user fee	User fee system has been introduced for wastewater discharge into Laguna Lake based on BOD load.	<ul style="list-style-type: none"> • Identification of the results of the existing fee system • Application to other areas

2 Development Strategy for IEM

2.1 Fundamentals and Issues of Corporate IEM

In view of promoting IEM, it is important for companies to recognize the necessity of adopting IEM as well as achieve stability in finance and management. It is important to develop an environment in which companies strongly feel necessity of IEM in relation to other parties surrounding the companies such as government organizations, other companies in the same sector, consumers, and local residents. The government is in a position to motivate business enterprises for proper IEM through application of various policy instruments, e.g. IEC, technical assistance, regulatory measures, economic incentives, and so forth. Aside from the government, business enterprises also have relationship with shareholders alike (business competitors), consumers, suppliers, environmental service providers, business groups, and so forth. For the factories, relationship with the peoples living in their vicinity is also of great importance. As our survey shows, the pressure from these relevant stakeholders is another key factor of strongly motivating them for IEM.

2.2 Basic Policies for Promotion of IEM in the Philippines

The National IEM Action Plan proposes direction of governmental intervention to companies, industry associations, and government organizations for the purpose of IEM promotion in the standpoint of BOI/DTI, which is in charge of promoting investment by the private sector.

The target of IEM activities is to establish production process management including reduction in generation of pollutants and an EMS for securing efficiency and legal

compliance of measures. The IEM promotion policies primarily focus on SMEs who often suffer from lack of financial and human resources and technologies.

The government IEM policies should be formulated and implemented with a central focus on increasing awareness of business owners toward importance of IEM, establishing EMS within each company, improving productivity through implementation of IEM, and furthering IEM activities by confirming benefits of IEM. The policies and measures to promote the above efforts are comprised of IEC measures to promote voluntary efforts of companies, legal and regulatory supports to implementation of IEM, and financial/economic incentives to promote IEM.

2.3 Identification of Priority Areas

The priority areas of IEM promotion in the Philippines in terms of industry sectors and measures are identified as follows.

(1) Priority Industry Sectors

Taking into account emissions and discharge of air and water pollutants, amount of solid waste generations, input of energy, water and other input materials, and the ratio of SMEs to total number of companies in each sector, the EMPOWER project has identified the following 19 sub-sectors as the priority sectors for promoting IEM.

- Beverages
- Ceramic industry
- Chemical products (industrial and agricultural)
- Coconut-based industries, edible oil and spirit distillation
- Cosmetics
- Electroplating and metal finishing
- Food processing (tuna, small scale food processing)
- Glass and glass products
- Machinery and tool manufacturing
- Foundry and forging
- Offset printing
- Petroleum products
- Pharmaceuticals
- Plastics and rubber
- Pulp and paper manufacturing
- Soap and detergents
- Spinning, textiles and dyeing
- Sugar milling and refining
- Wood and timber

(2) Priority Measures

Considering vulnerability in institutional and financial capacity of the Philippine Government, the first priority should be given to suasive measures that can promote

voluntary IEM activities by industries with comparatively lower cost. In determining the priority measures to promote IEM, the EMPOWER project considers the criteria given as follows:

- Measures contributing to both improvement of productivity, competitiveness and environment in lower cost of investment,
- Measures serving especially for development of IEM by SMEs,
- Measures that are expected to show identifiable benefits within the short-term of 2 to 3 years,
- Measures that are expected to have spillover effect upon IEM by industries,
- Measures that promote voluntary efforts of IEM by industry groups and NGOs,
- Measures contributing to establishment of the network among the relevant stakeholders including industrial enterprises, industry groups, environmental service providers, government and so forth,
- Measures contributing to building public and private partnership in IEM,
- Measures that can be continuously monitored about their progress and effects, and
- Measures that promote self-sustaining development of IEM by industries.

2.4 Basic Framework of IEM Promotion

Based on the basic policies and priorities of IEM promotion determined above, the EMPOWER project establishes here the basic framework of IEM promotion in the Philippines.

IEC Measures to Promote Voluntary IEM by the Philippines Industry

- To enhance awareness and capacity of corporate managers and other key stakeholders in IEM through establishment of an IEM information center, compilation of IEM best practices in the Philippines, and development of IEM leaders in the Philippines industry.
- To increase IEM practices in the Philippine industry through development of Action Plans on waste minimization and CP, and upgrading of corporations implementing IEM.
- To consider establishment of a center that can support management of industry associations so that their management capacity is strengthened.

Legal and Regulatory Support

- To implement the Philippine Environmental Partnership Program (PEPP) to promote various voluntary measures including simplified EMS certification, ecolabeling and voluntary agreement on environment management with nearby residents or LGUs, and so forth.
- To prioritize expansion of BOI's green procurement policy developed during the EMPOWER pilot project to other government organizations and preparation of a National Recycling Policy defined as DTI's responsibility by the Ecological Solid Waste Management Act.
- To coordinate activities among the relevant government authorities including BOI, EMB/DENR, LLDA and so forth.

Economic Incentives

- To identify impacts of the environmental user fee system upon reduction of pollution load and estimated amount and proper use of collected fees.
- To increase utilization ratio of current financial and economic incentives on environmental investment and develop new incentives.

3 Industrial Environment Management Action Plan (IEMAP)

3.1 Basic Framework of IEMAP

Based on the IEM promotion policy, the IEM Action Plan specifies measures/actions that needs to be taken in three years, from 2003 to 2005, including promotion of IEM by voluntary implementation, legal / regulatory assistance, and economic incentives.

For developing the IEM Action Plan, six roundtable sessions were held with stakeholders, including representative of industries, governments, environmental service providers, and donor organizations, in order to contemplate framework and scope of the IEMAP

3.2 Action Plan on IEC Measures to Promote Voluntary IEM

Following programs are implemented to expand dissemination of voluntary IEM by individual industries through implementation of the following action programs with public private partnership.

(1) IEM Knowledge Network

- General IEM information available and accessible to industry, and regularly provide and disseminate updates on environment – related developments, trends, studies and reports relevant to industry (The IEM Knowledge Network builds upon the EMPOWER pilot project on a web-based IEM information system)
- Information made available to the specific entity (information requested by the user of the network)

(2) Dissemination and Expansion of Corporate IEM Activities

- Implementation of demonstration projects for good housekeeping, waste minimization, and material flow control (training and technical support to the four industry sectors targeted in the waste minimization pilot project under the EMPOWER and additional six industry sectors.
- Advancing and disseminating IEM (advancing the IEM by the companies participated in the abovementioned demonstration projects, transferring IEM technologies, knowledge and know-how to other companies)

(3) Training and mobilization of cause champions within industry

- In coordination with IEM promotion program, train and mobilize cause champions

who lead IEM promotion within the industry (one person for each 10 industries)

(4) Development of IEM best practice manual

- Develop and publish IEM best practice manual for each 10 targeted industries.

3.3 Action Plan on Enhancement of Legal, Regulatory and Policy Measures to Promote IEM Adoption

Following programs are implemented to create a framework for market-based instruments, Environmental Management System, self-regulation /monitoring and waste recycling through enhanced legal, regulatory and policy measures.

(1) Support implementation of DENR's Philippine Environmental Partnership Program (PEPP)

- To disseminate the concept of PEPP to all the relevant stakeholders, the following public relations activities need to be carried out, a) prepare PEPP information materials (procedural manual, brochure, poster), and b) public relations through mass media
- Test applicability of partnership assistance to IEM demonstration projects

(2) Dissemination Program of BOI's Green Procurement Policy

- IEC activities to other government agencies (through PR in mass media, roundtable discussion with other government authorities, and so forth.)
- Technical assistance for interested agencies (including training of procurement officers in other government authorities, and preparation of advanced green procurement guidelines, etc)
- Additional designation of products preferably procured under Green Procurement Policy (promotion of ecolabeled products)

(3) National Recycling Policy Formulation Program

- Development of a national level inventory of recyclable materials
- Formulation of policies to promote the recycling industry
- Examination of legal/regulatory framework and incentives to promote recycling
- Formulation of the National Recycling Policy, including a) national and regional collection and utilization targets by recyclable materials and waste products, b) development plan of materials recovery facilities, c) recycling activity promotion plan, d) standards for recycled products and environment-friendly products, and e) legal/regulatory framework to promote recycling, and f) a framework of economic incentives to promote recycling.
- Formulation of an Action Plan on Recycling Promotion with clearly defined policy and program targets for a short term (2 to 3 years).

(4) Review Program of Existing Legal and Regulatory Framework of IEM

- Comprehensive review of existing laws and regulations in relation to IEM and proposal on their amendment. Issues include weak enforcement of IEM related

laws and regulations - uneven playing field, and poor compliance by SMEs due to their limited technological and financial capacity.

3.4 Action Plan on Economic Incentives to Promote IEM

To promote IEM adoption by industries through a package of market-based instruments to various industrial sectors, following actions would be taken:

- Review of the current economic incentives (e.g. LLDA's environmental user fee, preferential tax treatment, low interest loans)
- System design and feasibility assessment of new financial and economic incentives
- Advocacy and consensus building for approval of the proposed incentives including reforms. (Information materials for policy makers, conduct meetings with concerned institutions, and lobbying to parliamentary members)

4 Planning of the Pilot Projects

The EMPOWER project through implementing pilot projects aims to enhance capacity of NGOs and industry associations that are counterparts of government organizations implementing policies to promote IEM. Therefore the pilot projects were jointly implemented by government organizations and NGOs with rigorous participation of industry associations and other private sector organizations. For formulation of pilot project plans, the following conditions were considered:

- They should contribute to enhancement of capacity of government agencies implementing policy to promote IEM and NGOs that could be their counterpart.
- They do not require large capital investment.
- Their continuity and sustainability after the EMPOWER project are expected.
- They should be feasible within a short time period (about 8 months) with concrete results.

Waste minimization practice by industry and dissemination of the effort within the industry, establishment of information clearinghouse for win-win options and their success stories, development and marketing of eco-products, and development of policy for green procurement at BOI were selected as the pilot projects.

5 Waste Minimization Pilot Project

(1) Objectives and Project Components

The waste minimization pilot project aims to establish a framework to promote activities to verify effectiveness of integration of productivity improvement and waste minimization by carrying out waste reduction assessment and feasible measures identified through the

assessment for model companies. In addition, the pilot project has an objective that BOI and its institutional partners utilize the results of the project to formulate measures to promote IEM. Implementing bodies are PBE, ITDI/DOST, and BOI.

- Preparation of sector-wide/industry-wide waste minimization plan by target industry sectors
- Workshop on steps to plan and implement waste minimization activities
- On-site assessment and proposal preparation for waste minimization at 20 volunteer companies by experts
- Implementation of measures identified as feasible and effective to minimize wastes by at least four (4) model companies
- Evaluation of results of the measures at the model companies
- Preparation of the guidebook on promotion of waste minimization targeting company decision-makers
- Workshop on the experiences of the model companies
- Discussions on the award system for the companies rigorously conducting IEM

(2) Outputs of the Pilot Project

There are six main outputs of the pilot project.

1. Business executives / owner – entrepreneurs from Manila and Cebu who participated in the workshops have been oriented to waste minimization approaches and benefits.
2. Thirty-five Philippine companies come to strongly support waste minimization for productivity improvement.
3. Four industry associations have developed industry-wide waste minimization action plans and their role to sustain waste minimization program is strengthened.
4. Four model companies (one company for one target industry) have implemented successful waste minimization programs as shown by reduction of waste volumes and economic savings in operations.
5. Waste minimization guidebooks based on the experiences of the pilot project have been published (1,000 copies) and disseminated to owners of Philippines companies.
6. Establishment of the award system by DTI for companies that conducted IEM rigorously was discussed, and it was concluded to be incorporated into the PEPP framework promoted by DENR.

6 IEM Information System Pilot Project

(1) Objectives and Project Components

The integrated IEM information system pilot project aims to 1) create opportunities for those who are suppliers and users of information useful to promote IEM to assess and improve quality and accessibility of information, and 2) increase accessibility to information through establishment of an integrated IEM information system such as an IEM information clearinghouse. Implementing bodies are PBE and BOI.

- Preparation of framework of an integrated IEM information system

- Mobilization of available resources to secure personnel and financial resources for the maintenance as well as continuous improvement and updating of the IEM information system
- Information collection and creation of IEM information database
- Development and commencement of the service of an integrated IEM information website
- Policy dialogues between BOI and IEM information providers through the working group

(2) Outputs of the Pilot Project

Followings are results of the pilot project of IEM Information System Pilot Project:

1. Framework of an integrated IEM information system (institutional and financial arrangement to support the maintenance as well as continuous improvement and updating of the information useful to promote IEM) has been prepared and integrated into the national IEM Action Plan,
2. An integrated IEM information website (www.iem.net.ph) has been developed and its service commenced in August 2003, and
3. BOI has identified needs of ESPs through policy dialogues and become able to utilize the information for future policy formulation.

7 Ecolabeling Program and Green Procurement Policy Pilot Project

The pilot project is composed of establishment of organizational and methodological framework and details for ecolabeling program, and increase consumers' awareness towards ecolabeled products, and to empower BOI to promote green procurement policies through BOI's ISO 14001 certification and green procurement policy development.

7.1 Ecolabeling Program

(1) Objectives and Project Components

The project aims to empower the secretariat of the Ecolabeling Program (ELP) and relevant organizations to accredit the first eco-labeled products, establish organizational and methodological framework and details for ecolabeling program, and increase consumers' awareness towards ecolabeled products. Clean & Green Foundation Inc. is implementing body of the ecolabeling program.

- Establishment of the steering committee
- A workshop on ecolabeling program and green procurement policy targeting ELP body
- Preparation of a strategic plan on the establishment of the ecolabeling program
- Preparation of guidelines for ecolabeling program operation
- Development of product criteria for two product categories – household battery and plastic packaging
- Promotion of application and accreditation of the ecolabeled products

- Awareness campaign on the ecolabeling program
- A seminar on ecolabeling program and green procurement policy targeting government organizations and product suppliers

(2) Outputs of the Pilot Project

Followings are results of the ecolabeling program pilot project:

1. A master plan on the establishment of the ecolabeling program was adopted by ELP committee in August, 2003,
2. Product criteria have been developed for tissue papers and detergents by December, 2002, and plastic packaging and household batteries by August, 2003,
3. A system to accept applications for ecolabeled products has been established,
4. The first ecolabeled product – detergent, was accredited on March 10th, 2003; and
5. Awareness of consumers and industries toward ecolabel has been increased through Industrial Environmental Management Trade Exhibit that was held on 9th and 10th of June, 2003.

7.2 Green Procurement and ISO14001 Certification of BOI

(1) Objectives of the Pilot Project

By adopting green procurement policy and acquisition of ISO 14001 certificate, BOI aimed to disseminate its experience into other governmental agencies and private industries, as well as considered they should adopt their green procurement policy into their purchasing process and acquire ISO 14001 because it resolved to have an initiative in the field of industrial environmental management in the Philippines and promote the adoption of IEM by the private sector.

Green Procurement

- Collection and analysis of information about green procurement policies in other countries
- Workshop on green procurement policy targeting ELP body
- Preparation and adoption of BOI's green procurement policy
- Seminar on green procurement policy targeting government organizations and product suppliers

ISO14001 Certification of BOI

- EMS Core committee was reactivated
- Development of manuals (EMS Manual, EMS Elemental Procedures Manual, Operational Control Procedures Manual)

(2) Outputs of the Pilot Project

Followings are outputs of the pilot project for Green Procurement and Acquisition of ISO14001 certificate:

1. BOI has adopted an action plan stating green procurement policy in which GPP targets are set, i.e. targets for paper, pens, and electronic office equipments procurements. The experience was disseminated to other agencies through seminars, as well as sent signals to vendors and market to develop and sell environmentally sound products.
2. Although preparation of necessary documentation for acquisition of ISO14001 certification by BOI has not been completed, a manual that had been prepared in Industrial Initiatives for Sustainable Environment (IISE) program has been reviewed and assisted to organize the documents. Also, EMS committee within BOI has been reactivated.

8 Recommendation

The Study team recommend following actions to be taken by BOI for empowering all relevant organizations and individuals.

8.1 Implementation of National IEM Action Plan

- The IEM Action Plan has to be officially approved by the BOI Governing Board, and BOI should be strengthened for implementation of the Action Plan through additional staff, capacity building activities and budgetary support.
- Management system for implementing the IEM Action Plan should be established. It must be able to encourage relevant parties to start and continue actions listed in the IEM Action Plan, prioritize allocation of financial and human resources, and encourage donors to financially support implementation of the Action Plan, and continuously review (after three years) and improve the Action Plan.

8.2 Dissemination and Expansion of Outputs from the Pilot Projects

- Waste Minimization: In order to further promote involvement in IEM activities of the model companies and industry associations, BOI should identify their needs in technical assistance and coordinate with organizations that can provide assistance. Results of the pilot project should be disseminated to other industries through information media such as the Waste Minimization Guidebook and the IEM Knowledge Network.
- IEM Information System: The Editorial Committee to supervise the IEM information website should continuously improve the website, taking into account comments from the website users.
- Ecolabeling and Green Procurement: BOI should work with C&GF, the Secretariat of the ecolabeling program, to encourage formal adoption of Executive Order that requires government organizations to practice green procurement. BOI is also

expected to disseminate its experience in development and adoption of the green procurement policy and action plan to other government organizations. As for BOI's ISO 14001 certification, it should start implementing EMS based on the EMS documents prepared under the pilot project.

8.3 IEM Information Dissemination by BOI

- BOI should distribute brochures on the National IEM Action Plan to relevant parties and provide information about progress of the Action Plan implementation through BOI homepage and the like to encourage their cooperation for its implementation.
- BOI should upload its Green Procurement Policy and the action plan to BOI homepage with contact information so that other government organizations will have good reference as well as where to ask if any question arises.
- BOI should upload the operational manual and other documents regarding EMS on BOI homepage for other government organizations' reference.

Part 1

National Action Plan on Industrial Environment Management

Chapter 1

Current Status of Environment and Manufacturing Industry in the Philippines

1 Current Status of Environment and Manufacturing Industry in the Philippines

1.1 Current Status of the Philippines Manufacturing Industry

1.1.1 GDP and Manufacturing Industry

The GDP in the Philippines has been increasing at an average of 4.0 percent annually during the period of 1986-1999. The average annual per capita GDP had also been grown by more or less 1 percent to reach about 11,400 pesos in 1999. Although the economic growth had been slow down in the late 1990s due to the Asian financial crisis in 1997, some signs of recovery has been found since 1999. The growth rate of GNP increased again to 4.2% in 2000.

Industry sector, which covers about 34 percent of GDP in 2000, grew by 16% between 1995 and 2000. Manufacturing industry covers 72.3 percent of the total industry sector GDP and recorded 5.6 percent growth in 2000, increasing from 1.6 percent growth in 1999. Table 1.1.1 shows the trend of GDP in the Philippines.

Table 1.1.1 Trend of GDP in the Philippines (Unit: billion peso in 1985 price)

	1995	1996	1997	1998	1999	2000
1. AGRICULTURE, FISHERY & FORESTRY	173	179	185	173	184	190
a. Agriculture & fishery	171	178	184	172	183	189
b. Forestry	2	1	1	1	1	1
2. INDUSTRY SECTOR	284	302	321	314	317	329
a. Mining & Quarrying	10	10	10	10	10	10
b. Manufacturing	203	215	224	221	225	237
c. Construction	44	49	57	52	51	48
d. Electricity, Gas & Water	26	28	29	30	31	32
3. SERVICES SECTOR	345	367	387	401	417	435
a. Transportation, Communication & Storage	47	51	55	59	62	68
b. Trade	123	130	135	139	145	153
c. Finance	34	38	43	45	46	47
d. Ownership of Dwellings & Real Estate	44	45	47	48	48	48
e. Private Services	55	58	61	64	67	71
f. Government Services	42	44	45	46	48	48
Total	802	849	893	888	918	955

Source: National Statistical Coordination Board.

1.1.2 Employment in Manufacturing Industry

Employment in the Philippines has been dominated by the agriculture, fishery and forestry sector, which covers about 37 percent of the total employment in October 2000. Employment in manufacturing industry is the fourth largest after wholesale & retail trade sector and community, social and personal service sector. It employs about 2.8 million persons in 2000, which is about 10 percent of the total employment in the Philippines.

1.1.3 Trade in Manufacturing Industry

In 1999 and 2000, the Philippines recorded the trade surplus of US\$ 4,294 and US\$ 6,690 million at F.O.B. value respectively. The total exports of the country amounted to US\$ 38,078 million (F.O.B. value) while total imports were valued at around US\$ 31,387 million (F.O.B. value).

The US and Japan has been the most important trade partners of the Philippines. These two countries together accounted for US\$ 28.3 billion or 41.0 percent of the total trade in 2000. The other major trade partners include Singapore, Korea, Taiwan, Hong Kong, Malaysia, and Thailand, which generated a combined total trade of US\$ 21.3 billion in 2000.

The export from manufacturing industries covers about 90 percent of the total export value in 2000. Among the manufactured products, electronic and electrical equipment/parts and telecommunication and electronic microcircuits are the largest products exported, that accounted for 58 percent of the total export value. The other products recording more than 1 billion US dollars of export value in 2000 are machinery and transport equipment and garments. Table 1.1.2 below shows export values of the major manufactured products in the Philippines.

Table 1.1.2 Export Values of the Major Manufactured Products

Commodity Group	Export Value (FOB in million US\$)
Electronic & electrical equipment/parts and telecommunication & electronic microcircuits	22,178
Garments	2,563
Textile yarn/fabrics	249
Footwear	60
Travel goods & handbags	177
Wood manufactures	212
Furniture and fixtures	381
Chemicals	327
Copper metal	234
Non-metallic mineral manufactures	133
Machinery & transport equipment	5,909
Processed food & beverages	286
Misc. manufactured articles not elsewhere classified	489
Others	1,044
Total	34,242

Source: National Statistics Office.

1.1.4 Investment in Manufacturing Industry

Foreign direct investments (FDIs) as well as domestic investments are the important sources of capital to sustain growth of economy in the Philippines. The trend of FDIs, in particular,

is one of important indicators to identify the economic conditions of the country in terms of its attractiveness to foreign investors.

The total approved FDIs in the Philippines has been decreasing since 1997, when it recorded its highest of approximately 262 billion pesos. In the year 2000, the total approved FDIs slowed down to 80 billion pesos or about one third of 1997's. However, FDIs in manufacturing sector showed a stable growth up until 1999 although there was a decline in 2000. In the year 1999 and 2000, FDIs in manufacturing sector covered more or less 90 percent of the total FDIs while it was only a quarter of total FDIs in 1996. FDIs in manufacturing sector played an important role in the development of manufacturing industry in the Philippines. Table 1.1.3 below shows the trend of FDIs by industry.

Table 1.1.3 Trend of Approved FDIs by Industry (Unit: million pesos)

Sector	1996	1997	1998	1999	2000
Agriculture	750	780	32	174	5
Mining	9,403	5,672	2,609	416	36
Manufacturing	24,349	81,715	91,962	92,617	72,218
Electricity	6,133	16,584	33,226	6,920	5,517
Water	0	106,063	0	0	0
Construction	23,538	15,209	149	15	97
Trade	19	291	35	528	59
Transportation	21,404	296	7,681	2,418	80
Storage	69	52	489	1,549	216
Communication	4,753	10,490	8	6	194
Finance & Real Estate	2,880	24,186	32,607	266	8
Services	8,129	813	2,773	1,830	1,944
Total	101,428	262,153	171,570	106,739	80,374

Source: Board of Investments (BOI), Philippine Economic Zone Authority (PEZA), Subic Bay Metropolitan Authority (SBMA), Clark Development Corporation (CDC).

As to country origins of FDIs, Japan, USA and some European countries have been playing the major roles as shown in Table 1.1.4 below.

Table 1.1.4 Trend of Approved FDIs by Country of Investor

(Unit: million pesos)

Sector	1996	1997	1998	1999	2000
Australia	197	684	407	21	365
Br. Virgin Island	881	5,677	13,880	52	0
France	33	79,040	121	526	0
Germany	153	1,462	2,849	3,029	6,547
Hong Kong	35,844	1,153	25,540	90	3,086
Indonesia	2,940	0	9	0	0
Japan	14,482	41,222	43,864	12,204	20,382
Korea	1,980	2,110	441	537	823
Malaysia	3,173	18,560	231	390	102
Netherlands	182	10,767	709	0	27,246
PROC	158	116	66	149	172
Singapore	2,036	7,309	9,220	2,026	3,747

Sector	1996	1997	1998	1999	2000
Sweden	35	2,945	80	5	0
Switzerland	15	192	1,322	205	241
Taiwan	3,071	2,374	1,246	748	239
Thailand	454	3,802	4,783	1,776	17
UK	8,154	33,086	585	13,600	5,788
USA	6,800	42,011	16,917	8,895	9,581
Others	20,842	9,623	18,885	62,487	2,037
Total	101,428	262,153	171,570	106,739	80,374

Source: Board of Investments (BOI), Philippine Economic Zone Authority (PEZA), Subic Bay Metropolitan Authority (SBMA), Clark Development Corporation (CDC).

1.1.5 Large/Medium and Small/Micro Enterprises

Based on the results of the 1997 Annual Survey on Establishments, there were about 14,700 large/medium establishments (with 10 workers or more employed) engaged in manufacturing in the Philippines while approximately 101,000 are small/micro manufacturing establishments (with less than 10 workers employed). The large/medium establishments generated about 1,117 thousand employment while the small/micro establishments employed about 382 thousand workers. In terms of the total value added, the large/medium establishments produced about 560 billion pesos, about thirty-three fold of the total value-added of the small/micro establishments, which generated only 17 billion pesos.

1.1.6 Structure of Manufacturing Industry

In the Philippines, the manufacture of food products dominated the manufacturing sector in terms of the number of establishments, employees, as well as output value. The number of establishments engaged in the manufacture of food products was about 3,700 in 1997, accounting for 25 percent of the total manufacturing establishments (with 10 or more workers employed). It also employed a total of about 185 thousand workers, accounting for 16.7 percent of the total paid employees. Its value-added was about 103 billion pesos, accounting for the largest proportion of the total value added in the manufacturing industry.

With regard to number of establishments and employees, the manufacture of wearing apparel is the second largest after food products while the manufacture of electrical machinery, apparatus, appliances and supplies is the second largest in terms of the value-added. Table 1.1.5 shows the top five industrial sub-sectors in terms of number of establishments, employees, and value added in the Philippines.

Table 1.1.5 Top Five Industrial Sub-Sectors in the Philippines

	No. of establishments		No. of employees		Value-added	
	Sub-sector	No.	Sub-sector	Thousand	Sub-sector	Million pesos
1	Food (151-154, 156-159)	3,718	Food (151-154, 156-159)	185	Food (151-154, 156-159)	103,559
2	Wearing apparel (181-189)	2,003	Wearing apparel (181-189)	154	Electrical machinery, apparatus (311-324)	77,246
3	Printing and publishing (221-223)	910	Electrical machinery, apparatus (311-324)	148	Petroleum refineries (232)	68,153
4	Fabricated metal (281-289)	895	Textile (171-174)	55	Other chemicals (242-243)	48,281
5	Machinery (291-294)	726	Transport equipment (341-359)	40	Transport equipment (341-359)	40,819

Source: National Statistical Office (1997).

Meanwhile, the trend of production value index in the manufacturing sector showed that a remarkable growth in production had been achieved in the manufactures of transport equipment and electrical machinery. Production value index of those industries increased by more than twenty fold for the last 20 years from 1985 to 2000. Production value of electrical machinery, in particular, grew by ten fold between 1991 and 2000. Table 1.1.6 below shows the trend of production value index of key manufacturing sub-sectors in the Philippines.

Table 1.1.6 Trend of Index of Production Value in the Key Manufacturing Sub-sectors from 1991 to 2000 (1985 =100)

Sub-Sector	1991	1994	1997	2000
Food	187.9	237.9	281.7	368.0
Beverage	222.1	268.6	365.9	464.3
Tobacco	120.3	153.4	182.9	232.0
Textile	212.4	163.9	147.3	158.2
Wearing Apparel	214.1	283.8	236.7	254.8
Wood and Wood Products	179.5	147.3	132.9	109.6
Furniture and Fixtures	233.5	184.7	539.9	659.3
Paper and Paper Products	186.5	210.1	208.3	384.0
Chemicals & Chemical Products	152.9	251.3	314.4	429.6
Rubber Products	195.9	167.5	147.0	189.3
Petroleum Products	157.1	148.5	246.2	374.0
Non-Metallic Mineral Products	247.6	294.2	418.8	309.6
Basic Metals	347.8	334.6	440.3	204.7
Transport Equipment	1,001.6	2,257.6	2,446.6	2,003.8
Electrical Machinery	273.6	523.9	1,206.1	2,457.6
Miscellaneous	70.1	209.5	309.8	312.4

Notes:

1. Prior to 1998, data were results of the Survey of Key Manufacturing Establishments (SKEM).
2. Starting 1999, data were results of the Monthly Integrated Survey of Selected Industries (MISSI).

Source: National Statistics Office

1.1.7 Importance of Manufacturing Industry in the Philippines Economy

The manufacturing industry has been playing a vital role in the growth of the Philippines economy since late 1990s. The figures shown in Table 1.1.7 below indicate the relative importance of manufacturing industries in the Philippines.

Table 1.1.7 Contribution of Manufacturing Industry to the Philippines Economy

Economic Indicator	Contribution of Manufacturing Industry
GDP	25% of GDP (Year 2000).
Employment	10% of the total employment (Year 2000)
Trade (Export)	90% of the total export value (Year 2000)
FDIs	90% of the total FDIs (Year 2000)

The large coverage of manufacturing industry in export and FDIs clearly shows its importance in international trade and investment market in the Philippines.

Meanwhile, the analysis of sub-sector wise contribution of manufacturing industry to the Philippines socio-economy indicates relative importance of specific sub-sectors as shown in below.

Table 1.1.8 Relative Importance Specific Sub-Sectors of Manufacturing Industry in Terms of Major Socio-Economic Indicators

Sub-Sector	Major contribution to the Philippines Socio-Economy
Food	-185 thousand of employees (The largest in the manufacturing). -103,559 million pesos of VA (The largest in the manufacturing) -286 million dollars of export (The sixth largest in the manufacturing).
Wearing Apparel	-154 thousand of employees (The second largest in the manufacturing). -2,563 million dollars of export (The third largest in the manufacturing).
Electrical Machinery and Apparatus	-77,246 million pesos of VA (The second largest in the manufacturing). -22,178 million dollars of export (The largest in the manufacturing).
Transport Equipment	-40 thousand of employees (The fifth largest in the manufacturing). -40,819 million pesos of VA (The fifth largest in the manufacturing). -5,909 million dollars of export (The second largest in the manufacturing).
Textile	-55 thousand of employees (The fourth largest in the manufacturing). -249 million dollars of export (The seventh largest in the manufacturing).
Chemicals	-48,281 million pesos of VA (The fourth biggest in the manufacturing). -327 million dollars of export (The fifth biggest in the manufacturing).
Wood-based	-593 million dollars of export (The fourth biggest in the manufacturing).
Petroleum Refineries	-68,153 million pesos of VA (The third biggest in the manufacturing).

The above sub-sectors of manufacturing industry will be given primary attention in terms of their relative importance to the Philippines economy. Proper consideration upon

environmental management will also be more required for these sub-sectors so as to prevent negative impacts on their products in the international market due to low environmental performance.

1.2 Environmental Pressures by the Manufacturing Industry in the Philippines

1.2.1 Overview

The growth of population, industrialization and urbanization over the past 50 years has put increasing pressure on the consumption and pollution of the natural resources in the Philippines. Local agencies¹ and international aid agencies² indicate that this natural resource degradation is putting serious and increasing restraints on the country's economic and social development. The following discussion outlines the impacts of these pressures in general and the share of industry, in particular, on the natural resource base of air, water and land (solid wastes), and provides some indications of the impacts on human health and the economy.

1.2.2 Air

(1) General

Air emissions are dominated by households (fuelwood for cooking and garbage burning) and re-suspended dust, accounting for about 80% of particulates, followed by mobile sources (predominantly PM10 and VOCs), cement, food, and construction industries. The energy, manufacturing, food and mining sectors account for most of the SO_x, NO_x and VOCs. Indoor air pollution (households) is ubiquitous, but except for some remote, large, stationary sources such as power stations and pulp and paper plants, most external air pollution is concentrated in and around urban areas, primarily Metro-Manila and Metro-Cebu, although mobile sources and re-suspended dust are increasingly affecting other secondary cities and small settlements strung along major arterial roads.

¹ DENR, the NSO and NEDA Estimates in the Philippine Environmental and Natural Resources Accounting Project (ENRAP)

² Notably the World Bank and Asian Development Bank. The World Bank's 'Philippines Environment Monitor' publications of 2000 and 2001 provide much useful data, some of which is used in this paper.

(2) Implication for Manufacturing Industry

The overall implication for manufacturing industry is that, while the most significant air pollution sources are from households and vehicles, the growth of manufacturing industry also poses an increasing threat to the ambient air quality. The USAID-supported Industrial Environmental Management Project (IEMP) and Environment and Natural Resources Accounting Project (ENRAP) gave several sub-sectors of manufacturing industry primary importance in terms of the levels of pollution load. As to the air and water pollutants, ENRAP made a ranking of pollution load by sources as well as regions. Table 1.2.1 below shows the sub-sector wise ranking within manufacturing industry.

Table 1.2.1 Sub-Sector Wise Ranking of Pollution Load in Manufacturing Industry (Air Pollution)

Sub-Sector (Manufacturing)	NCR and Region 4		Region 7	
	Particulates	SO ₂	Particulates	SO ₂
Cement	1	2	2	1
Sugar	2	4	1	3
Petroleum Refining	4	1	-	-
Beverage and Liquor	5	8	4	2
Coconut Oil Refining	9	5	-	-
Flour	3	6	3	-
Paint and Varnish	6	9	-	-
Pulp and Paper	7	3	-	-
Rice and Corn Milling	10	10	-	5
Wood and Wood Products	8	7	-	4
Fertilizer Manufacture	-	-	5	-
Tanning and Leather	-	-	-	-
Bakery	-	-	-	-

Note: The above ranking is made in accordance with the comparison of pollutants volume among sub-sectors. The volume of pollutants was estimated by making use of the sub-sector wise industrial production data in the Philippines and emission factor data of the above pollutants per unit production taken from USEPA inventory. The ENRAP data omits other air pollutants such as NO_x, VOCs, CO, and so forth. If these were included, it would raise the priority of other sub-sectors.

The above table indicates relative importance of specific sector such as cement, sugar, and petroleum refining in addressing air pollution control. It also shows the difference in sources of air pollution between regions.

1.2.3 Water

(1) General

According to the USAID-supported ENRAP Study, **water pollution** (BOD and SS) is dominated by households and agricultural, mining and urban run-off, which together account

for about 70% to 80% of this type of pollution (43% of total BOD is accounted for by households, and for SS, the agricultural, forestry and mining run-off is about 95% of the total). The remaining 20% to 30% emanates from industry and is dominated by livestock and poultry processing, sugar, coconut oil refining and pulp and paper. The major sources of toxic pollutants include gold mining (mercury), tanning and leather (chromium and sulfides), fertilizer production (P_2O_5 , fluoride and sulphates), cement (TOC and ammonia), and iron and basic industries (heavy metals, potassium). Between 1988 and 1992, BOD increased by 12% (for urban areas 15%), but SS reduced by 19%, due mainly to the slow-down in the mining sector. The toxic and heavy metal pollutants increased by up to 22% over this period, except for phenols, P_2O_5 , fluoride and sulfates (8% to 12% increase). 1992 was an exceptionally dry year, and the run-off was low. These increases are therefore an understatement of the average trend.

Almost all of the surface water bodies in the country are polluted, except for some streams in southern Mindanao. In the study regions, as in all urban areas, rivers are heavily polluted, being most severe in Metro-Manila, where all surface waters can be considered biologically dead during the dry months³. This is due to heavy concentration of population and industrial activity and an inadequate sewerage treatment system that services only about 8% of the 9 million residents. Wastewater is not used to recharge aquifers or for irrigation, but discharged directly into Manila Bay and other rivers. The coastal waters of Manila Bay are also deteriorating. The total load of organic matter in the Bay is about 250,000 tons of BOD/year, with more than 90% coming from the Pasig and Bulacan river systems in Metro-Manila, and there are high levels of ammonia nitrogen and severe oxygen depletion (as low as 1.9 mg/l). Heavy metals have been rapidly accumulating in the Bay – between 1982 and 1992 copper concentrations increased by 50%, mercury more than doubled, and zinc levels tripled⁴. Studies conducted in 1996-1998 revealed a significant decline in benthic organisms, and an increase in algal blooms in the eastern part of the Bay and in the Pasig and Bulacan rivers. In Laguna Lake, the biggest freshwater body in the country, and whose watershed covers 50% of Metro-Manila and most of Region 4, the BOD load is 73,400 tons/year, of which 69% is from domestic sources, 19% from industry and 12% from agriculture. While the water quality is still Class C (suitable for fisheries), and is also a source of drinking water for Metro-Manila, the lake is facing increasing BOD loads and siltation (estimated at 4M m²/year). The culture period for fish is increasing, and fish kills have occurred in the western part of the lake where industries and settlements are concentrated. The expansion of industry in the lake watershed (especially since the

³ DENR. IEPC report MEIP.

implementation of several large industrial estates) has given rise to increasing levels of toxic and hazardous wastes (THW), which, while not yet at critical levels (still meeting class C standards), are a cause for concern. Finally, groundwater extraction is also a cause for concern.

There are however, some bright points in this generally gloomy scene. Efforts to rehabilitate the Pasig river system resulted in a 30% reduction in BOD from 1990 to 1996, achieving Class C BOD, although dissolved oxygen (DO) did not improve. Most of the decrease in BOD is attributable to reduction in the load from industry and solid wastes (the focus of the clean-up program in the absence of an effective sewerage system).

In addition, the Laguna Lake Development Authority (LLDA) has a fairly efficient monitoring system (ambient and source), and registers most polluters within its area. Efforts to get industry to contain and store their effluent is having some success, and monitoring for toxic and heavy metals showed improvements between 1984 and 1999. In 1997, LLDA initiated a BOD pollution charge system on industries (called the Environmental User Fee), and by 2001 had registered and collected charges on over 650 industrial establishments. LLDA claims that this has produced a dramatic reduction in industrial BOD of over 80% during this time period due to industries implementing cleaner production methods and installing end-of-pipe treatment plants to avoid the charge. Other industrial water pollutants are also likely to have been reduced through this measure. LLDA is now extending the user charge to commercial establishments, housing sub-divisions and condominiums. The success of this approach has encouraged GOI to apply it nationwide through the upcoming water pollution legislation. Finally, initiatives by DENR/EMB to promote environmental management (such as 'Eco-watch' and river associations), and by industry associations (such as PBE) have raised environmental awareness and supported measures for waste reduction by a range of enterprises.

(2) Implication for Manufacturing Industry

In summary, the impacts of manufacturing industry are i) a minority, but still significant share of urban BOD and SS, especially from livestock, food and beverage and dye and textile industries, ii) an increasing share of toxic and heavy metal pollutants, originating from industrial chemical and fertilizer industries, tanneries, foundries and metal finishing, pulp and paper production, entering both surface and sub-surface water, and iii) health impacts of these toxics, whose effects have not been properly assessed in the Philippines, but which may be more serious than realized. More research is urgently needed on this matter. Shows the

⁴ DENR. IEPC report by MEIP

sub-sector wise ranking within manufacturing industry in terms of water pollution loads based on the ENRAP Study.

Table 1.2.2 Sub-Sector Wise Ranking of Pollution Load in Manufacturing Industry (Water Pollution)

Sub-Sector (Manufacturing)	NCR and Region 4		Region 7	
	BOD	SS	BOD	SS
Cement	-	-	-	
Sugar	1	-	1	4
Petroleum Refining	-	-	-	
Beverage and Liquor	3	1	-	2
Coconut Oil Refining	2	2	-	3
Flour	-	-	-	
Paint and Varnish	-	-	-	
Pulp and Paper	4	3	-	6
Rice and Corn Milling	-	-	-	5
Wood and Wood Products	-	-	-	
Fertilizer Manufacture	-	-	-	1
Tanning and Leather	5	-	-	
Bakery	-	-	-	

Note: The above ranking is made in accordance with the comparison of pollutants volume among sub-sectors. The volume of pollutants was estimated by making use of the sub-sector wise industrial production data in the Philippines and emission factor data of the above pollutants per unit production taken from USEPA inventory. Since the above ranking only covers the estimation of BOD and SS loads, it still needs further elaboration through incorporation of the loads by other toxic pollutants.

1.2.4 Land

(1) General

Solid Wastes (SW) and much **Hazardous Wastes (HW)** are the main impacts of pollutants to the land, where they may remain for some time, posing a danger to public health and clogging drainage, before leaching to surface and sub-surface water, or becoming air pollution in the form of dust and aerosols. Most SW is generated by households and commercial enterprises (i.e., municipal wastes: 10 million tons/yr - 81%), then commercial and industrial HW (2.4 million tons/yr 'net'⁵ - 19.3%), and hospital infectious wastes (6,750 tons/yr -0.05%). Of the total municipal wastes generated, urban areas claim about 60%, and rural areas 40%.

⁵ About 4 times this amount of HW is produced by industry, but much is in liquid form (especially acids), which are recycled by the plant, or neutralized or otherwise treated on-site. The 2.4 million tons/yr shown here is a conservative estimate of the amount requiring off-site treatment in specialized HW treatment facilities- see JICA- 'Hazardous Wastes Management in the Philippines. 2001'.

(2) Implication for Manufacturing Industry

HW from industry and hospitals comprise a significant, and rapidly growing proportion of the waste problem. The main generating sectors of industrial HW are fabricated metal, plating and machinery, chemicals, food and beverage, tanning and textiles. Although EMB is making efforts to address HW⁶, there is a general lack of awareness of the dangers of HW, and its health and economic impacts need urgent study. Higher priority needs to be given to its monitoring, transport and safe disposal. The lack of effective HW management in the country is dissuading foreign investment and is likely to hamper the image and sales of Philippine products in overseas markets. A major means to reduce solid wastes would be for industry to take greater responsibility for the eventual fate of their products through 'extended producer responsibility'. This should be a major area of attention for industrial leaders and government policy.

⁶ A Master Plan has been prepared and a feasibility study is being prepared for a HW treatment plant.