MALAYSIA

ENVIRONMENTAL QUALITY REPORT, 1988

Department of Environment
Ministry of Science, Technology and the Environment

ISSN 127-6433

MALAYSIA
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FOREWORD

The Environmental Quality Report 1988 describes the various environmental programmes and activities undertaken by the Department of Environment throughout the year and reflects the government's concerted effort to control and prevent pollution as well as to protect and enhance the quality of the environment.

During 1988, the Department of Environment worked hard towards strengthening the role of the State Environmental Committees set up to coordinate the management of environmental matters at the state level. For the first time, the national World Environment Day celebration was held outside Kuala Lumpur and hosted by the State Government of Penang on 20 August and all the State Environmental Committees participated in the launching celebration as well as in a conference on sustainable development. This historical event has strengthened the foundation for Federal-State cooperation in environmental matters and paved the way for not only holding future national level celebrations of World Environment Day outside Kuala Lumpur but also for Federal and State Ministers and State Executive Councillors in charge of environmental matters to meet and exchange views on environmental problems, on how they can be solved, as well as to discuss on the implementation of sustainable development principles.

Another significant event during 1988 is the coming into force of the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987 with effect from 1 April 1988. This coincided with the establishment of the one stop investment centre at the Malaysian Industrial Development Authority of the Ministry of Trade and Industry and similar set-ups at the state level to facilitate foreign investment. The Department of Environment deployed senior officers to serve at these centres and has prepared a booklet known as the "Investment Guidelines-Environmental Requirements" for distribution to potential investors.

As in previous reports, attention is drawn to the fact that while pollution from industrial and motor vehicle sources are kept under control by the Department of Environment, there remain a number of major pollution sources viz sewage, animal wastes, municipal solid waste and soil erosion which need to be given urgent attention. As these are under the jurisdiction of the Local and State Authorities, much action is needed by these Authorities to bring them under control.

This also explains why the role of the State and Local Governments in environmental matters needs to be institutionalised and strengthened.

It is hoped that this report will, among other things, help to increase environmental awareness among its readers particularly those who are involved in the planning and implementation of various economic development sectors. This is because without their awareness and commitment to environmentally sound sustainable development, the dream of "Our Common Future" - a report on sustainable development by the World Commission on Environment and Development will never be realised.

Finally, I wish to thank all those responsible for producing this issue of the annual report for their dedication and untiring efforts.

(Ir. GOH KIAM SENG, KMN)
Acting Director-General of Environmental Quality
Malaysia

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ENVIRONMENTAL POLICIES AND STRATEGIES

Introduction

More than a decade has passed since the Third Malaysia Plan (1976-80) first endorsed the fundamental needs of sound environmental management in planning and implementation of development programmes. The policy of sound environmental management continues to be the thrust in the Fifth Malaysia Plan (1986-90). The year 1988 observed the recovery of the Malaysian economy after two years of overall slow-down with certain sectors experiencing very little or negative growth. In response to this, long term strategies were drawn by the Government and they were basically concentrated on restructuring the economic base that include efforts to increase productivity, investment and job opportunities. These rationalisations were aimed at lessening Malaysia's dependence on primary commodity exports that simultaneously diverse the industrial base and dynamically strengthen our commitment to achieving the Newly Industrialised Country (NIC) status. Such strategies put increasing pressures on the existing framework of environmental management which have to be strengthened to meet the challenges of the late Eighties.

Environmental Policy Objectives

The Fifth Malaysia Plan (1986-90) continues to outline the following environmental policy objectives:

(i) "... to maintain a clean and healthy environment...";

(ii) "... to maintain the quality of the environment relative to the needs of the growing population...";

(iii) to minimise "(the) impact of the growing population and human activities relating to mineral exploration, deforestation, agriculture, urbanisation, tourism, and the development of other resources on the environment...";

(iv) to balance "...the goals for socio economic development and the need to bring the benefits of development in a wide spectrum of the population ... against (the) maintenance of sound environmental conditions..."

(v) "... to place more emphasis on prevention through conservation rather than on curative measure ..." inter alia by preserving the country's unique and diverse cultural and natural heritage;

(vi) "... to incorporate an environmental dimension in project planning and implementation ..." inter alia by determining "...the implication of the proposed projects ... and the costs of the required environmental mitigation measures through the conduct of Environmental Impact Assessment" studies; and

(vii) to promote "(greater) co-operation and increased co-ordination among relevant federal and state authorities ..." as well as "...(among) the ASEAN Governments ...".

The ultimate aim of the Federal Government working in close co-operation with the State Governments is to ensure as far as possible that all man's activities are in balance with his environment. To this end, in recognizing that the environment transcends national boundaries, the Governments will also co-operate with Foreign Governments either directly or through competent regional and international organisations.

New Strategies in Environmental Management

In view of the growing concern over global environmental issues such as climate change, ozone and natural resource depletion, transboundary movements of hazardous material and acid rain, it is imperative that the standing environmental policy objectives need to be reinforced through integration of principles of sustainable development as outlined by the World Commission on Environment and Development (WCED) and endorsed by the United Nations General Assembly on 11 December 1987. In this regard, Malaysia adopts the recommended eight principles of the World Commission. The principles are:-

(i) To revise economic growth and sustain the development of both developing and industrialised nations;

(ii) To raise the quality of growth;

(iii) To conserve and enhance the resource base;

(iv) To ensure a sustainable level of population;

(v) To reorient technology and manage risks;

(vi) To integrate environment and economics in decision making;

(vii) To reform international economic relations; and

(viii) To strengthen international co-operation.

Sustainable Development: New Environmental Direction

Sustainable development essentially is development which meets the needs of the present without compromising the ability of future generations to meet their own needs. There can only be sustainable development if environmental concerns are taken into account in development activities.

The nature of the environmental problems cut across all development sectors and new ideas are needed to ensure economic growth. In this connection, structural changes need to be integrated into environmental and economic decisions both in Government and in trade. The environment and economy cannot be addressed as two separate problems. Rather, they should be viewed as one.

In the same token, environmental issues, goals and action cannot be formed in isolation from the development sectors in which they emanate. The Department of Environment, sensitive to these needs, continue, firstly, to assess the environmental impact in the implementation of development and industrial projects and secondly, enforce pollution control regulations under the Environmental Quality Act of 1974.

The concept of environmental protection and sustainable development clearly need to be incorporated in the key ministries and legislative committees where appropriate decisions can be made. In initiating this responsibility, the Department of Environment has organised a preparatory workshop on 2 August 1988 to discuss a country report on "The Environmental Perspective to the year 2000 and Beyond". The workshop was attended by participants from Federal and State Government Agencies, Non-Governmental Organisations and Universities that enabled a set of consultative documents entitled "Malaysia's Response To Sustainable Development" be compiled. The compilation among other matters, contains recommended instrument of environmental action needed to reinforce the recommended actions outlined in the various development sectors. These instruments include assessment, planning, legislations, awareness and training and roles of institutions. This was followed by a National Conference on Sustainable Development on 20 August 1988.

To implement the principles, the Department of Environment is also actively participating in the State Environmental Action Committees by providing input and comments pertaining to environmental aspects in individual development and industrial projects. Another notable development is the formation of a 'one-stop agency' which was announced in September 1988 under which administrative procedures at Federal and State level are streamlined. The Department of Environment being a member of this Coordination Centre for Investment (COI) operated by the Malaysian Industrial Development Authority (MIDA), is required to assist and advise investors on matters relating to the Environmental Quality Act, 1974. These reflect the Government's initiative to enhance environmental concepts into project planning and decision-making.

The Department of Environment has also been involved in various activities under the environmental education programme to promote the sustainable development concept. The activities carried out include exhibitions and the World Environment Day celebration launched in Pulau Pinang on 20 August 1988 that carried the theme "Sustainable Development: When You Put Environment, First, Development Will Last".

It is hoped that, the contributions made by all concerned, will assist the Department of Environment to develop a draft national policy document on sustainable development for the guidance of sectoral development agencies in incorporating environmental protection and sustainable development considerations into their sectoral development policies and programmes which consequently contribute to the building up of a sustainable "common future" for Malaysia.

While pursuing the new strategies, the Department of Environment maintains the following three pronged strategies:

Pollution Control and Prevention

In the pollution control and prevention approach, 11 pollution control regulations have been formulated and enforced to date under the Environmental Quality Act 1974, and its Amendment, 1985. A set of rules made under the Road Traffic Ordinance 1958 i.e Motor Vehicles (Control of Gas and Emission) Rules of 1977 to control smoke and gas emission from motor vehicles is also enforced by the Department of Environment jointly with the Police and Road Transport Department.

Land-use Planning

In the promotion of comprehensive land-use planning approach, environmental considerations are incorporated into land-use plans such as regional plans, master plans, structure plans, local plans or development plans. This is the time to apply good conservation and natural resources management principles. In this connection, the Department of Environment has drawn up a list of land-use planning guidelines for use by planning agencies.

Integrated Project Planning

In the integrated project planning approach, environmental considerations are integrated into project planning and implementation. The Environmental Quality (Amendment) Act 1985 requires anyone who intends to carry out a prescribed activity to first conduct a study to assess the environmental impacts that arise from the prescribed activity as well as the mitigating measures to overcome them. The report should be approved by the Director General, Department of Environment before the project could be implemented. The Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order, 1987 was enforced on 1 April 1988. The Order specified some 19 categories of activities requiring environmental impact assessment.

CHAPTER 2
ENVIRONMENTAL QUALITY COUNCIL

ENVIRONMENTAL QUALITY COUNCIL

Introduction

The Environmental Quality Council (EQC) established under Section 4(1) of the Environmental Quality Act 1974, is a body to advise the Minister on matters pertaining to the Act and also on any matter referred to it by the Minister. In addition, the Council has also provided guidance to the Department in the formulation of policies and strategies related to environmental protection and management.

Membership

The members of the Environmental Quality Council in 1988 were as follows:

Name and Designation

1. Y.Bhg. Tan Sri Datuk Dr. Hamzah bin Sendut, DMPN, PGDK, PSM, DJN, PPT (Chairman)

2. Encik Mohd. Noordin bin Hassan, KMN, SMP, JMN
   Secretary General,
   Ministry of Science, Technology and the Environment

3. Encik Haron bin Siraj, KMN
   Director,
   International Division,
   Ministry of Trade and Industry

   Alternate:
   Encik Ithnin bin Hj. Hassan
   Principal Assistant Director,
   Industry Division,
   Ministry of Trade and Industry

4. Ir. Dato Tuan Haji Shahrizaila bin Abdullah, KMN, PCM, BSK
   Director General,
   Department of Drainage and Irrigation,
   Ministry of Agriculture

5. Ir. Tuan Haji Abdul Jalil bin Mahmud
   Director General,
   Department of Factories and Machinery,
   Ministry of Labour

6. Tuan Haji Othman bin Mohd. Rijal, SMS, KMN
   Deputy Secretary General (Planning),
   Ministry of Transport

   Alternate:
   Encik Abd. Rahman bin Haji Mohd. Noor
   Under Secretary, Land Division,
   Ministry of Transport

7. Ir. Lum Weng Kee, KMN
   Director,
   Engineering Services Division,
   Ministry of Health

8. Encik Charles G. Edmund @ Charles Labunda
   Permanent Secretary,
   Ministry of Tourism and Environmental Development, Sabah

   Alternate:
   Encik Yeo Boon Hai
   Senior Environmental Officer,
   Ministry of Tourism and Environmental Development, Sabah

9. Encik Willian Tang
   Permanent Secretary,
   Ministry of Environment and Tourism,
   Sarawak

   Alternate:
   Encik Darrell Tsen
   Principal Assistant Secretary,
   Local Government Division,
   Ministry of Environment and Tourism,
   Sarawak

10. Encik Ismail bin Ahmad
    Head,
    Environmental and Pollution Control Division,
    National Petroleum Authority
    (PETRONAS)

11. Ir. Ng Swee Kong
    Representative,
    Malaysian Oil Palm Growers Council (MOPGC)

12. Encik A.S. Machado
    Representative,
    The Federation of Malaysian Manufacturers (FMM)

    Alternate:
    Encik G. Krishnan

The Federation of Malaysian Manufacturers (FMM)

13. Ir. Yeo Siow Pah
from 1.7.1988
Representative, Malaysian
Rubber Products Council (MRPC)

Alternate:
Dr. Haji Badri bin Muhammad
Malaysian Rubber Producers Council (MRPC)

14. Prof. Dr. Sham bin Sani
Deputy Vice Chancellor (Academic and Research)
Universiti Kebangsaan Malaysia

Alternate:
Dr. Ahmad Badri bin Mohamad
Head,
Department of Botany,
Universiti Kebangsaan Malaysia

15. Ir. Gurmit Singh K.S
President,
Environmental Protection Society of Malaysia (EPSM)

16. Y.Bhg. Datuk Haji Mohd. Ishak bin Hj. Mohd. Ariff, DSPN, SMS, DJN, PPT, KMN, PJK
President,
Malaysian Professional Centre

17. Ir. Goh Kiam Seng, KMN
Acting Director General of Environmental Quality,
Department of Environment (Secretariat)

Activities

In 1988, the Council met three times. The meetings were held at the Department Head Office on 5th April, 3rd August and 15th November, 1988. Among the important agenda tabled in the meetings included Environmental Quality Reports. International Convention on Marine Environment, World Commission on Environment and Development, National Action Plan on Environmental Education/World Environment Day, Feasibility Study on Treatment and Disposal of Toxic and Hazardous Waste in Malaysia, and matters related to sustainable development.

The 1985-86 and 1987 Environmental Quality Reports were tabled during the year and the Council recommended that these reports be made public. A Conference on 'Sustainable Development' was organised by the Department of Environment in conjunction with the World Environment Day 1988 Celebration at Pulau Pinang on 20 August 1988.

The report of the World Commission on Environment and Development entitled 'Our Common Future' was discussed. The Council adopted the principles as outlined in the report of the World Commission and requested the Department to promote the concept of sustainable development and its incorporation into various sectoral development programmes in the Sixth Malaysia Plan (1991-95).

The detailed list of all the working papers submitted to the council in 1988 are given in Table 2.1.

Since 1977, 38 meetings were held and 83 working papers presented. Of the 83 working papers discussed, 21 (25 percent) were on legal matters, 46 (56 percent) on programme matters, and the remaining 16 (19 percent) on other issues as shown in Table 2.2.

Table 2.1

Working Papers Submitted to the Environmental Quality Council, 1988

Meeting	Date	Title	Subject
1.	5 April 1988	1. Status Report on State Action Committees on Environment.	Programme, Coordination
		2. Status Report on Environmental Education Programme	Programme, Environmental Education
		3. International Convention on Marine Environment	Programme, Contigency Plan
		4. A Feasibility Study on Treatment and Disposal of Toxic and Hazardous Waste in Malaysia Final Report	Programme, Guidelines
		5. Report of the World Commission on Environment and Development	Programme, Environmental
2.	3 August 1988	1. Environmental Quality Report 1985-86 (Executive Summary)	Programme, Environmental Report
		2. Report on the Status of Environ mental Education Programme World Environment Day	Programme, Environmental Education
		3. Environmental Conference on Sustainable Development	Programme, Seminar
3.	15 November 1988	1. Environmental Quality Report 1987 (Executive Summary)	Programme, Environmental Report
		2. Response on the Implementation of Sustainable Development Principle	Programme, Environmental Perspective
		3. National Action Plan on Environmental Education	Programme, Environmental Education

Table 2.2

Working Papers Submitted to the Environmental Quality Council by Subject Matter, 1977-1988

Subject Matter	Working Paper (Number)	Percentage (%)
1. Legal		
1.1 Regulations		
Clean Air	3	
Crude Palm Oil	2	
Raw Natural Rubber	2	
EIA	1	
Lead in Petrol	1	
Motor Vehicle Noise	2	
Sewage & Industrial Effluents	1	
Waste, Toxic & Hazardous	2	
Emissions from Diesel Engines	1	
1.2 Standards		
Palm Oil	2	
Rubber	1	
Water Quality	1	
1.3 Legislation		
Amendments	2	
Sub Total	21	25
2. Programme		
2.1 Planning		
World Environmental Day	5	
EIA	3	
Guidelines (Toxic and Hazardous Wastes)	6	
Klang Valley	1	
Seminar	3	
Environmental Education	5	
Environmental Perspective/Report	5	
2.2 Operations		
Contingency Plan	4	
Marine, Oil Spills	1	
Air Quality Monitoring	1	
Water Quality Monitoring	1	
Enforcement	1	
Clean Air	1	
EQA	1	
EQC	1	
Motor Vehicle	1	
Palm Oil	1	
Rubber	1	
Sewage & Industrial Effluents	1	
2.3 Coordination	4	
Sub Total	46	56

Subject Matter		Working Paper (Number)	Percentage (%)
3. Issues			
Environmental Issues		3	
Marine Pollution		2	
Piggery Waste		2	
Pollution Complaints		2	
Annual Report		1	
Noise		1	
Sewage		1	
Vehicle Air Pollution		1	
Ozone Layer		1	
Waste, Municipal		1	
Water Pollution		1	
	Sub Total	16	19
	Total	83	100

CHAPTER 3
ADMINISTRATION

ADMINISTRATION

Organisational Structure

The Department of Environment is headed by the Director General who is appointed under Section 3(1) of the Environmental Quality Act, 1974. The Department is structured into three main divisions namely, Planning and Development, Operation, and Administration. In addition, eight regional offices have been set up and are located at Butterworth, Ipoh, Kuala Lumpur, Johor Bahru, Kuantan, Kuala Terengganu, Kuching and Kota Kinabalu as shown in Figure 3.1.

Planning and Development Division

The main function of the Planning and Development Division is to ensure that environmental factors are taken into consideration at all stages of development or project planning, to document pollution control technologies, to increase public awareness as well as develop a positive attitude towards the environment, to promote regional and international co-operation in the field of environment and also to formulate and review environmental guidelines and regulations. The Division consists of three sections namely Evaluation, Development, and Programme and Guideline Formulation. Activities of these sections are as follows:

Evaluation Section

- environmental impact assessment
- environmental input to development planning
- natural resource assessment

Development Section

- environmental education
- environmental information procurement and dissemination
- regional and international affairs
- presiting evaluation of new industrial premises
- approval of pollution control equipment
- approval of fuel burning equipment
- environmental technology documentation

Programme and Guideline Formulation Section

- development of criteria and standards
- formulation of regulations
- development of guidelines
- toxic and hazardous waste management
- chemical risk assessment

Operations Division

The function of the Operations Division is to control and prevent pollution through its enforcement and monitoring programmes. The Division has two main sections, namely, Enforcement, and Monitoring. Activities of these sections include:

Enforcement Section

- source inventory
- licensing
- enforcement and prosecution
- marine pollution control
- review of compliance and pollution complaints
- control of mobile sources and noise

Monitoring Section

- environmental monitoring
- environmental data management and information dissemination
- instrument and services
- technical training
- investigation and special studies

Administration Division

The function of the Administration Division is to manage and administer matters pertaining to finance, personnel, support services as well as security of the Department. Activities of this Division include:

- general administration and coordination
- personnel administration
- registration of fees collected and licences issued
- support services

Regional Offices

The main functions of Regional Offices are to carry out environmental monitoring and enforcement of various regulations made under the Environmental Quality Act, 1974 (Amendment 1985), as well as giving advisory services to the state authorities regarding sound environmental planning. Activities of the Regional Offices include:

- air, river, and coastal water quality monitoring
- enforcement

- investigation of complaints
- project siting
- environmental awareness
- general administration and finance
- state liaison

Finance

Operating Expenditure

The Department's total operating expenditure for 1988 was M$8,085,275. About 57 percent of the operating expenditure was for staff emolument and related expenditures, while 43 percent was for services, supplies and assets.

Figure 3.2 shows the Department's operating expenditure for the period 1980-88. Notable in 1988 was the increase in operating expenditure by 11 percent from that received for the previous year.

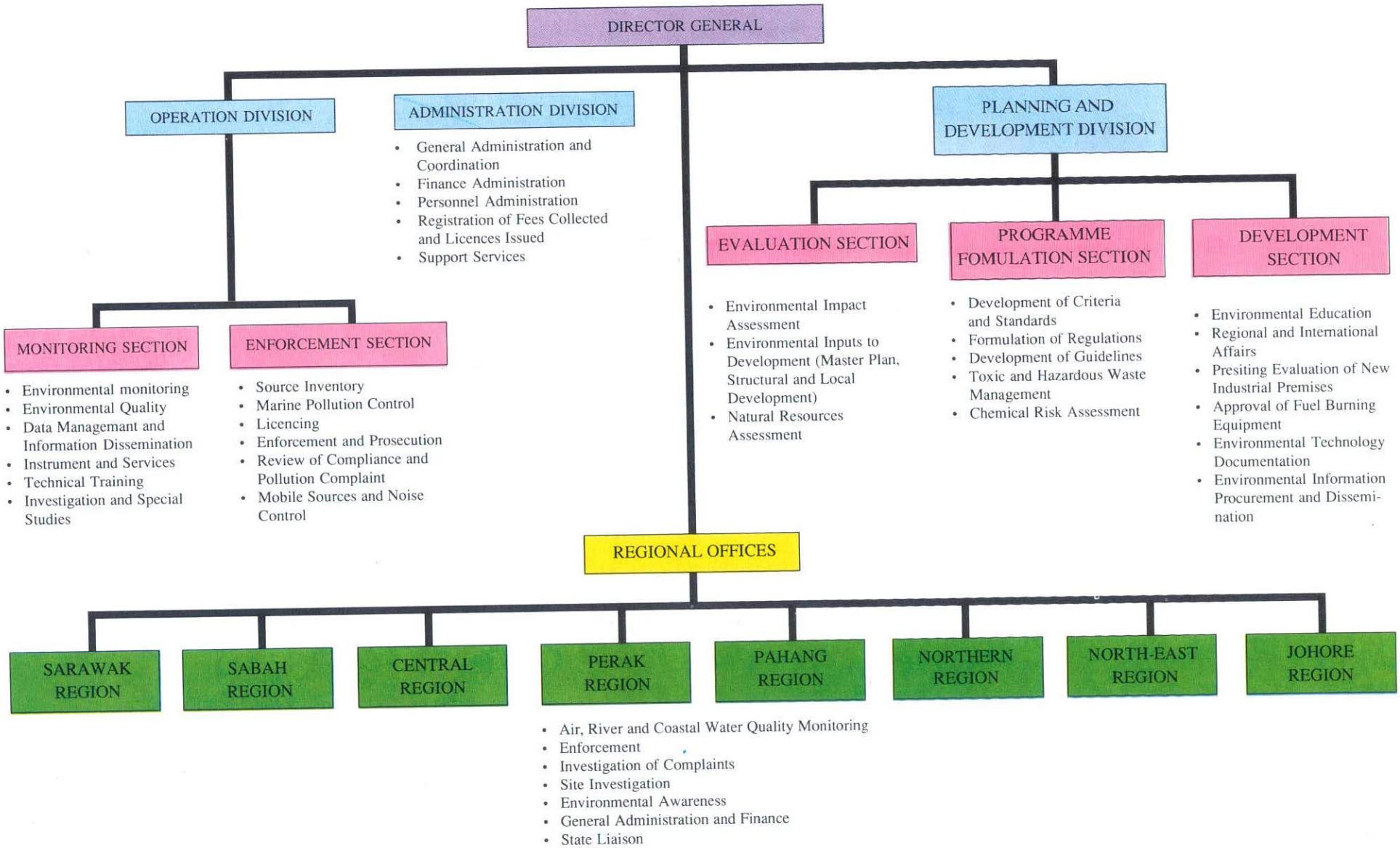
Development Expenditure

The total allocation for development in 1988 was M$3.63 million, and a sum of M$2,113,025 or 58 percent of the allocation was spent for the purchase of equipment. However, much of the physical work such as the calling of tenders and quotations were completed before the end of the year and in some cases the Tender's Board has approved the purchase of the equipment. The Department's expenditure for the period 1980-88 is also shown in Figure 3.2.

Revenue

Revenue collected in 1988 amounted to M$660,589 was a decrease of 11 percent compared to M$741,314 collected in 1987. Effluent related fees accounted for 94.4 percent of the total revenue, while compounds and fines collected under the Environmental Quality (Clean Air) Regulations, 1978 amounted to another 5.6 percent. Other sources of revenue included the sale regulations, and other documents.

Figure 3.1 Organisation Chart of the Department of Environment Ministry of Science, Technology and the Environment, 1988.



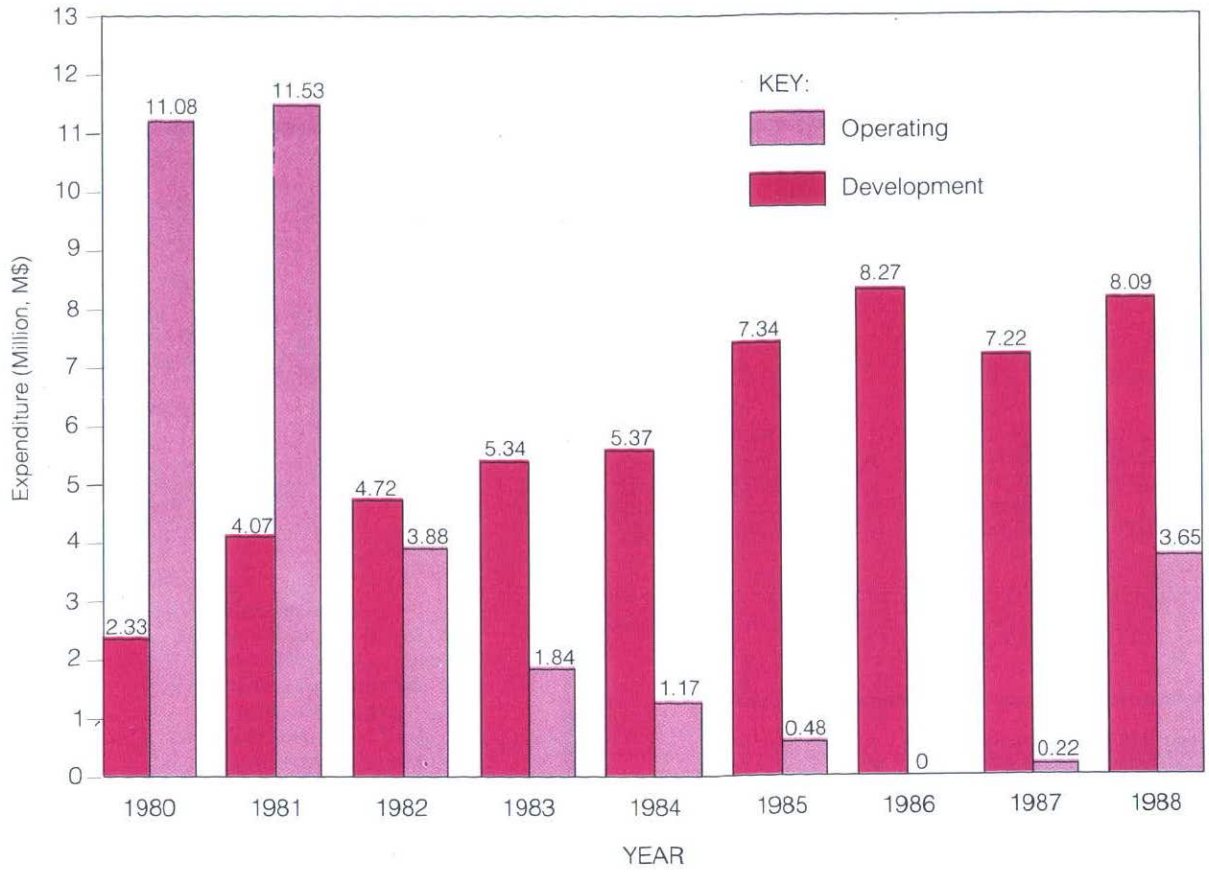


Figure 3. 2. Department of Environment: Operating and Development Expenditures, 1980–1988

CHAPTER 4

ENVIRONMENTAL QUALITY MONITORING AND SURVEILLANCE

ENVIRONMENTAL QUALITY MONITORING AND SURVEILLANCE

Air Quality

In 1988, Air Quality Monitoring continued for the measurement of dust fall-out, total suspended particulates and atmospheric lead. In line with the objective to evaluate the effectiveness of the enforcement programme, emphasis was given for source orientated monitoring stations both for stationary and mobile sources. Measurement for stations located within residential and commercial areas were continued to determine the baseline information for air pollution dispersion.

Tables 4.1 and 4.2 show the distribution of the monitoring stations according to areas for total suspended particulates and dust fall-out respectively.

In total, 1585 samples for dust fall-out were taken using Dust Deposit Gauge (DDG), an increase of 61 samples from 1987, although monitoring stations were reduced by one to 161 stations. There was also an increase in the number of samples for total suspended particulates and lead using High Volume Samplers (HVS). In total, 1666 samples were taken from 29 stations compared to 1539 samples from 25 stations in 1987.

Table 4.3 shows the sampling performances using High Volume Sampler and Dust Deposit Gauge. In general, sampling performances for both dust deposit gauge and total suspended particulate remained satisfactory at an average of 9 and 60 samples per station respectively.

River Water Quality

Under the 1988 Annual River Water Quality Monitoring Programme, 87 major rivers were monitored. A total of 3009 samples were collected from 575 monitoring sites. Several previous sites were dropped, mainly those located in the states of Sabah and Sarawak, due to inaccessibility and logistic problems.

The assessment of water quality was carried out in terms of the physical, biological and chemical characteristics of the water body. Several parameters were measured at almost every monitoring site namely Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Dissolved Oxygen (DO), Conductivity, Ammoniacal Nitrogen (AN), pH, Suspended Solids (SS), Turbidity and Temperature. The selection of other parameters, depended largely on the local characteristics of the water body and the surrounding areas. The water quality analyses carried out in 1988 are presented in Figure 4.1.

Coastal Water Quality

In 1988, a review was carried out on the coastal water quality monitoring programme. A total of 163 sites were selected for coastal water quality monitoring to represent areas of beneficial uses (especially for recreational purposes) as well as estuarines site to indicate pollution from river inputs. This shows an increase of 10 sites as compared to the total of 153 sites in 1987.

Control sites were established to compare the results obtained. Further, a quality assurance programme comprising of monitoring methodology, site selection, sample preservation as well as equipment used, was also established to ensure that the monitoring is done uniformly throughout all the regional offices in the country.

A minimum of 4 samples were collected at each site and in total 897 samples were collected for biological and chemical analyses by the Chemistry Department. This indicates an increase of 14 percent since 1987. Salinity, temperature, conductivity, pH, dissolved oxygen as well as light penetration measurements were carried out in-situ at each site.

Ground Water Quality

Malaysia has a significant amount of groundwater recharge amounting to about 20 billion cubic metres per year in Peninsular Malaysia, 14 billion cubic metres per year in Sabah and 30 billion cubic metres per year in Sarawak.* As the country is endowed with abundant rainfall, Malaysia has been depending largely on surface water as a main source for its water supply. With the increase in the need of water supply and the deterioration of water quality due to the increase in population, industrialisation and agriculture, the amount of good, clean surface water has decreased. Over the last few years, groundwater has played an important role as an additional source of water supply.

* Quoted from : "National Water Resources Study, Malaysia, Main Report Vol. 2: Water Resources Development And Use Plan, Oct. 1982. Government of Malaysia and Japan International Co-operation Agency.

With this, it becomes the responsibility of the Department of Environment to carry out a groundwater quality monitoring and surveillance programme to ensure that the groundwater quality is maintained at safe level. For a start, an extensive literature review on the availability, utilization as well as the quality of groundwater in Malaysia was done after which a "Position Report on Groundwater Sources in Malaysia" was prepared.

Consequent to this and due to the concern over groundwater being contaminated by the haphazard disposal of toxic and hazardous wastes, a project called "Environmental Quality Monitoring Programmes for Toxic Pollutants in Groundwater" was initiated. Domestic waste disposal sites situated near housing estates/villages, watercourse, industrial areas and those used illegally as toxic waste dumps were given priority. During the year, 47 disposal sites located within the various Local Authorities throughout Peninsular Malaysia were visited to determine visually whether any of the sites have been contaminated by toxic and hazardous wastes. From these preliminary investigations, the potentially contaminated sites will be selected and monitoring wells will be established to determine the extent of the groundwater contamination.

Noise

The increase in the number of noise-related complaints received by the Department of Environment from 74 cases in 1987 to 98 cases in 1988 clearly indicates the growing public awareness and annoyance against noise pollution. Twenty-five percent of the total number of complaints received were from the residents of Kuala Lumpur. Following such complaints, investigations and noise measurements were carried out.

In order to achieve the objectives of the Noise Monitoring Unit to provide reliable and representative data and information, a literature survey on the theory and the proper noise measuring methods was conducted. Apart from this, a noise monitoring exercise was carried out in Kuala Lumpur and Petaling Jaya. The scope and duration of the exercise were however limited due to lack of manpower and equipment constraints. The main part of the study comprised of roadside traffic noise measurements. A total of 24 sites were selected randomly in Kuala Lumpur. The study showed that the A-weighted Equivalent Continuous Sound Level for 5 minutes (L A, eq, 5 min) for traffic noise in Kuala Lumpur ranged from 66 dB(A) to 81 dB(A). 88 percent of the sites surveyed were found to have values exceeding L A, eq, 5 min of 70 dB(A). All measurements were conducted during non-peak traffic hours i.e. between 0900-1200 hours and 1400-1600 hours. However due to insufficient number of samples, the findings did not represent the overall situation in Kuala Lumpur.

Thus, throughout the year emphasis has been placed on the training and familiarisation on the operation of equipment - both the existing and the newly acquired Mobile Traffic/Industrial Noise Monitoring System.

Special Studies

Special studies were carried out to gather new information and to supplement existing data on environmental quality and management.

The special studies done by the regional offices were mostly pertaining to persistent public complaints while the studies carried out by the headquarters covered environmental issues and matters of common interest or need to all.

The major studies carried out by the headquarters for 1988 are described in Table 4.4.

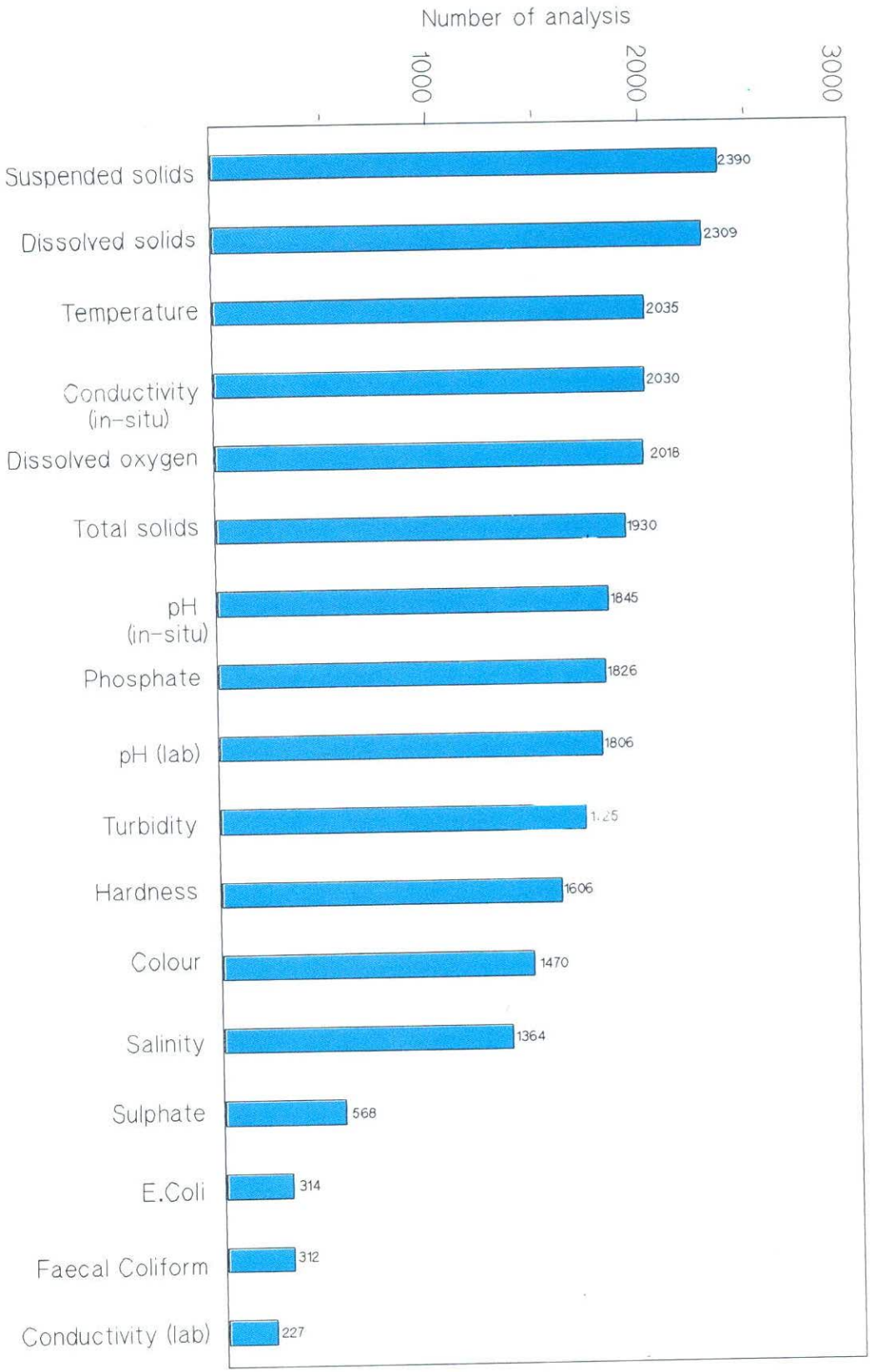


Figure 4.1. Number of Analysis for Physical, Biological and Chemical Parameters of the Monitored River Waters,1988

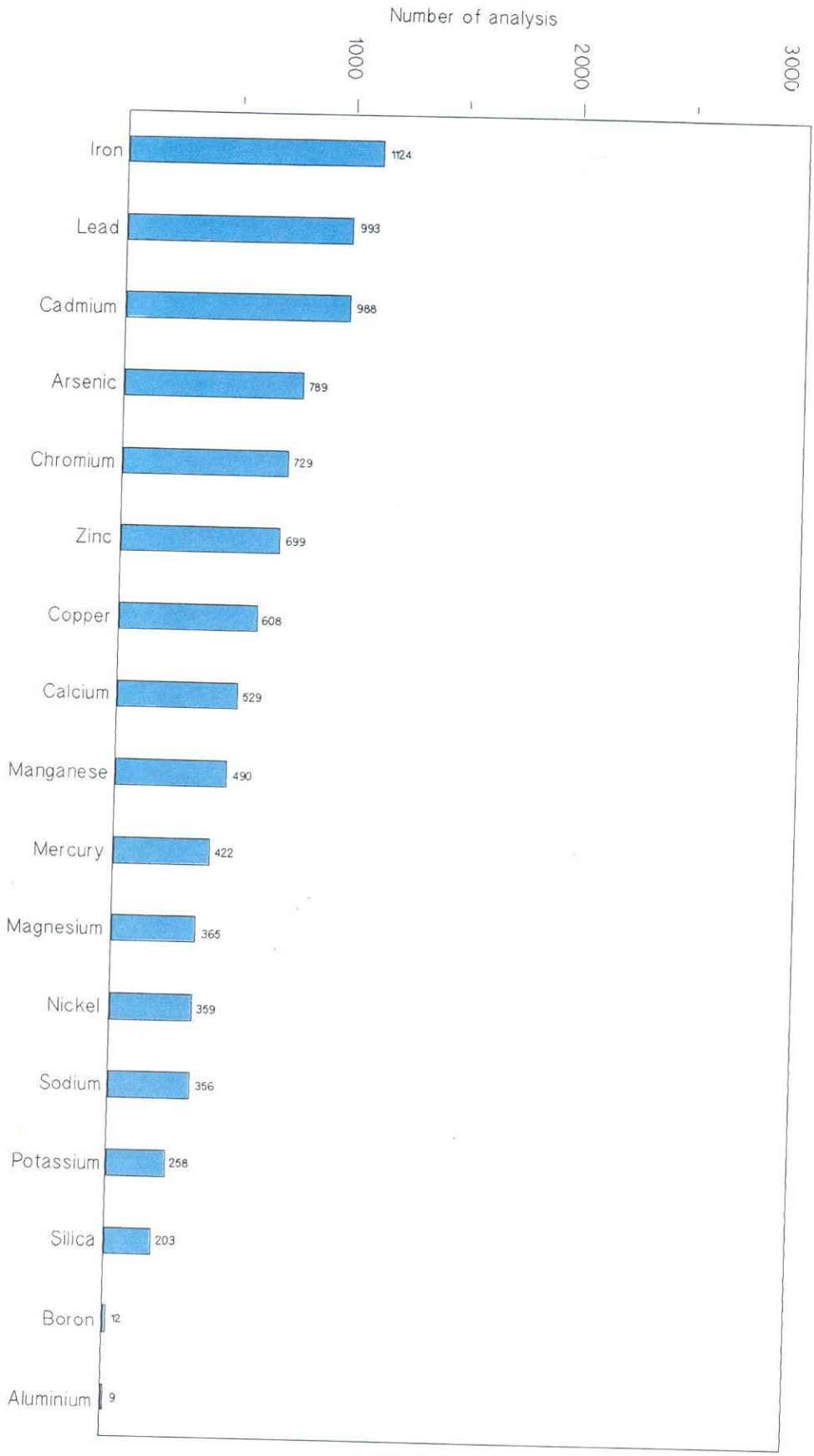


Figure 4.1 (Continuation)

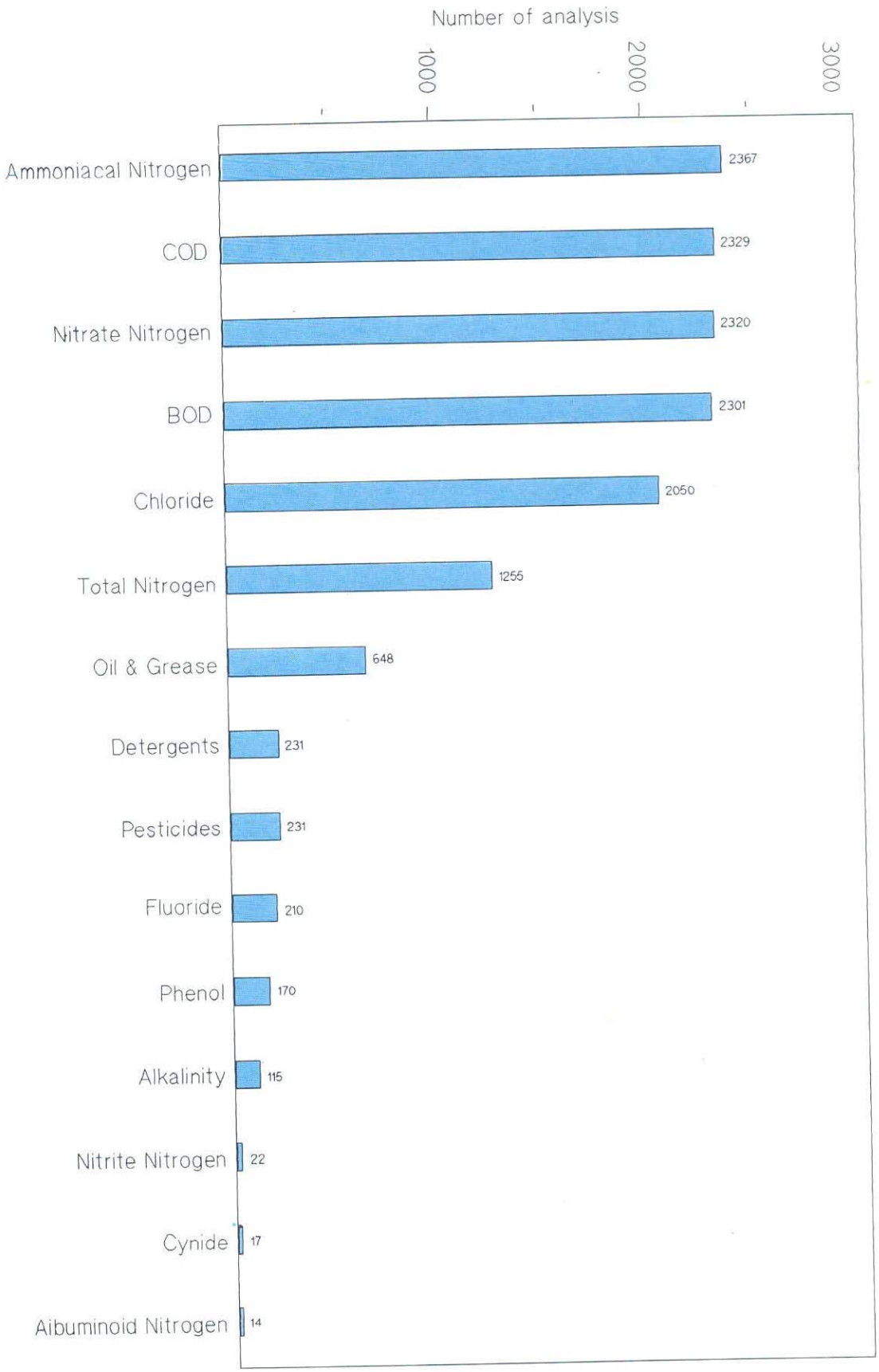


Figure 4.1 (Continuation)

Table 4.1

Malaysia: Distribution of Monitoring Stations for Total Suspended Particulates, 1988

Type / State	Source		Ambient			Total
	Industries	Traffic	Residential	Commercial	Rural	
Johor	2 *	-	-	1 *	-	3
Kelantan	-	-	-	-	-	-
Kedah	1	-	-	-	-	1
Melaka/ Negeri Sembilan	-	-	-	-	-	-
Perlis	-	-	-	-	-	-
Pahang	1 *	1 *	-	-	-	2
Perak	1 *	-	-	1 *	-	2
Seb. Perai/ Pulau Pinang	2 *	2 *	1 *	-	1	6
Selangor	2 *	2 *	1 *	-	-	5
Sabah	-	-	1 *	-	-	1
Sarawak	2	-	-	-	-	2
Terengganu	1 *	-	-	1 *	-	2
Wilayah Persekutuan	-	4 *	1 *	-	-	5
Total	12	9	4	3	1	29

Note : * Lead is also monitored.

Table 4.2

Malaysia: Distribution of Monitoring Station for Dust Fall Out, 1988

Type / State	Source Industries	Ambient			Total
		Residential	Commercial	Rural	
Johor	16	5	1	-	22
Kelantan	6	1	-	-	7
Kedah	6	1	1	-	8
Melaka	3	-	1	-	4
N. Sembilan	3	-	1	-	4
Perlis	4	-	-	-	4
Perak	19	-	1	-	20
Pahang	12	3	2	-	17
Seb.Prai/ P.Pinang	9	1	4	1	15
Selangor	14	4	-	-	18
Sabah	8	3	-	-	11
Sarawak	9	3	1	-	13
Terengganu	12	1	2	-	15
Wilayah Persekutuan	2	-	1	-	3
Total	123	22	15	1	161

Table 4.3

Malaysia: Sampling Performance of High Volume Sampler (HVS) and Dust Deposit Gauge (DDG) by Region, 1988

Region (State)	HVS		DDG	
	Number of Samples	Percentage of Achievement	Number of Samples	Percentage of Achievement
Central (Kuala Lumpur, Selangor, Melaka and Negeri Sembilan	435	50	236	68
East (Pahang)	97	54	175	85
North (Seberang Prai/ Pulau Pinang, Kedah and Perlis)	574	96	339	98
North East (Terengganu and Kelantan)	175	97	264	100
Perak	79	44	128	53
South (Johor)	136	50	245	92
Sabah	62	69	81	61
Sarawak	108	60	117	75
Total	1666	65	1585	81

Table 4.4
Malaysia : Special Studies,1988

Type of Study	Description/Findings
1. Structure Plan	
a) Johor Barat (Muar, Pontian, Johor Bharu, Segamat, Kluang Districts), Johor	Baseline Studies were carried out to supplement existing water quality data to aid future landuse planning of the respective areas. Certain industries such as textiles and sago processing industries could be considered as problematic as they do not treat their wastes accordingly before discharging into waterways.
b) Marang/Dungun	The need for future planning of the area is tremendous as the preservation of the environment is necessary for tourism as well as industrial development.
2. Pollution/Impact Studies	
a) Compliance Study on Several Oxidation Ponds in Kuala Lumpur and Selangor	Most of the oxidation ponds studied (8 ponds were studied) did not comply with the effluent/sewage discharged standards stipulated under the Environmental Quality (Sewage and Industrial Effluent) Regulations, 1979.
b) Sungai Sepang Study	The river is mostly polluted by a single pollution source - piggery wastes from both Selangor and Negeri Sembilan farms.
c) Completion of Sungai Tekam Study and Report	The Sungai Tekam Study, financed mainly by the International Hydrological Programme (IHP) with the coordination of DID, FRIM, UPM, UM and DOE examined the impact of the conversion of primary forests into agri-cultural land. The study took about 15 years to complete. The final report was finalised in 1988.
3. Monitoring Methodology	
Monitoring of Pesticide Residues in River Water	33 water monitoring stations were sampled for analysis of pesticides residues but none was ever detected at any station. The study was to ascertain if there could possibly be any problems involved with sampling, preservation and laboratory analysis. The findings showed that the sampling methodology was appropriate but inconclusive for laboratory analysis.

CHAPTER 5
STATE OF THE ENVIRONMENT

STATE OF THE ENVIRONMENT

Introduction

The report of the state of the environment in 1988 focusses on the quality of air, river water as well as coastal and marine waters. With the strengthening of the Department's monitoring programmes and data processing, it is now possible to obtain a more reliable picture of the state of the environment in Malaysia. This information is useful in assessing the effectiveness of short and long term environmental pollution control programmes and in formulating new programmes in environmental management.

Air Quality

The air quality monitoring continued in 1988 for the measurements of total suspended particulates (TSP), atmospheric lead (Pb) and dust fallout in various areas namely residential, commercial, industrial, trafficed and rural areas. The annual concentration of TSP in 1988 remained high in industrial and trafficed areas due to emission of particulates from factories and motor vehicles whilst commercial and residential areas indicated otherwise. The atmospheric lead levels recorded in 1988 was low in all the areas monitored. The annual concentration of dust fallout in 1988 was high in the commercial and residential areas but industrial areas had indicated otherwise.

Total Suspended Particulates (TSP)

Residential areas in the country continued to record low levels of total suspended particulates as evidenced by the results obtained from 1985 to 1988 as shown in Table 5.1 and represented graphically in Figure 5.1. In 1988, the annual mean concentration recorded in residential areas was 62 ug/m^3 obtained from a total of 243 daily observations. The station which is located in Majlis Perbandaran Seberang Perai Hall, Seberang Perai recorded 75 ug/m^3 whilst the station located in Vocational School in Sabah recorded the lowest value of 43 ug/m^3 (Figure 5.2).

Trafficed areas continued to record high levels of TSP as shown in Figure 5.3. In 1988, the annual mean concentration of TSP in trafficed areas was 107 ug/m^3 from a total of 477 observations (Table 5.1). The highest and lowest annual mean concentration of TSP in trafficed areas was 163 ug/m^3 and 43 ug/m^3 as recorded by stations located at Pudu Post Office, Kuala Lumpur and Petronas Laboratory, Ulu Klang respectively (Figure 5.3).

High levels of TSP was continuously recorded in industrial areas (Figure 5.1) and in 1988 the annual mean concentration of TSP was 92 ug/m^3 from a total of 456 daily observations. The stations located at Johor Port Authority, Pasir Gudang and Waterworks Department, Kuala Terengganu recorded 186 ug/m^3 and 54 ug/m^3 as the highest and lowest annual mean concentrations of TSP in industrial areas. (Figure 5.4).

Commercial areas in the country has indicated a continuous reduction in annual mean concentration of TSP as evidenced in Figure 5.1 and in 1988 the recorded annual mean concentration from a total of 151 samples was 76 ug/m^3. (Table 5.1). The station located at the Ipoh Central Market recorded the highest annual mean concentration of 89 ug/m^3 whilst the station at the Kuala Terengganu District Council recorded the lowest value of 54 ug/m^3 (Figure 5.5). Monitoring of TSP in rural areas in 1988 has shown that the annual mean concentration of TSP was 49 ug/m^3 from a total of 53 daily observations (Table 5.1 and Figure 5.6). Figures 5.7 to 5.11 show the compliance performances of all stations located in various areas. In 1988, all the stations located in rural, residential, commercial and trafficed areas complied with the latest recommended Malaysian Guideline value of 260 ug/m^3 (24-hour averaging period). However results from a total of 456 daily observations in industrial areas has shown that the guideline value was exceeded. The station located at the Johor Port Authority recorded that 5 out of a total of 38 daily observations had exceeded the guideline value whilst the station at Johnson and Johnson, Petaling Jaya recorded an exceedance of one out of a total of 49 daily observations (Figure 5.7).

The latest recommended Malaysian guideline value of 90 ug/m^3 (one year averaging period) was exceeded by nine stations located in the industrial and trafficed areas (Figures 5.3 and 5.4). Four stations in industrial areas located at the Johor Port Authority, Johnson and Johnson, Petaling Jaya, Asian Rare Earth, Ipoh and Sharp-Roxy, Bakar Arang, recorded annual mean concentrations higher than 90 ug/m^3, thus exceeding the annual recommended guideline. Five stations in trafficed areas that recorded annual mean concentrations exceeding the annual guideline value are located at Pudu Post Office, Kuala Lumpur, Bagan Ajam Clinic, Seberang Prai, Kajang Police Station, Kajang and Police Headquarters, Pulau Pinang. All stations located in residential, commercial and rural areas recorded annual mean concentrations of TSP below

the annual guideline value.

Trend observations of TSP in the various areas from 1985 to 1988 has shown that residential areas in the country continued to record low levels of TSP whilst the industrial and trafficed areas indicated otherwise. Trend observations on levels of TSP in commercial areas has shown that there was a continuous reduction from 1985 to 1988 (Figure 5.1).

Atmospheric Lead

Trafficed areas continued to record the highest lead levels from results obtained in 1988 (Table 5.2). The annual mean concentration of lead recorded in trafficed areas is 0.80 ug/m^3 from a total of 501 daily observations. Industrial, commercial and residential areas recorded annual mean concentrations of 0.14, 0.08, 0.20 and 0.02 ug/m^3 from a total of 305, 78,182 and 46 daily observations respectively.

Figures 5.12 to 5.16 show the compliance performance of all the stations located in the various areas in 1988. All stations located in industrial, commercial, residential and rural areas complied with the latest recommended Malaysian Guideline value for lead of 1.5 ug/m^3 (3-month averages). However, two stations in trafficed areas had exceeded the guideline value. The stations located at the Bangsar Dental Clinic, Kuala Lumpur has shown that all of the 10 3-month averages exceeded the guideline value whilst the station located at the Pudu Post Office, Kuala Lumpur recorded that 7 out of a total of 11 3-month averages had exceeded the guideline value. (Figure 5.12).

Trend observations of atmospheric lead from 1985 to 1988 have shown that trafficed areas continued to record the highest lead levels followed by industrial and residential areas. The lead levels has reduced from 1.4 ug/m^3 in 1985 to 1.1 ug/m^3 in 1986 to 0.6 ug/m^3 in 1987 and increased significantly to 0.8 ug/m^3 in 1988. Lead levels in industrial areas had shown an increase from 0.23 ug/m^3 in 1985 to 0.70 ug/m^3 in 1986 and a reduction to 0.16 ug/m^3 in 1987 and susequently to 0.14 ug/m^3 in 1988. Residential areas indicated a similar pattern to industrial areas in which an increase in annual mean value of lead levels from 0.14 ug/m^3 in 1985 to 0.56 ug/m^3 in 1986 was noted and a reduction to 0.29 ug/m^3 in 1987 and 0.20 ug/m^3 in 1988.

Commercial areas have shown that there was a reduction of annual mean lead levels from 0.63 ug/m^3 in 1985 to 0.02 ug/m^3 in 1987 but an increase to 0.08 ug/m^3 in 1988. (Figure 5.17).

Dust Fallout

In 1988, the recorded annual mean concentration of dust fallout in industrial areas was 112 mg/m^2/day whilst residential and commercial areas recorded 156 and 140 mg/m^2/day respectively (Table 5.3). Trend observations of dust fallout from 1985 to 1988 have shown that there is no distinctive levels of dust fallout between the three areas monitored, namely residential, commercial and industrial areas as can be seen in Table 5.3 and represented graphically in Figure 5.18. This could be due to the fact that monitoring of dust fallout were not carried out in typical residential, commercial and industrial areas but more of a mixed landuse type.

The dust fallout in industrial areas has shown a reduction trend as evidenced by results shown in Figure 5.18. The annual mean values had reduced from 273 mg/m^2/day in 1985 to 209mg/m^2/day in 1986 to 171 mg/m^2/day in 1987 to 113 mg/m^2/day in 1988.

The commercial areas also recorded a reduction of annual mean values of dust fallout from 196.8 mg/m^2/day in 1985 to 168.2 mg/m^2/day in 1986, an increase to 200 mg/m^2/day in 1987 and reduction to 140mg/m^2/day in 1988.

It was noted that there is a similar pattern of the trend observations between the commercial and residential areas in which the annual mean values of dust fallout of the latter had reduced from 213 mg/m^2/day in 1985 to 135mg/m^2/day in 1986, increased to 168 mg/m^2/day in 1987 and reduced to 156 mg/m^2/day in 1988.

In 1988, commercial and residential areas in the country continued to record annual mean values of dust fallout which exceeded the proposed Malaysian Interim Guidelines of 133 mg/m^2/day (annual monthly averages) whilst industrial areas indicated otherwise.

River Water Quality in Malaysia

Generally the quality of the river water in Malaysia had fairly improved. The appraisal of water quality data collected is based on the water quality index for five parameters. As given in Table 5.5 or 5.5a, the assessment of water quality data in 1988 revealed 3 rivers were seriously polluted, 71 rivers were slightly polluted and the remaining rivers were considerably clean.

The organic pollution had improved at the rate of 0.2 percent, whereas the rate of improvement for suspended solids and ammoniacal nitrogen were 1.5 and 2.6 percent, respectively.

Biochemical Oxygen Demand (*BOD5*) ; Organic Pollution

Figures 5.19a and 5.19b show that in 1988, 3 rivers were still seriously polluted by organics due to continuous

heavy industrialisation and intensive pig farming activities in the catchments. Sungai Juru, Sungai Sepang and Sungai Kelang were the rivers which were seriously affected by organic pollution. Eight rivers fall in the category of slightly polluted and were found in the west coast of Peninsular Malaysia, and only 2 were in the east coast. Among the polluted rivers, only 4 showed slight improvement in organic pollution. These rivers were Sungai Merbok, Sungai Linggi and Sungai Buloh. The rest had been deteriorating since 1985.

Suspended Solids (SS) : Soil Erosion and Sedimentation

Thirty five rivers were seriously affected by soil erosion and river siltation. Out of this number, 11 rivers were on the west coast of Peninsular Malaysia, 10 rivers in Sabah, 11 rivers in Sarawak and only 3 on the east coast of Peninsular Malaysia. Only 10 rivers were found slightly polluted, whereas others were relatively clean. However 19 polluted rivers showed an improvement since 1985. The rivers which showed a significant improvement were Sungai Tingkayu, Sungai Kinabatangan, Sungai Limbang, Sungai Balingian, Sungai Chukai, Sungai Tengi and Sungai Ibai. Sungai Segama, Sungai Silabukan, Sungai Brantian, Sungai Umas-Umas, Sungai Similajan, Batang Oya and Sungai Kemasin had significantly deteriorated.

Ammoniacal-Nitrogen (NH3-N) : Pollution by Sewage and Animal Waste

Most of the rivers in the west coast of Peninsular Malaysia were badly polluted by ammoniacal nitrogen due to heavy loadings from sewage and animal waste and to a certain extent industrial waste. Figure 5.20a and 5.20b show the most affected rivers from namely, Sungai Perai, Sungai Juru, Sungai Buluh, Sungai Kelang, Sungai Linggi, Sungai Melaka, Sungai Sepang, Sungai Sepetang, Sungai Jejawi and Sungai Merbok. Out of 38 rivers classified as slightly polluted, only 11 were located on the east coast and the rest were found on the west coast of Peninsular Malaysia. The rivers which were slightly affected by ammoniacal nitrogen in the east coast were Sungai Sedili, Sungai Mersing, Sungai Endau, Sungai Paka, Sungai Chukai, Sungai Setiu, Sungai Besut, Sungai Kemasin and Sungai Kelantan. Out of 39 polluted rivers, 21 had shown an improvement and 18 had been deteriorating since 1985. The rivers which showed a substantial improvement were Sungai Juru, Sungai Buluh and Sungai Kelang. On the other hand, the rivers that have been deteriorating significantly were Sungai Merbok, Sungai Sepang, Sungai Linggi, Sungai Sepetang and Sungai Melaka.

Heavy Metals Pollution

The assessment of heavy metals were carried out on 26 rivers. The recorded levels ranged from 0.007 to 9.9 mg/l for Lead (Pb), 0.001 to 2.0 mg/l for Mercury (Hg), 0.001 to 5.6 mg/l for Cadmium (Cd), 0.003 to 1.5 mg/l for Vopper (Cu), 0.002 to 1.9 mg/l for Zinc (Zn) and 0.001 to 4.0 mg/l for Arsenic (As). In 1988, the highest concentration of 2.0 mg/l for Hg and 5.6 mg/l for Cd were detected in Sungai Sugut, 9.9 mg/l of Pb in Sungai Langat, 1.5 mg/l of Cu in Sungai Linggi, 1.9 mg/l of Zn in Sungai Pahang and 4.0 mg/l of As in Sungai Batu Pahat. The levels of heavy metals remained consistently low for other rivers. (Table 5.6).

In the more urbanised and industrialised west coast of Peninsular Malaysia, the rivers had more heavy metals values which are greater than specified standards. The percentage of non-compliance of Ar was 15 percent, Pb 14 percent, Hg 3 percent, Cu 5 percent, Cd 2 percent and Zn 0.4 percent. Sungai Kelang, Sungai Linggi, Sungai Melaka and Sungai Perak were the main contributors of heavy metals non-compliance. However, Hg and Cd were also detected to exceed the specified standards in Sungai Buloh, Sungai Juru and Sungai Kedah. In the east coast, only Pb non-compliance wasfairly high, mainly contributed by Sungai Pahang, Sungai Kuantan and Sungai Balok/Cherating. The rest of heavy metals non-compliances were relatively low. In East Malaysia, fairly high non-compliances in river waters was shown for Pb and Cu mainly in the state of Sabah. Figure 5.21 shows 27 percent of the values of Pb and 21 percent of the values of Cu exceeded the Interim National Water Quality Criteria and Standards specified for fisheries. The main contribution of high percentage of non-compliances of Pb was from Sungai Sugut, Sungai Segama, Sungai Kalumpang, Sungai Rakit, Sungai Putatan, Sungai Labok and Sungai Padas. In the case of Cu the contribution came mainly from Sungai Labok, Sungai Sugut, Sungai Segama, Sungai Kalabakan and Sungai Putatan. As for the other various heavy metals. The percentage of non-compliance was relatively small for other heavy metals.

Nutrients

The levels of nitrate recorded for all rivers were found to be acceptable. Not more than 2 percent of the values recorded exceeded 7.0 mg/l (Interim National Water Quality Criteria and Standards specified for raw drinking water supply). The phosphate values were high in several rivers such as Sungai Juru, Sungai Buloh, Sungai Kelang, Sungai Sepang, Sungai Linggi and Sungai Melaka. Values for sulphate greater than 250 mg/l (Interim National Water Quality Criteria and Standards specified for raw drinking

water supply) were detected in Sungai Merbok, Sungai Muar and Sungai Batu Pahat. However the median values of sulphate for all rivers were still below the specified standards as shown in Tables 5.7 and 5.8.

Coastal and Marine Water Quality

The coastal water quality of Malaysia remained contaminated by the presence of total suspended solids, faecal coliform and oil and grease. In addition, the occurrence of heavy metals was also detected along the coastal waters of Malaysia.

During the period of 1985 to 1988, considerable improvement was observed in terms of total suspended solids in the coastal waters especially off the states of Kedah/Perlis, Perak, Johor and Negeri Sembilan.

However, the coastal waters of Sabah, Pahang and Melaka remained seriously affected by the high content of suspended solids. The situation in the other States had improved compared to the previous years.

The degree of faecal contamination in the coastal waters of Malaysia had increased especially for the states of Negeri Sembilan, Selangor, Kedah/Perlis and Johor. However,for the coastal waters of other states, the situation had improved. Meanwhile, the state of Sarawak was noted to be totally free from faecal contamination.

The coastal waters of Malaysia had also been affected by oil and grease contamination, except for the state of Pahang. As compared to the results obtained in 1987, the situation in the states of Melaka, Negeri Sembilan, Selangor, Terengganu, Perak, Kelantan, Sarawak and Sabah had either deteriorated or remained continuously polluted by oil and grease contamination. However, the coastal waters of Pulau Pinang and Pahang had shown improvement.

The coastal waters of Kedah/Perlis and Pulau Pinang were still affected by a serious problem of heavy metals contamination particularly in term of cadmium, copper, mercury, nickel and lead. About 90 percent of the samples collected exceeded the recommended limits for conservation of marine aquatic resources. However, for the other States especially Perak, Sabah, Pahang and Johor, the situation had improved compared to the previous years. Meanwhile, the occurrence of heavy metals in the coastal waters of Melaka, Negeri Sembilan, Sarawak and Selangor was noted to be quite negligible.

Overall, the coastal waters off the beaches in Malaysia were not contaminated with faecal coliform and still considered safe for the purpose of recreational activities which include swimming, diving, water skiing, boating and canoeing. Certain sites, were grossly contaminated with faecal coliform such as Pantai Merdeka, Tanjung Lembang, and Pulau Langkawi in Kedah and Pantai Telok Tempoyak, and Pantai Gertak Sanggul both in Pulau Pinang.

Although the other beaches were not contaminated with faecal coliform, they were contaminated with oil and grease for example the beach of Port Dickson in Negeri Sembilan, Pantai Tanjung Keling, Pantai Kundur and Pantai Tanjung Bidara in Melaka and Pantai Morib in Selangor. This is evident since these beaches fronted the Straits of Malacca which is one of the busiest seaway in the world. Apart from that, the beaches off the coast of Terengganu and Kelantan were also heavily contaminated with oil and grease as reflected by the major oil exploration activities carried out within the region. Meanwhile, the beaches off the coast of Sabah were also heavily contaminated with oil and grease but not with faecal coliform. Table 5.9 indicates the sampling sites of the coastal beaches of Malaysia.

Faecal Coliform

Faecal Coliform is used as an indicator for human and animal waste pollution. As reflected in Figure 5.22, the coastal waters of Pulau Pinang ranked the highest in terms of faecal contamination followed by Selangor and Negeri Sembilan, while the coastal waters of Sarawak was found to be free from faecal coliform. On the other hand, the east coast states namely, Terengganu, Pahang and Kelantan recorded less than 50 percent of faecal contamination throughout the year.

Total Suspended Solids

The coastal waters of Sabah was most seriously affected by total suspended solids whereby, all the observations exceeded the Proposed Interim Standard of Total Suspended Solids for Recreational Purposes of 50 mg/l followed by Pahang, Melaka, Terengganu, Kelantan, Perak and Sarawak, listed in descending order. The degree of pollution in terms of total suspended solids for Negeri Sembilan and Johor was found to be negligible. Figure 5.23 shows the overall situation of total suspended solids contamination in the coastal waters of Malaysia.

Oil and Grease

Six states, namely, Melaka, Negeri Sembilan, Selangor, Terengganu, Kelantan and Sabah were seriously affected by oil and grease contamination. Meanwhile, for the other states the percentage of observations exceeding the standard of 0.0 mg/l in terms of oil and grease on conservation of marine aquatic resources, was found to be less than 50 percent except for the state of Pahang which was totally free from oil and grease contamination, as indicated in Figure 5.24.

Heavy Metals

The heavy metals monitored along the inshore waters of Malaysia, were arsenic, cadmium, chromium, copper, lead, mercury and nickel.

Along the coastal waters of north-west Peninsular Malaysia, Kedah/Perlis, Pulau Pinang and Perak, cadmium, copper, lead, mercury and nickel were detected to exceed the recommended limits. Pahang, too, was affected by some of these heavy metals.

The remaining states recorded heavy metal contamination less than 50 percent of the time with the exception of Sarawak and Selangor which were considered free from the contamination of heavy metals. It is to be noted that the inshore waters of Malaysia were free from arsenic contamination. (Figures 5.25 to 5.30).

Beach Tar Sampling

Beach tar sampling was carried out on most of the popular beaches in Peninsular Malaysia. 60 percent of the beaches sampled were found to be free from tar ball contamination. The beaches in Terengganu were also found to be free from contamination except for Bukit Kluang.

On the other hand, tar balls were spotted occasionally on the beaches of the other states especially the beach of Pantai Desaru, Johor which recorded the highest amount of tar balls collected.

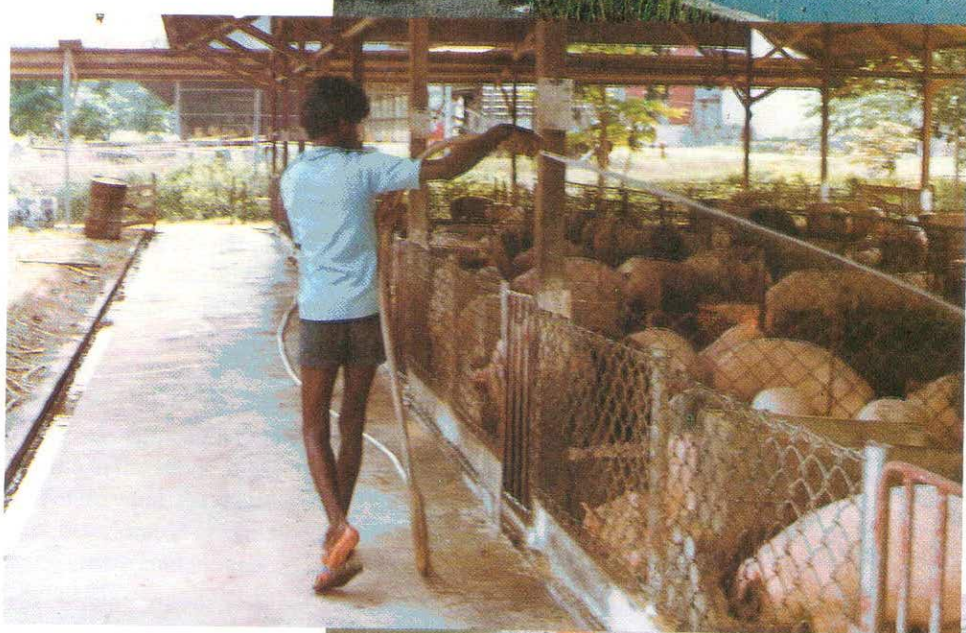
OUTSTANDING ISSUE: HIGH SEDIMENT LOAD IN RIVER WATER

Earthworks generate soil erosion.

Mining and quarrying contribute siltation problems in rivers.

OUTSTANDING ISSUE: POLLUTION FROM SEWAGE AND ANIMAL WASTE

Water Pollution may arise from the discharge of partially treated or untreated sewage.



Animal waste is another major contributor of organic pollutant.

High levels of organic pollutants- a threat to the water quality at public drinking water intake points.

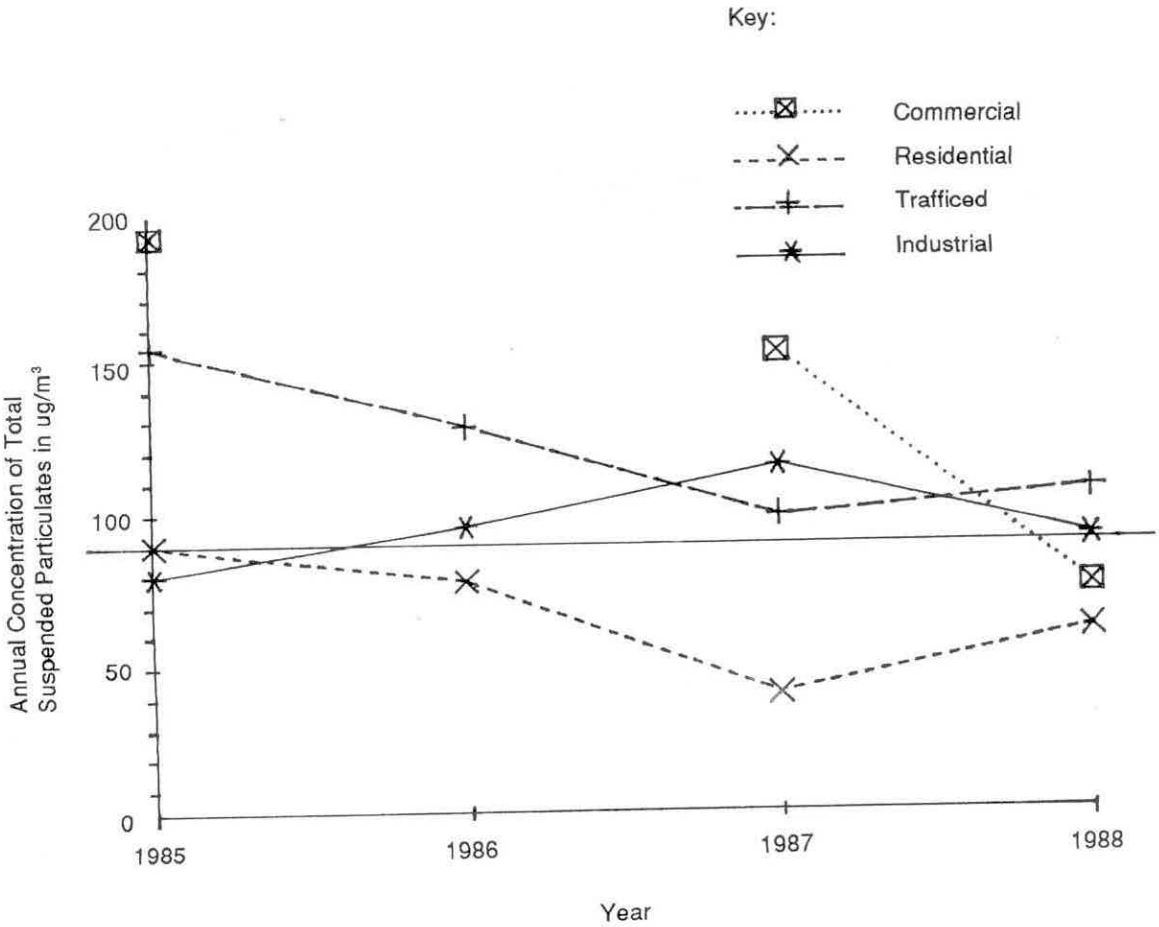


Figure 5.1. Malaysia: Status of Air Quality. Trend for Total Suspended Particulates, 1985-1988

Note:

The Recommended Malaysian Guidelines for Total Suspended Particulates is 90 ug/m³ (annual mean of 24-hour measurements)

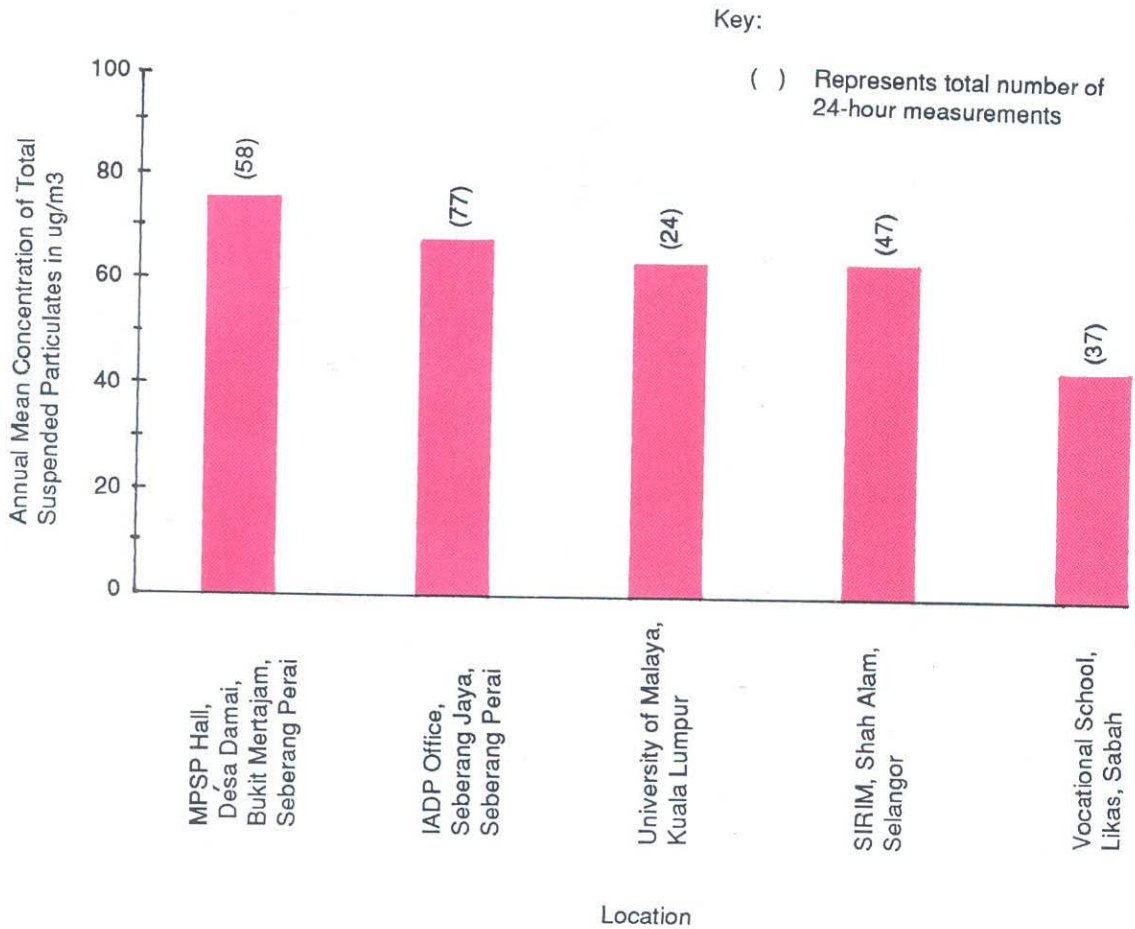


Figure 5.2. Malaysia: Status of Air Quality. Total Suspended Particulates in Residential Areas by Location, 1988

Note:

The Recommended Malaysian Guidelines for Total Suspended Particulates is 90 ug/m^3 (annual mean of 24-hour measurements)

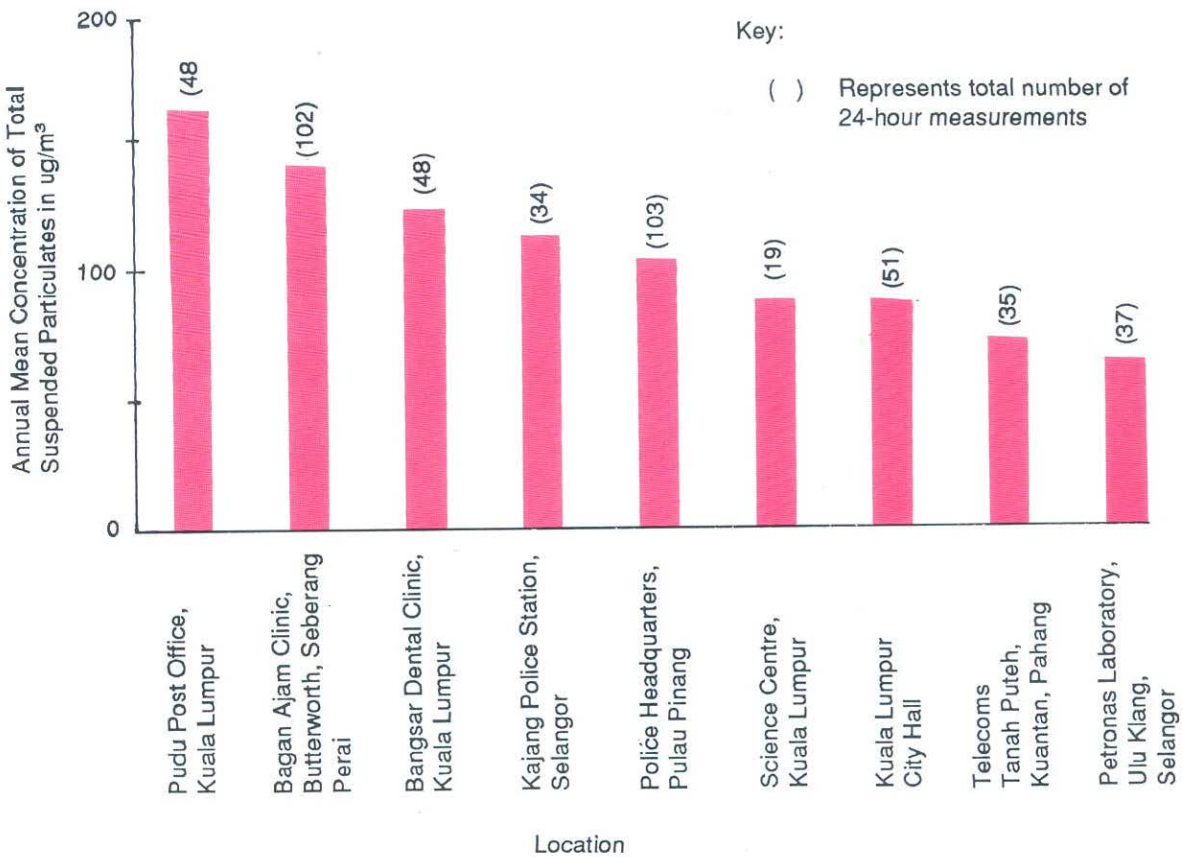


Figure 5.3. Malaysia: Status of Air Quality. Total Suspended Particulates in Trafficed Areas by Location, 1988

Note:

The Recommended Malaysian Guidelines for Total Suspended Particulates is 90 ug/m³ (annual mean of 24-hour measurements)

Figure 5.4. Malaysia: Status of Air Quality. Total Suspended Particulates in Industrial Areas by Location, 1988

Note:

The Recommended Malaysian Guidelines for Total Suspended particulates is 90ug/m³ (annual mean of 24-hour measurements)

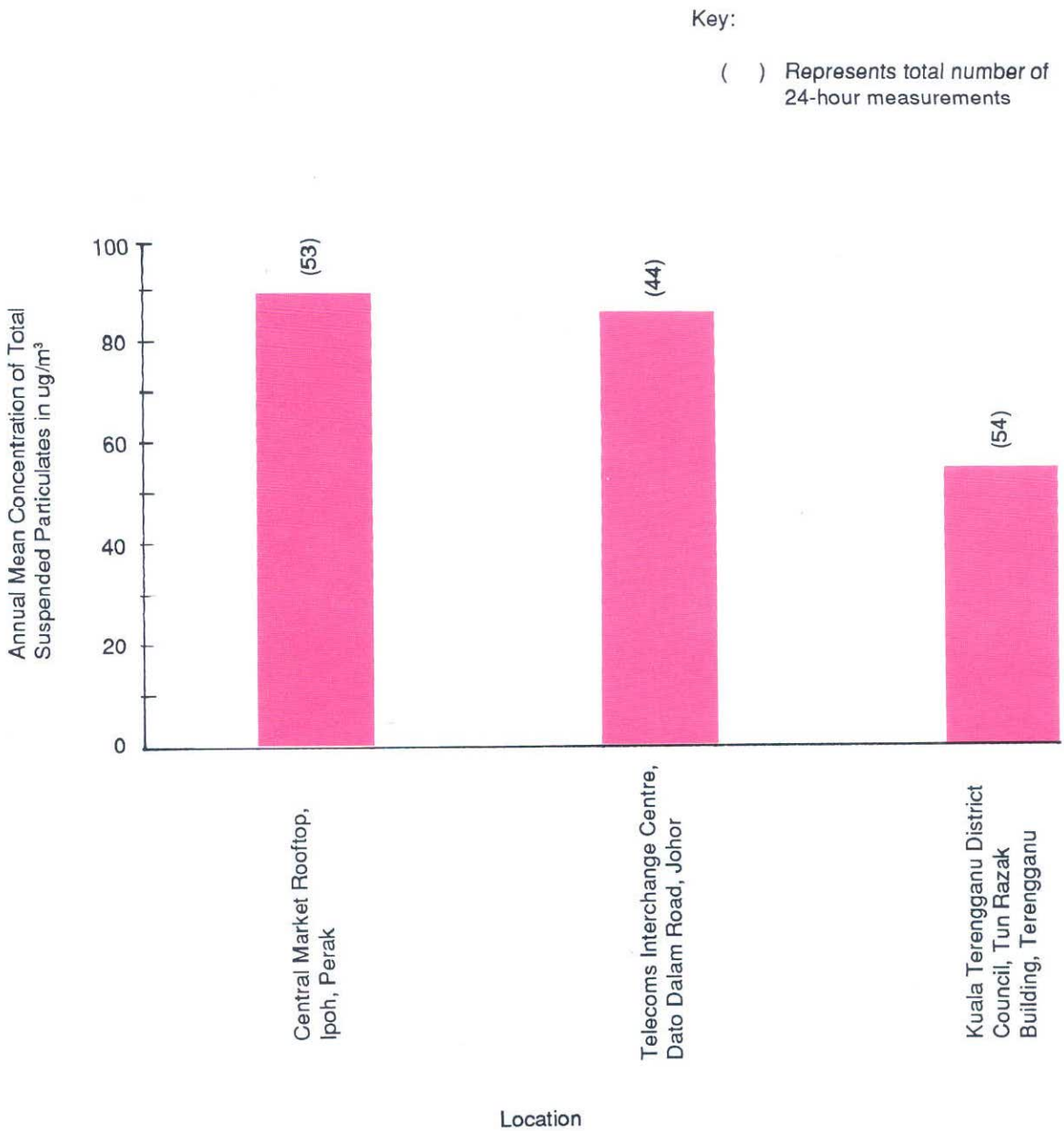


Figure 5.5. Malaysia: Status of Air Quality. Total Suspended Particulates in Commercial Areas by Location, 1988

Note:
The Recommended Malaysian Guidelines for Total Suspended Particulates is 90 ug/m³ (annual mean of 24-hour measurements)

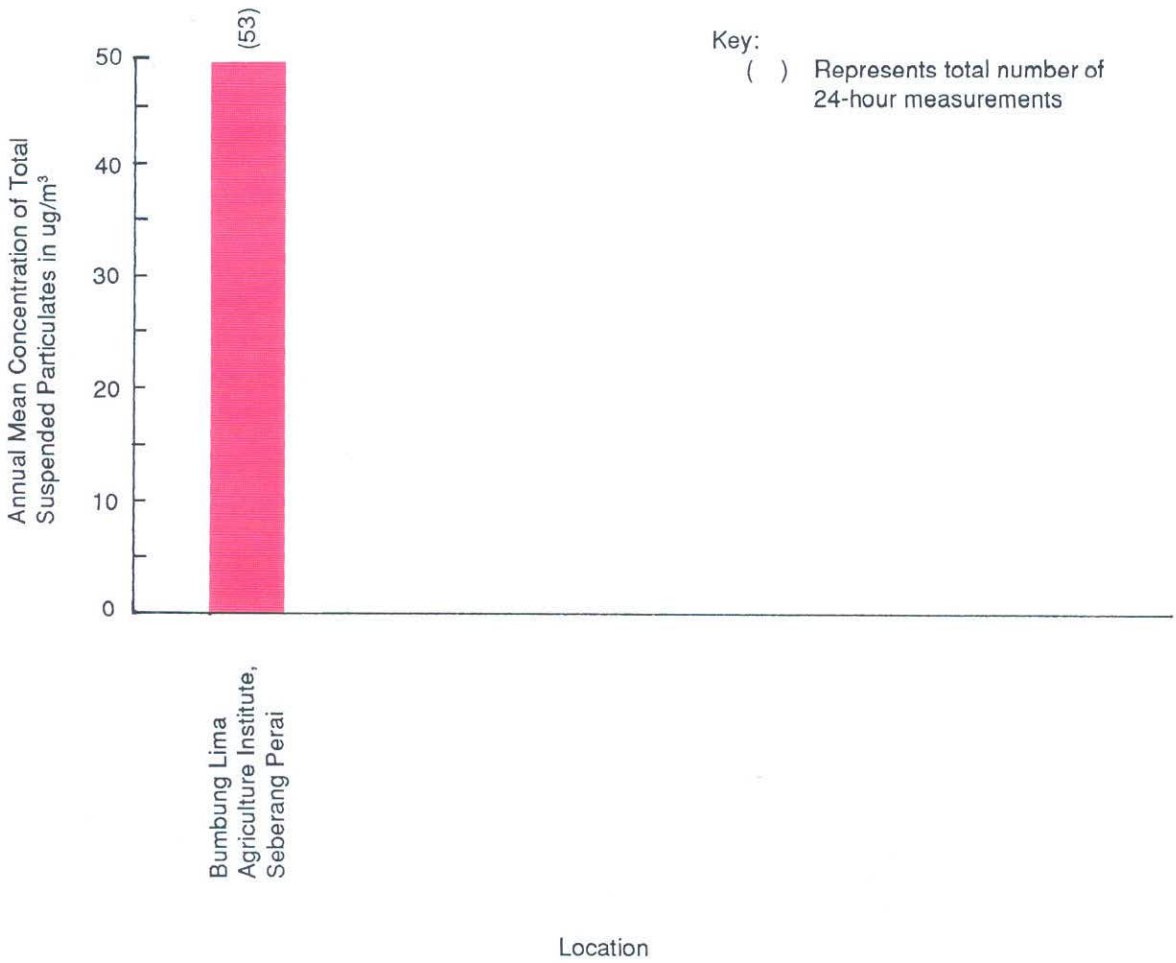


Figure 5.6. Malaysia: Status of Air Quality. Total Suspended Particulates in Rural Areas by Location, 1988

Note:

The Recommended Malaysian Guidelines for Total Suspended Particulates is 90 ug/m³ (annual mean of 24-hour measurements)

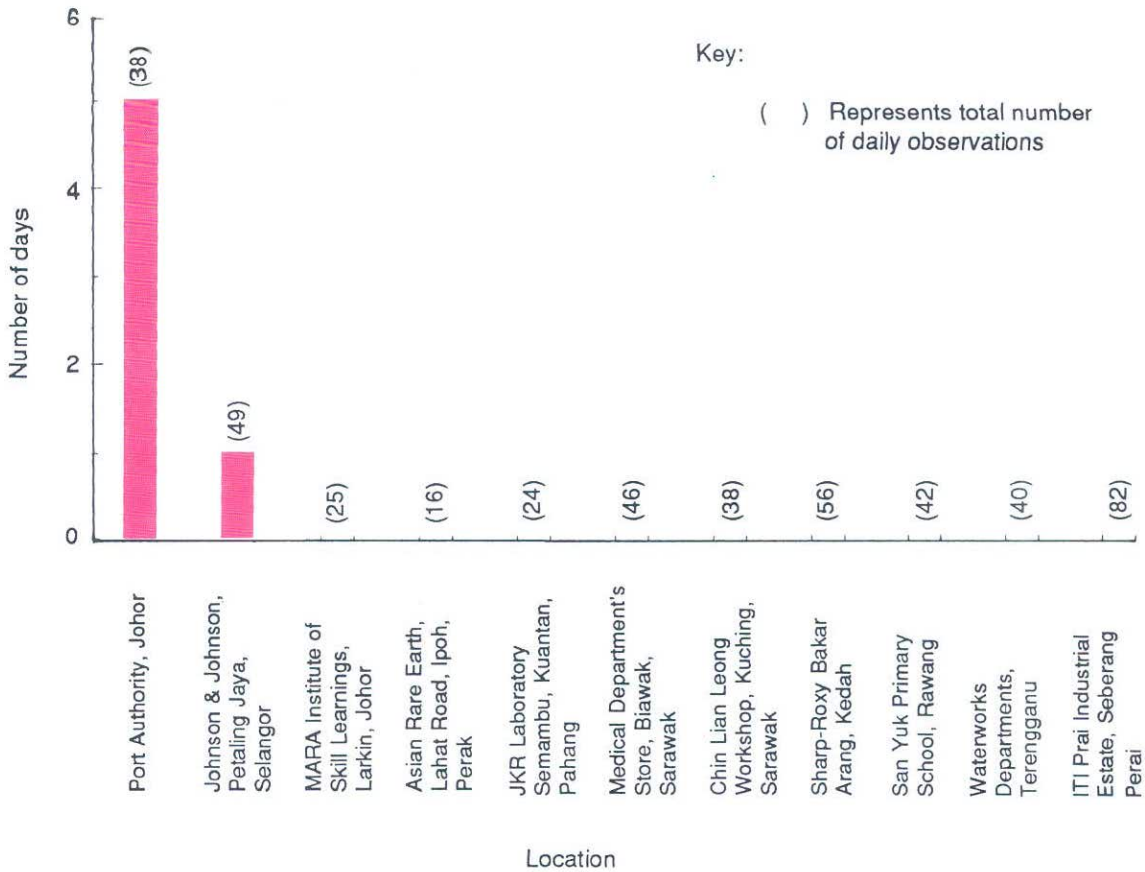


Figure 5.7. Malaysia: Status of Non-Compliance of Guideline Value for Total Suspended Particulates in Industrial Areas, 1988

Note:

The Recommended Malaysian Guidelines for Total Suspended Solids is 260 ug/m^3 (24-hour average)

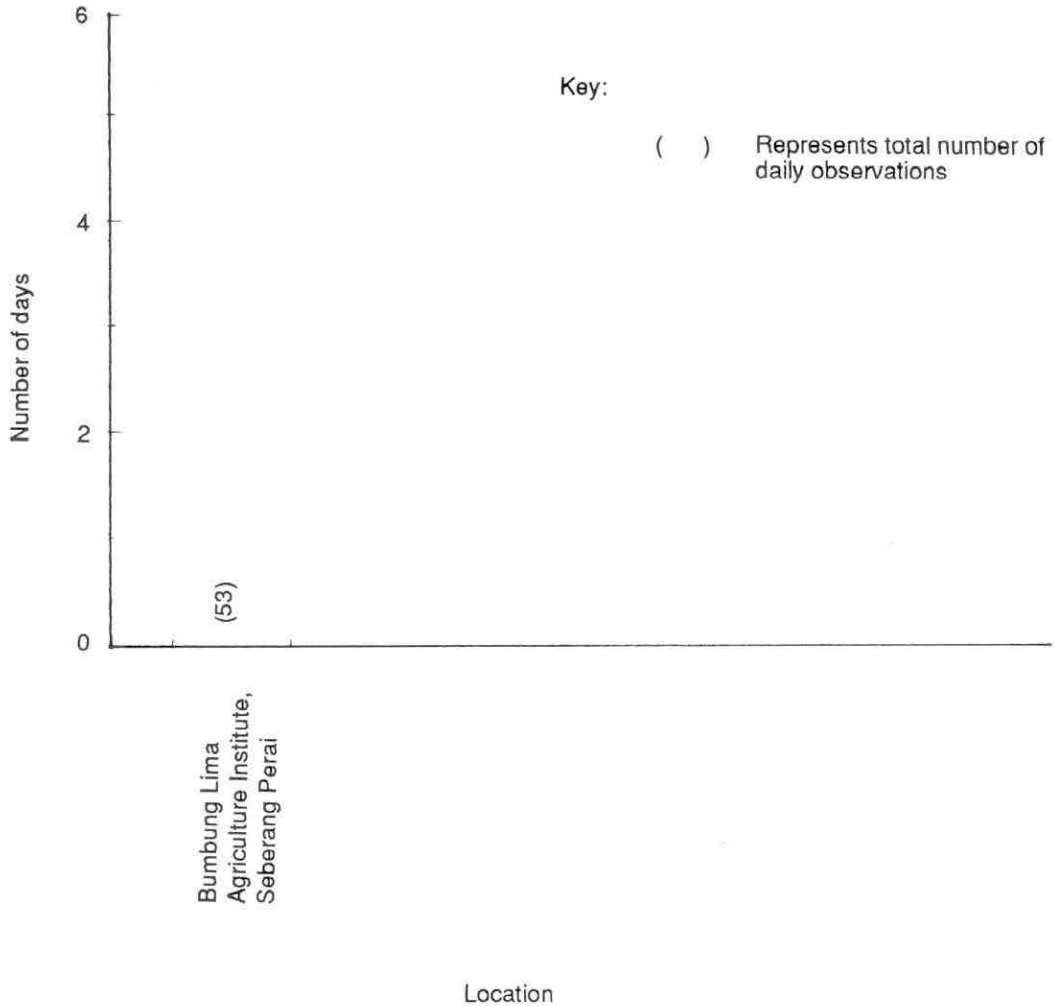


Figure 5.8. Malaysian: Status of Non-Compliance of Guideline Value for Total Suspended Particulates in Rural Areas, 1988

·Note:

The Recommended Malaysian Guidelines for Total Suspended Solids is 260 ug/m³ (24-hour average)

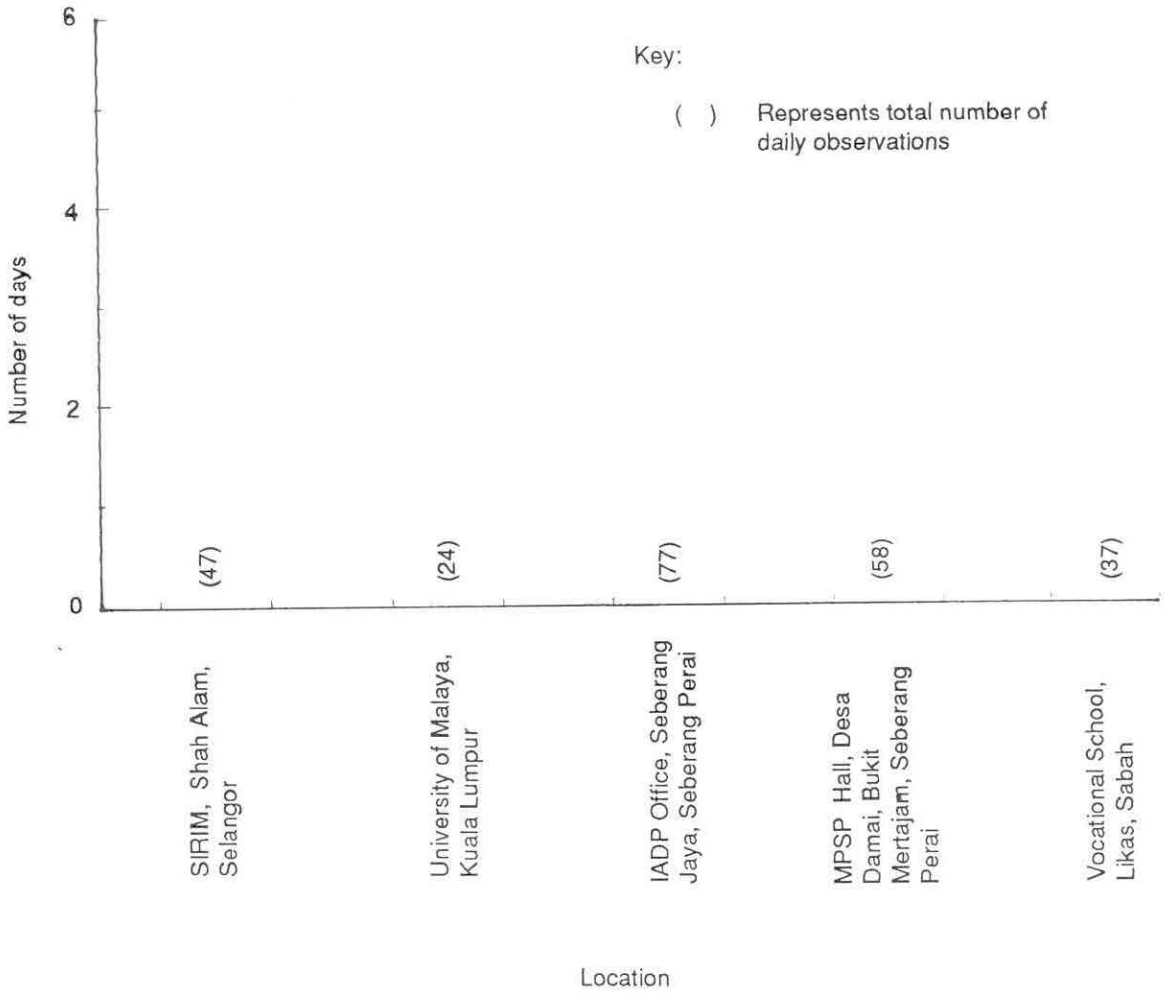


Figure 5.9. Malaysia: Status of Non-Compliance of Guideline Value for Total Suspended Particulates in Residential Areas, 1988

Note:

The Recommended Malaysian Guidelines for Total Suspended Solids is 260 ug/m^3 (24-hour average)

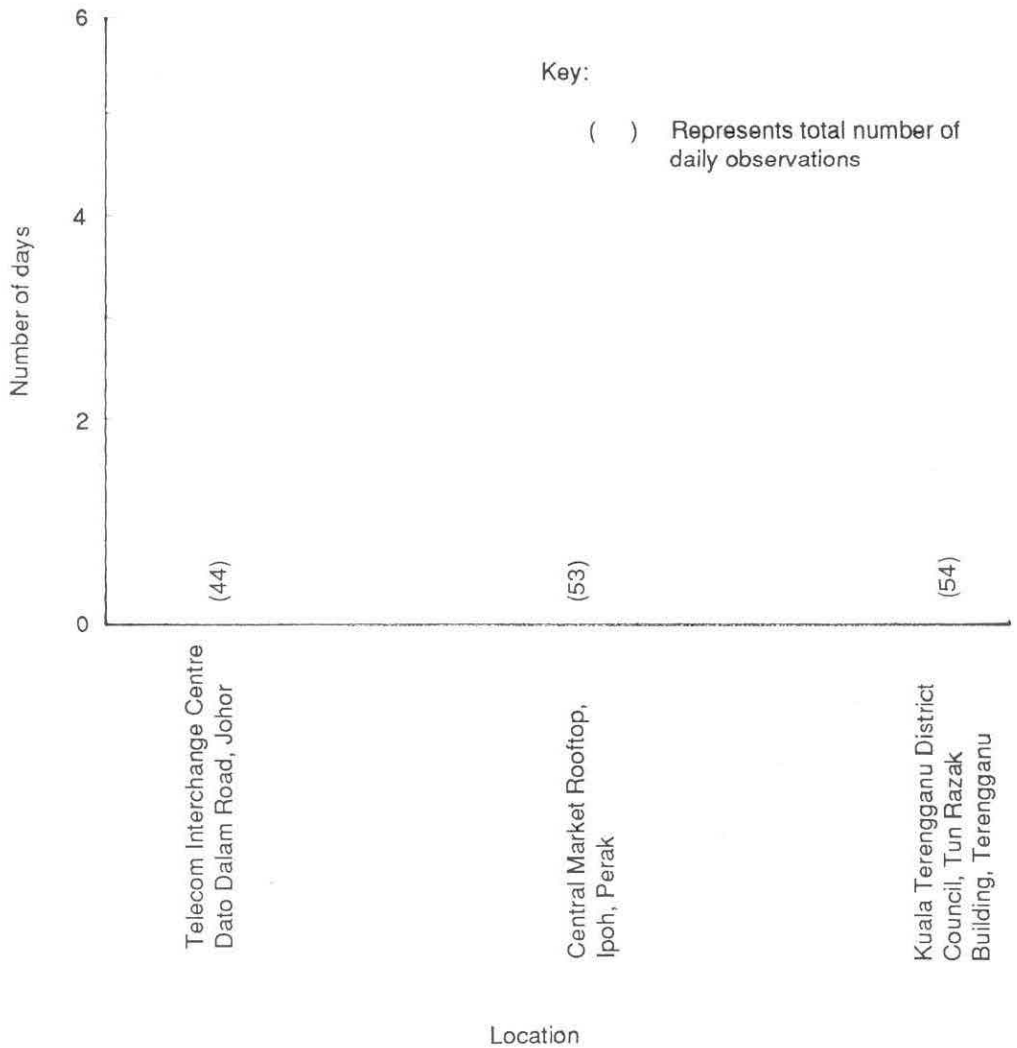


Figure 5.10. Malaysia: Status of Non-Compliance of Guideline Value for Total Suspended Particulates in Commercial Areas, 1988

Note:

The Recommended Malaysian Guidelines for Total Suspended Solids is 260 ug/m^3 (24-hour average)

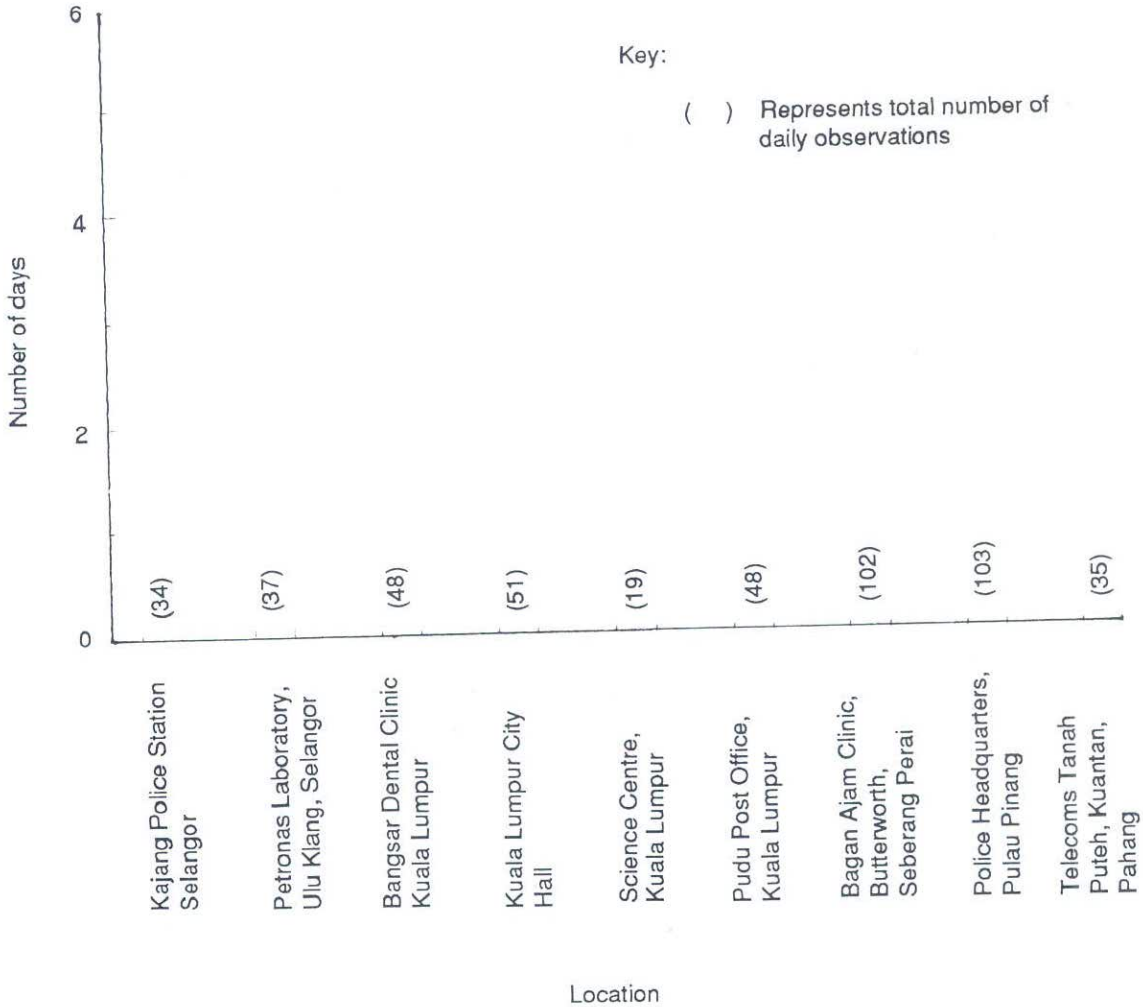


Figure 5.11. Malaysia: Status of Non-Compliance of Guideline Value for Total Suspended Particulates in Trafficed Areas, 1988

Note:

The Recommended Malaysian Guidelines for Total Suspended Solids is 260 ug/m^3 (24-hour average)

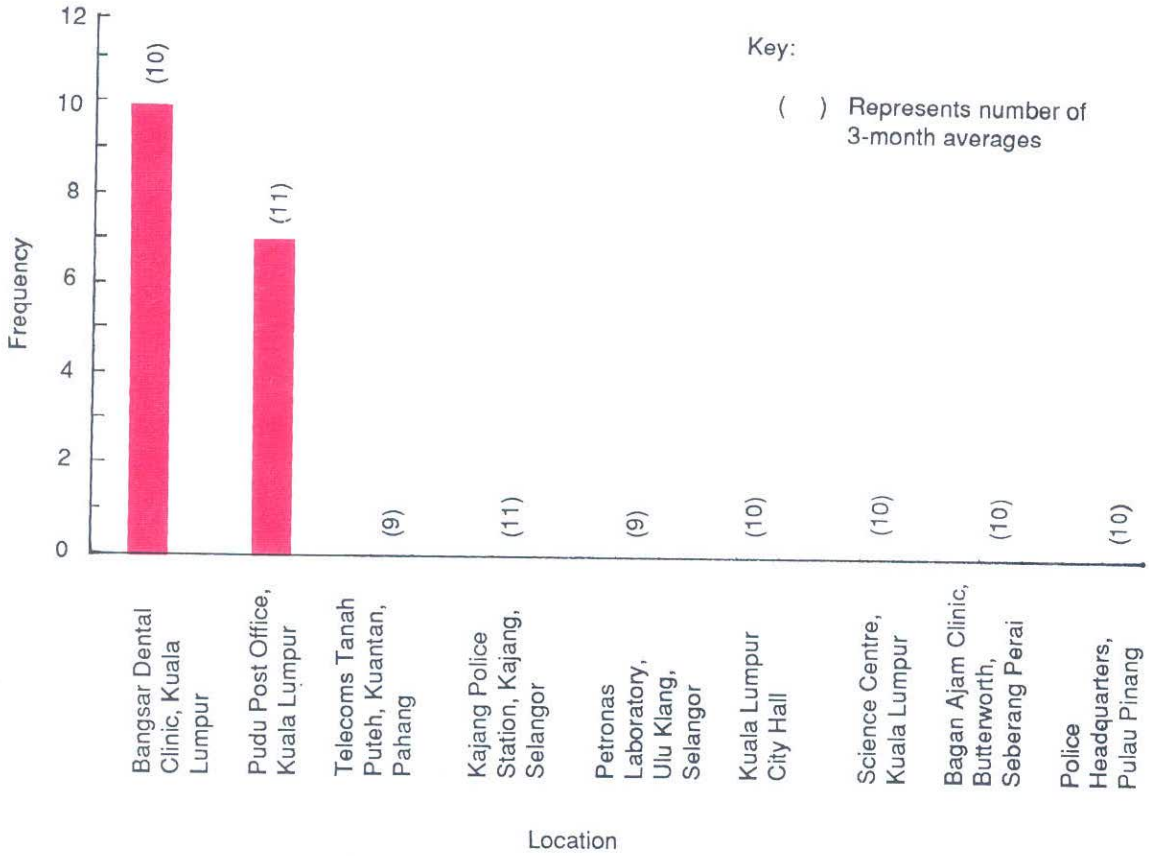


Figure 5.12. Malaysia: Status of Non-Compliance of Guideline Value for Lead in Trafficed Areas, 1988

Note: The Recommended Malaysian Guidelines for Lead is 1.5 ug/m³ (3-month averages)

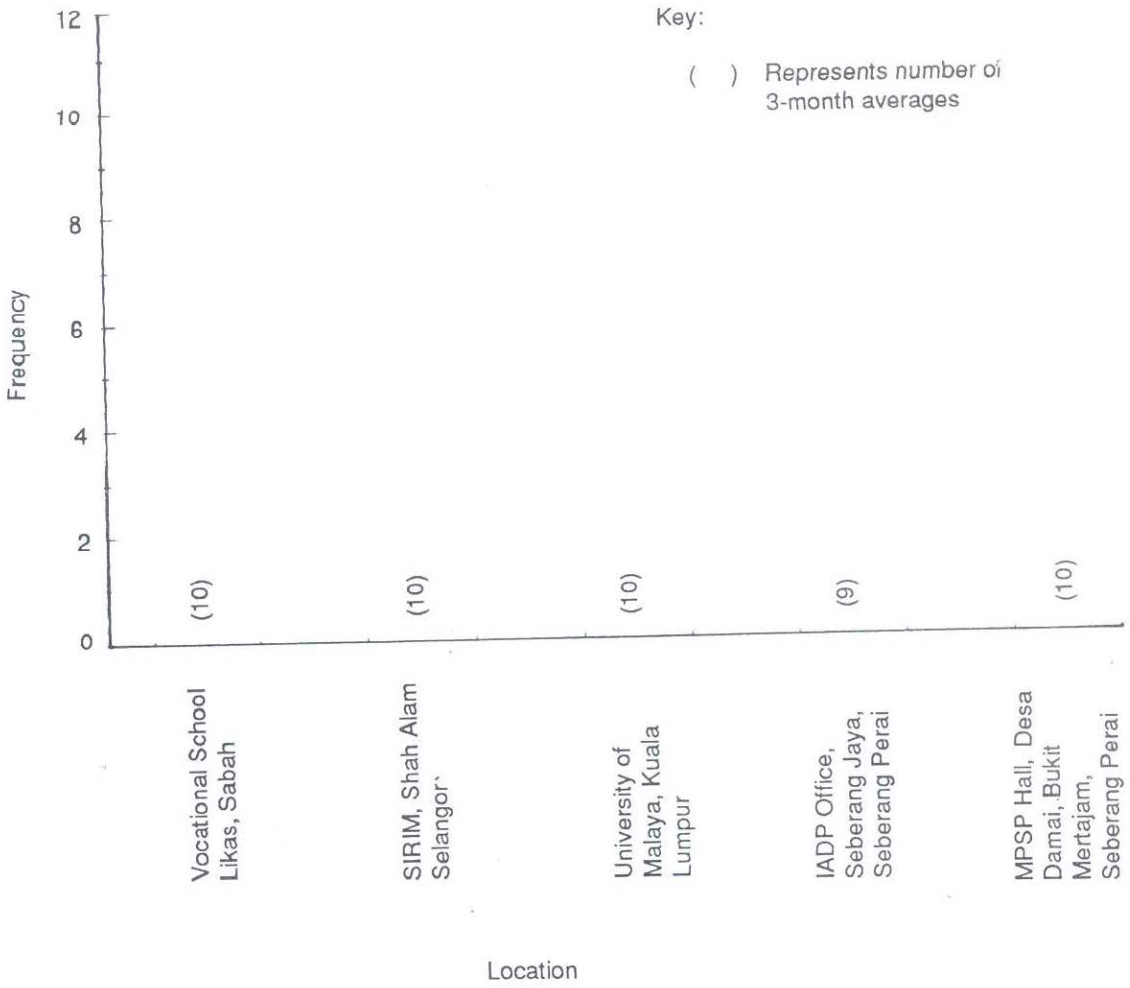


Figure 5.13. Malaysia: Status of Non-Compliance of Guideline Value for Lead in Residential Areas, 1988

Note:
The Recommended Malaysian Guidelines for Lead is 1.5 ug/m^3 (3-month averages)

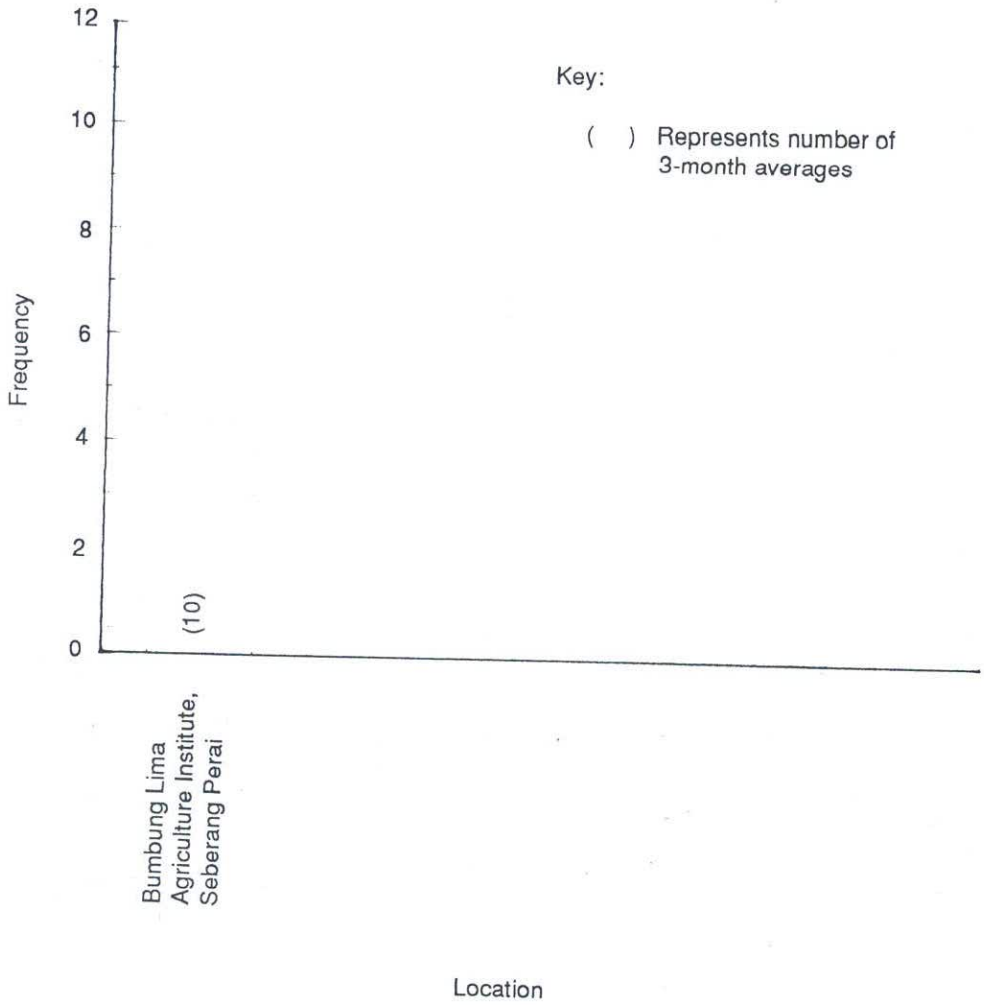


Figure 5.14. Malaysia: Status of Non-Compliance of Guideline Value for Lead in Rural Areas, 1988

Note:

The Recommended Malaysian Guidelines for Lead is 1.5 ug/m^3 (3-month averages)

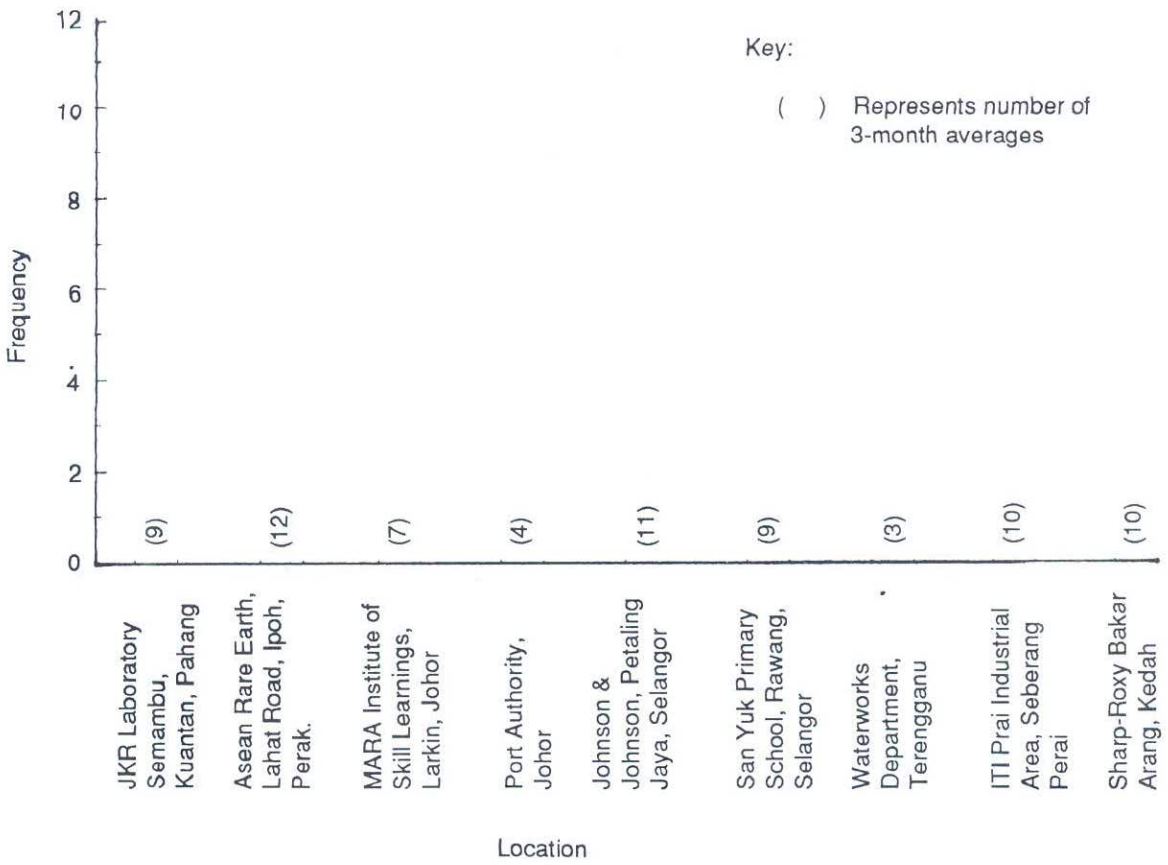


Figure 5.15. Malaysia: Status of Non-Compliance of Guideline Value for Lead in Industrial Areas, 1988

Note:
The Recommended Malaysian Guidelines for Lead is 1.5 ug/m^3 (3-month averages)

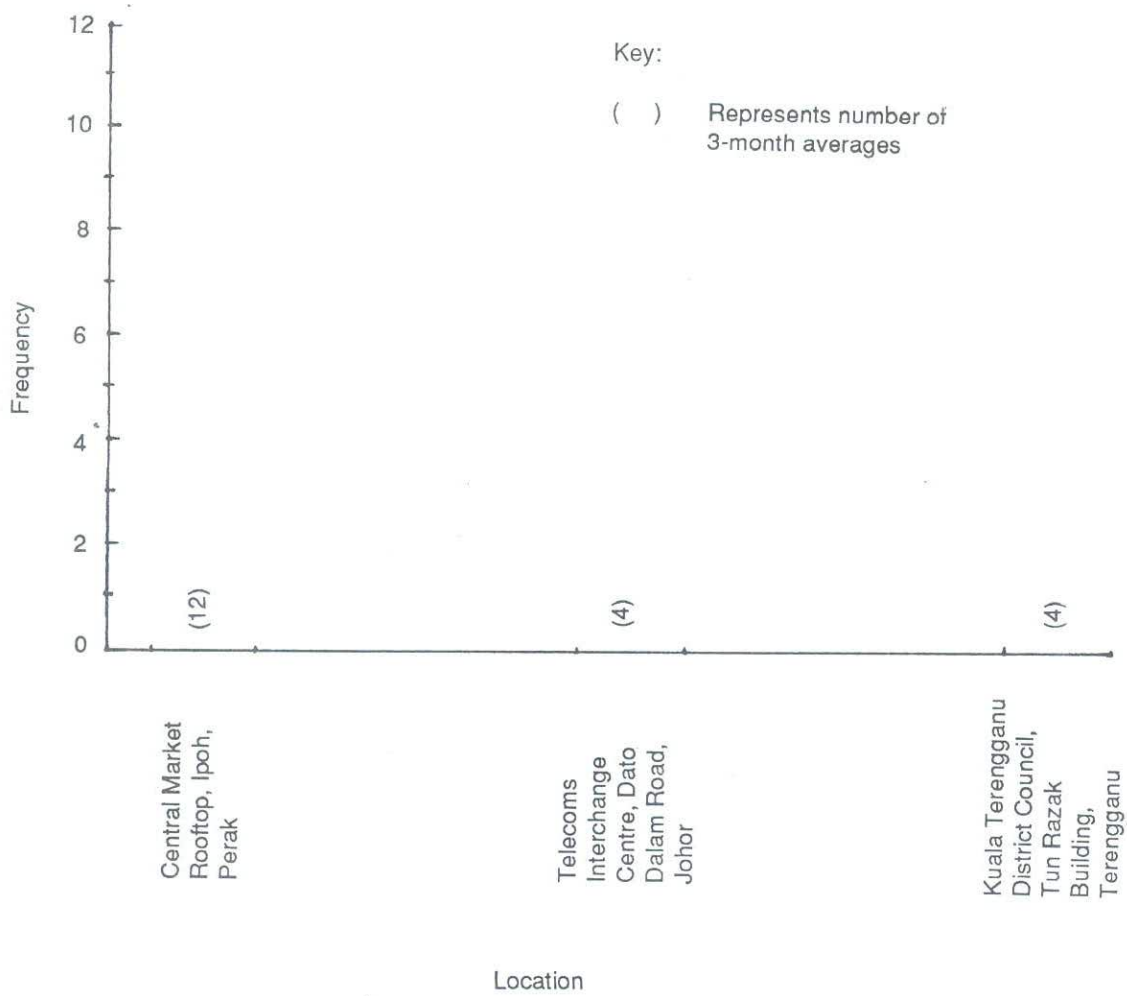


Figure 5.16. Malaysia: Status of Non-Compliance of Guideline Value for Lead in Commercial Areas, 1988

Note:
The Recommended Malaysian Guidelines for Lead is 1.5 ug/m^3 (3-month averages)

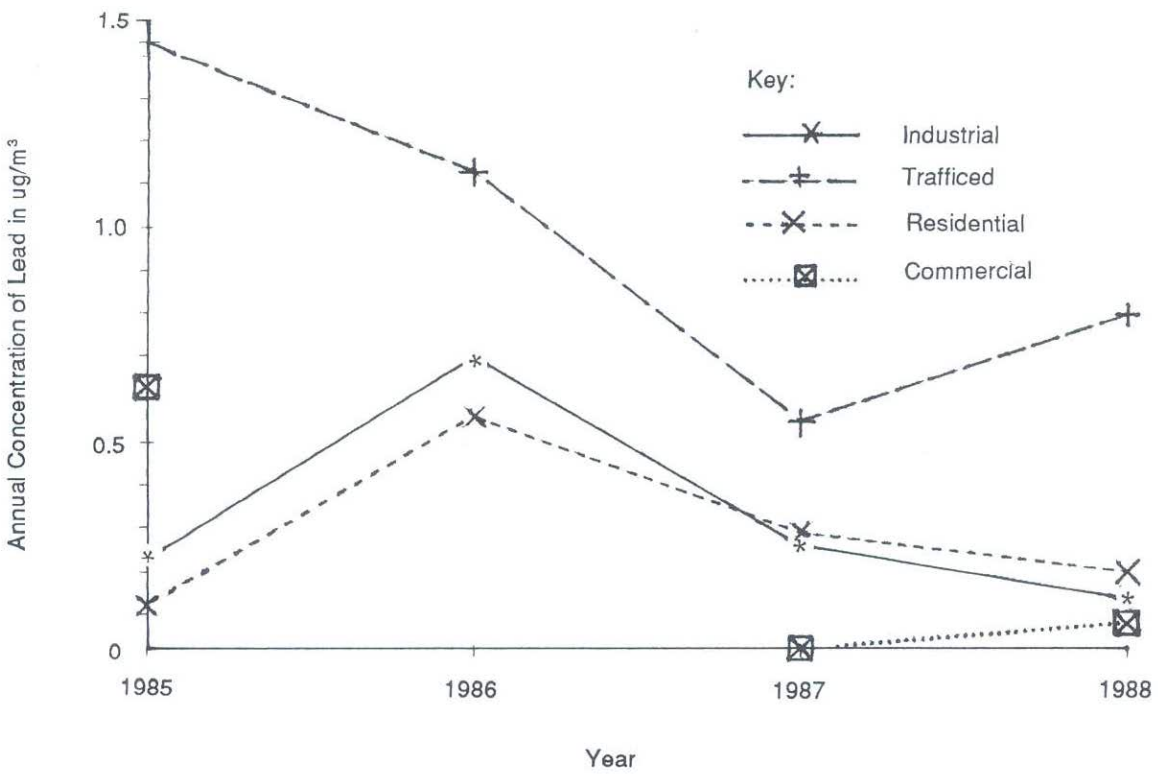


Figure 5.17. Malaysia: Status of Air Quality. Trend for Lead Levels, 1985 - 1988

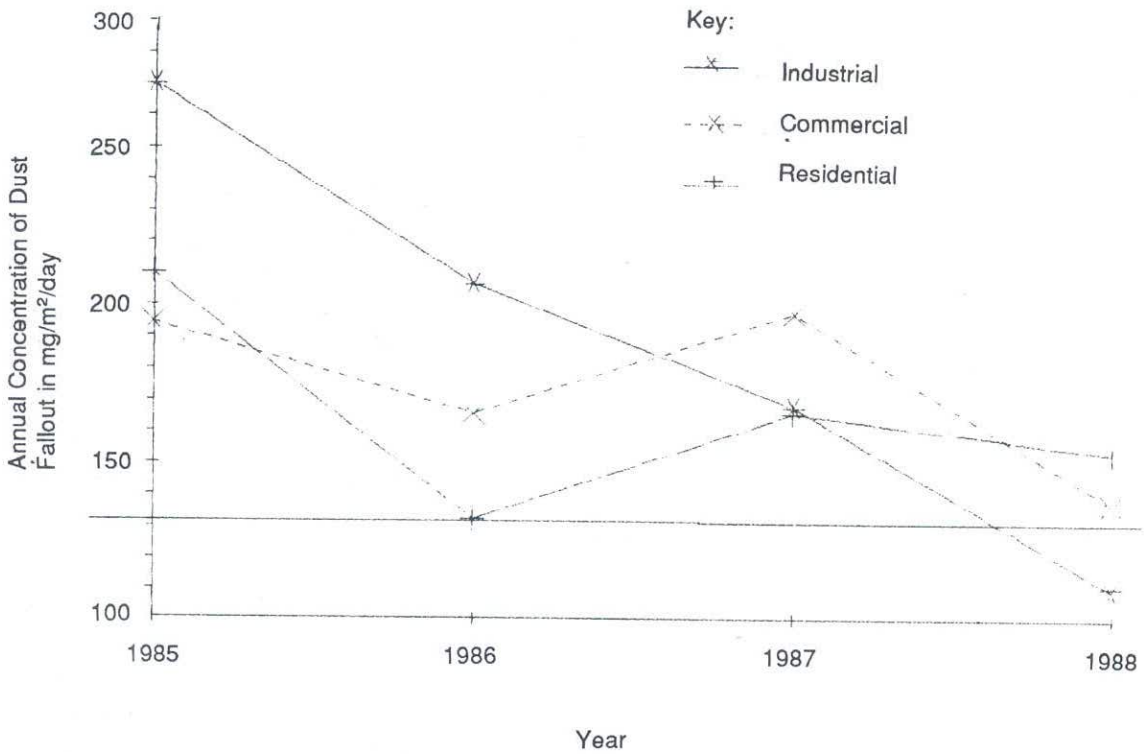


Figure 5.18. Malaysia: Status of Air Quality. Trend for Dust Fallout, 1985-1988.

Note:
The Proposed Malaysian interim Guidelines for Dust Fallout is 133 mg/m²/day (annual mean of monthly averages)

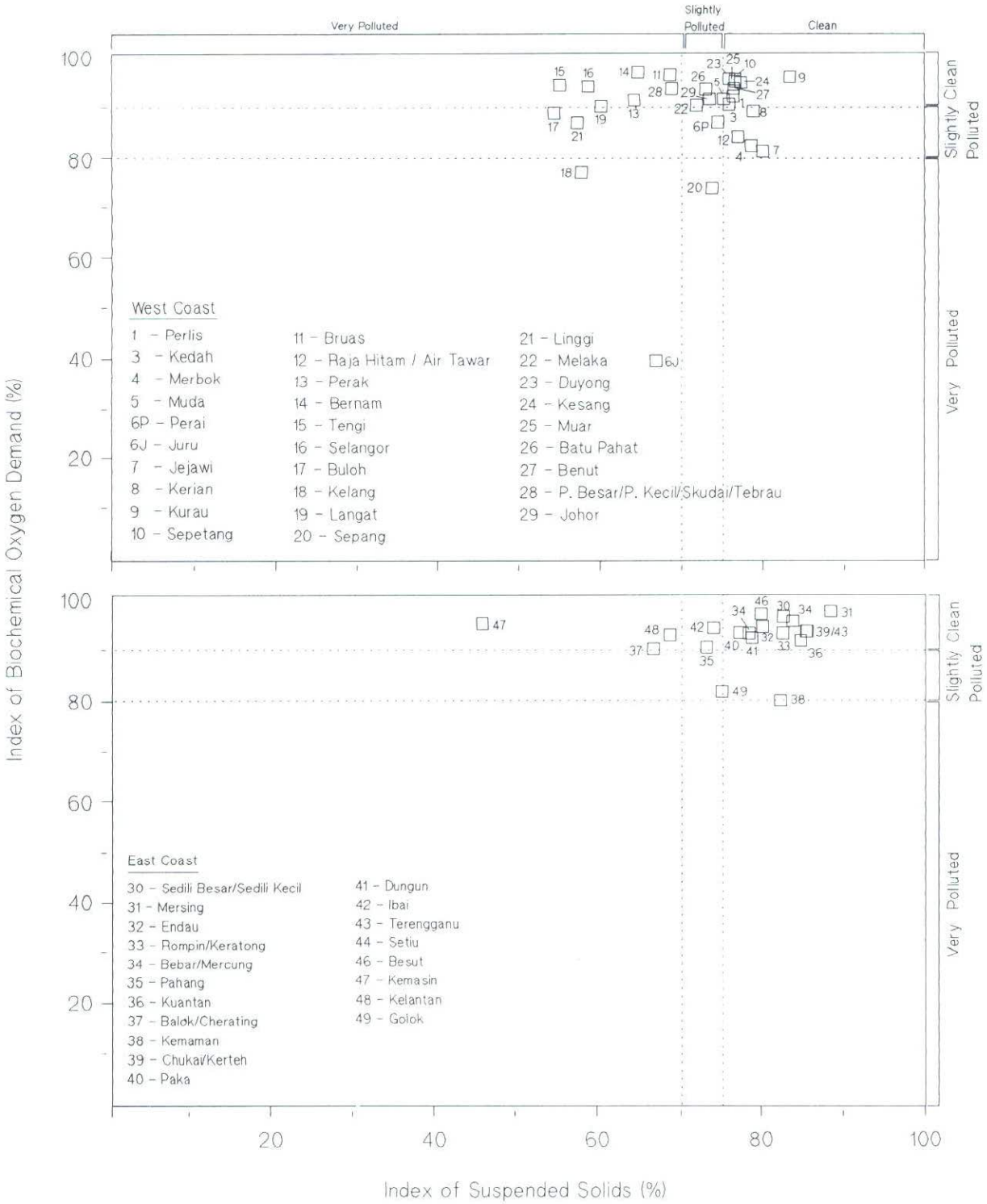


Figure 5.19(a). Peninsular Malaysia : River Water Quality Index in term of Biochemical Oxygen demand and Suspended Solids, 1988

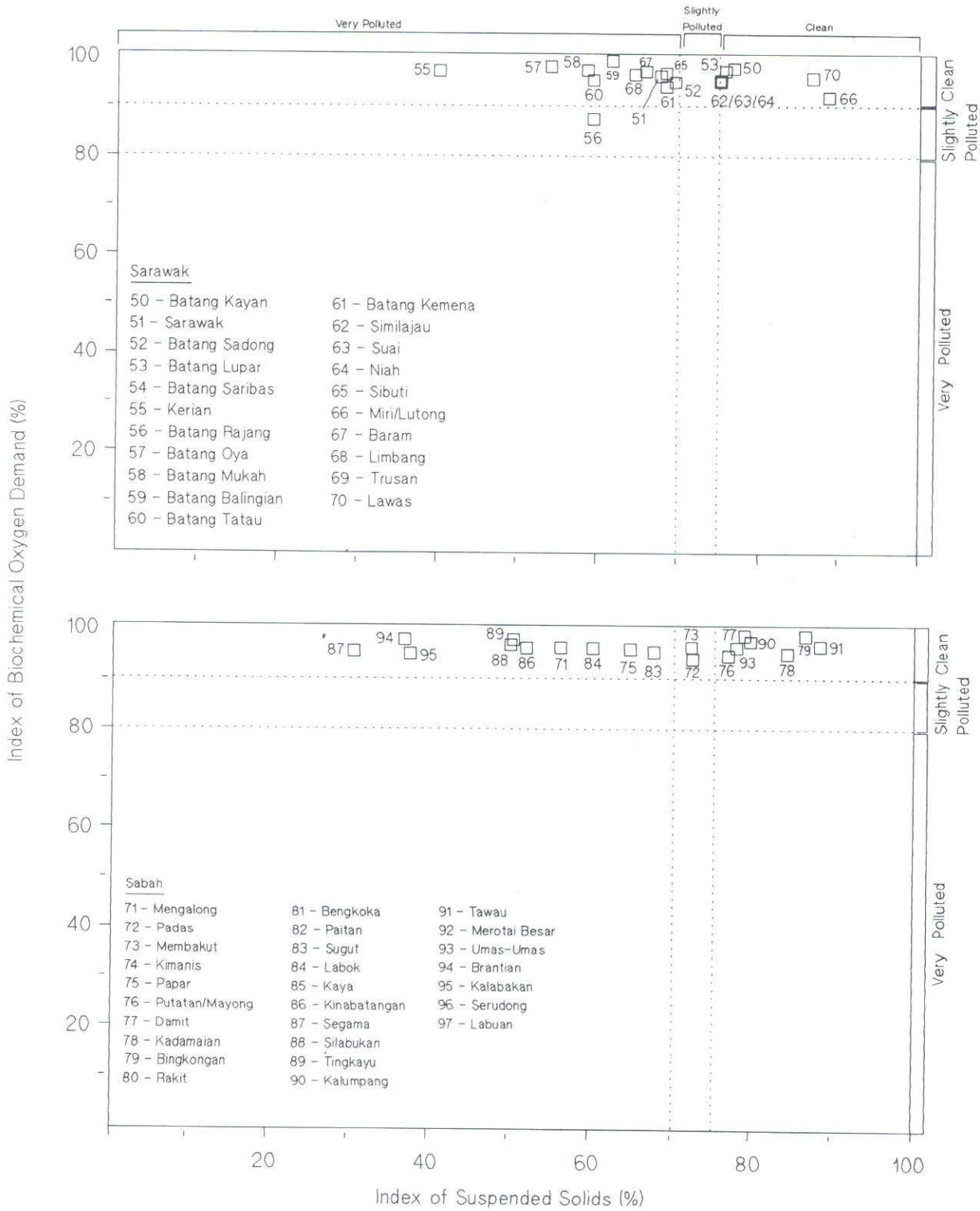


Figure 5.19(b). East Malaysia: River Water Quality Index in term of Biochemical Oxygen and Suspended Solids, 1988

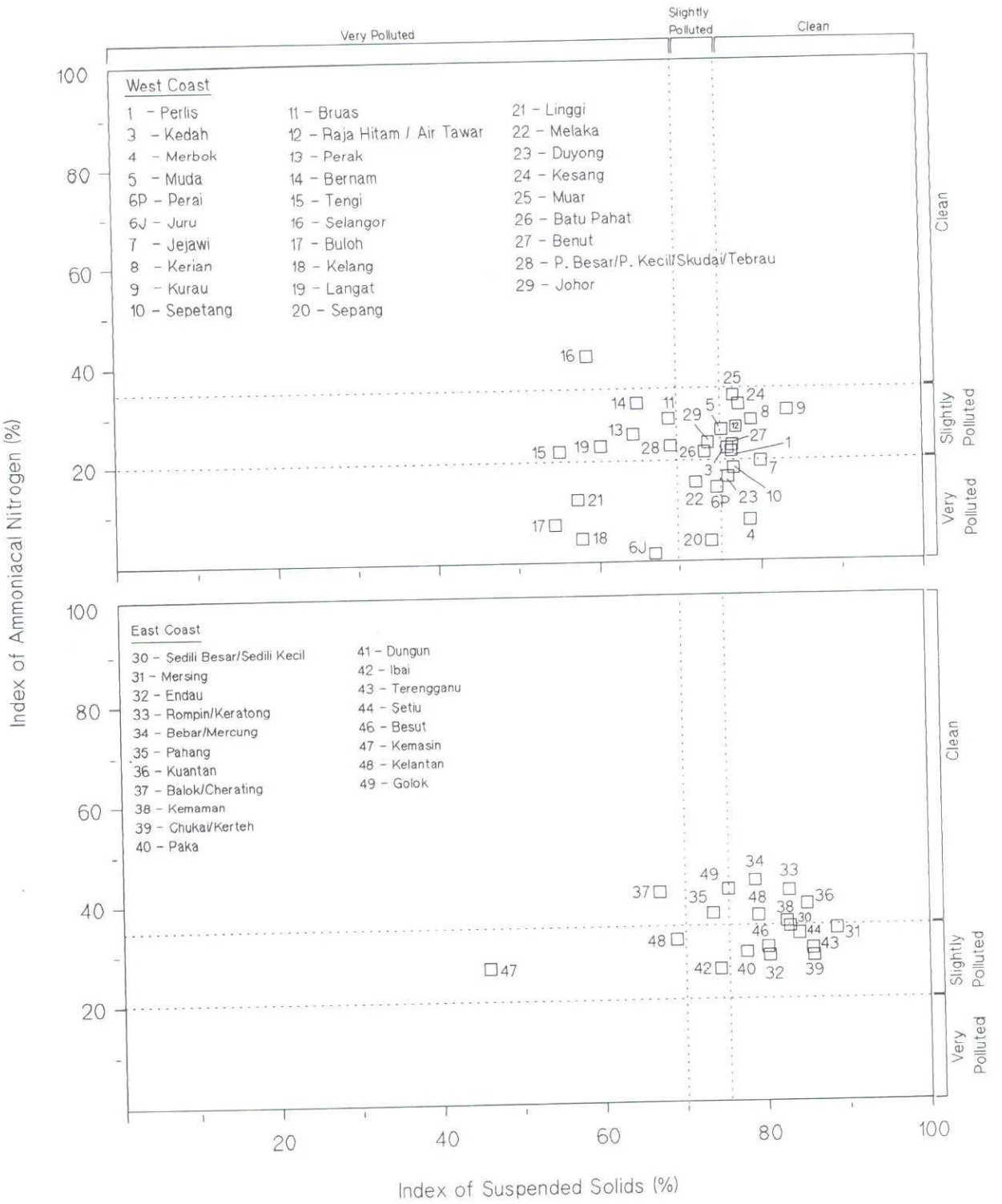


Figure 5.20(a). Peninsular Malaysia : River Water Quality Index in term of Ammoniacal Nitrogen and Suspended Solids, 1988

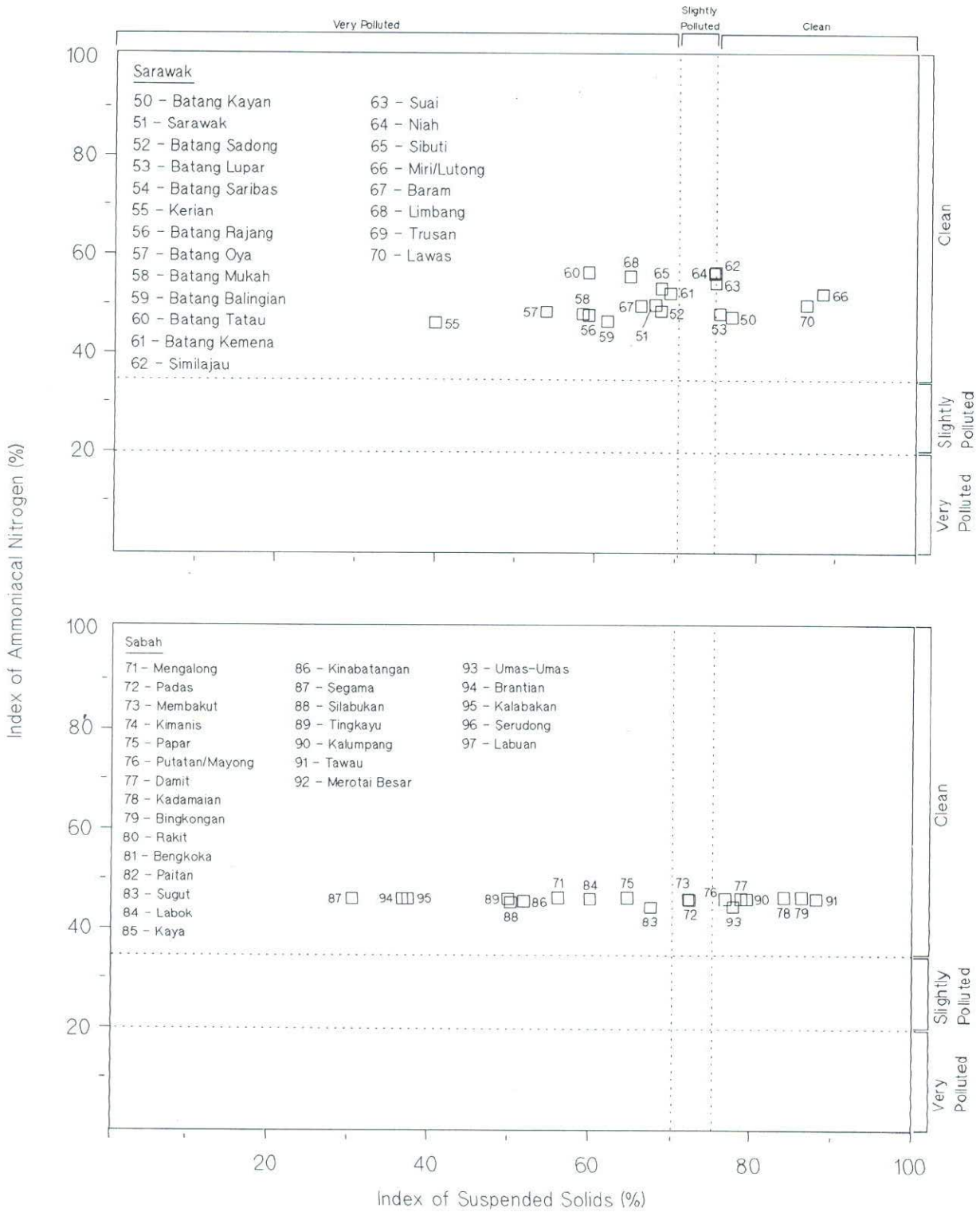


Figure 5.20(b). Malaysia : River Water Quality Index in term of Ammoniacal Nitrogen and Suspended Solids, 1988

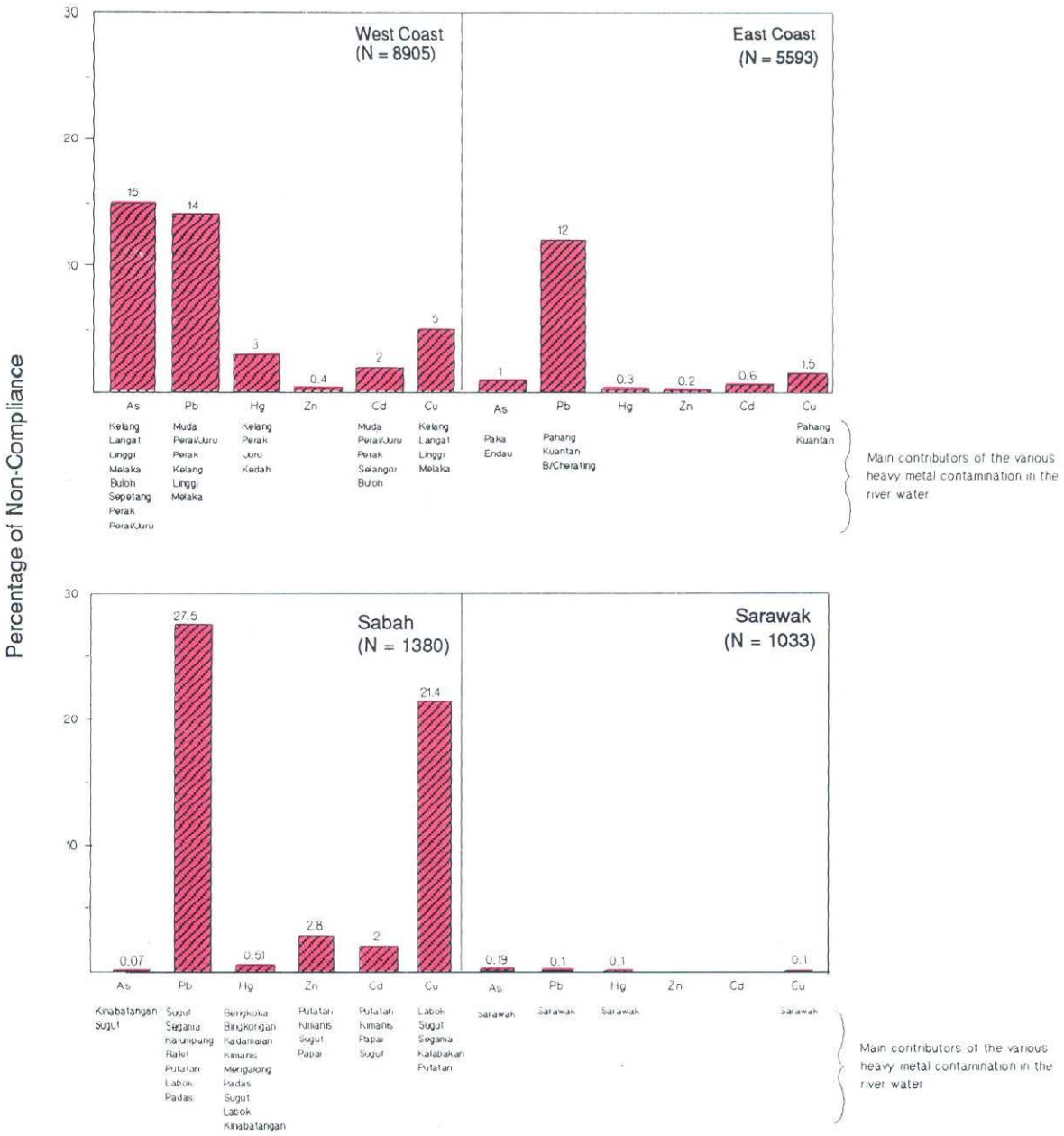


Figure 5.21. Malaysia: Trend of Non-Compliance (in per cent) of Various Heavy Metals, 1980-1988

Note:

Standard Stipulated for Class III under the National Water Quality Creteria and Standard: As=0.44 mg/l, Pb= 0.014 mg/l, Hg= 0.004 mg/l, Zn= 0.35 mg/l, Cd= 0.011 mg/l & Cu= 0.012 mg/l

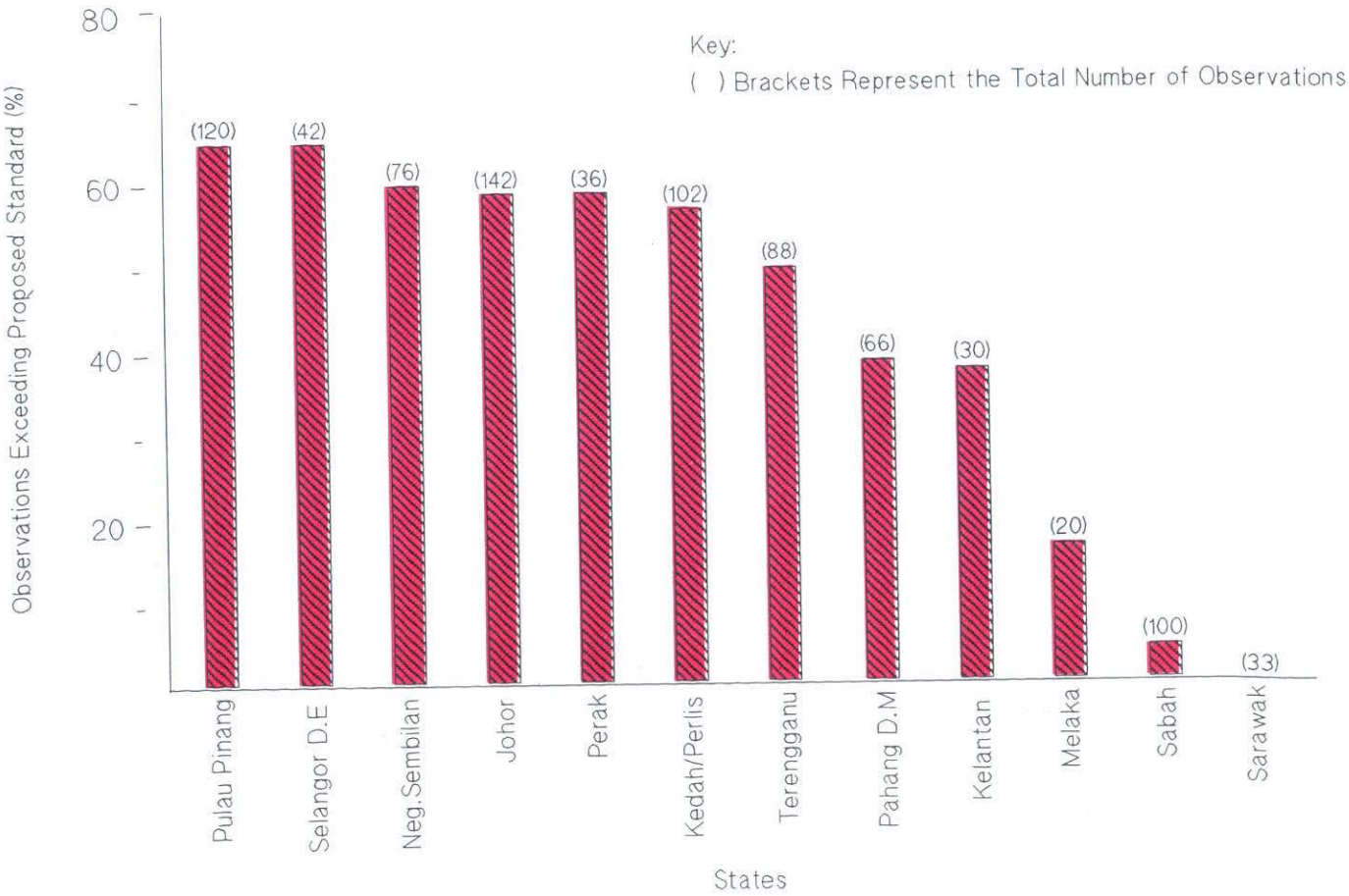


Figure 5.22. Malaysia: Status of Marine Water Quality in Terms of Faecal Contamination by State, 1988

Note:

The Proposed Interim Standard of Faecal Contaimination for Recreational Purposes is 100 MPN/100 ml

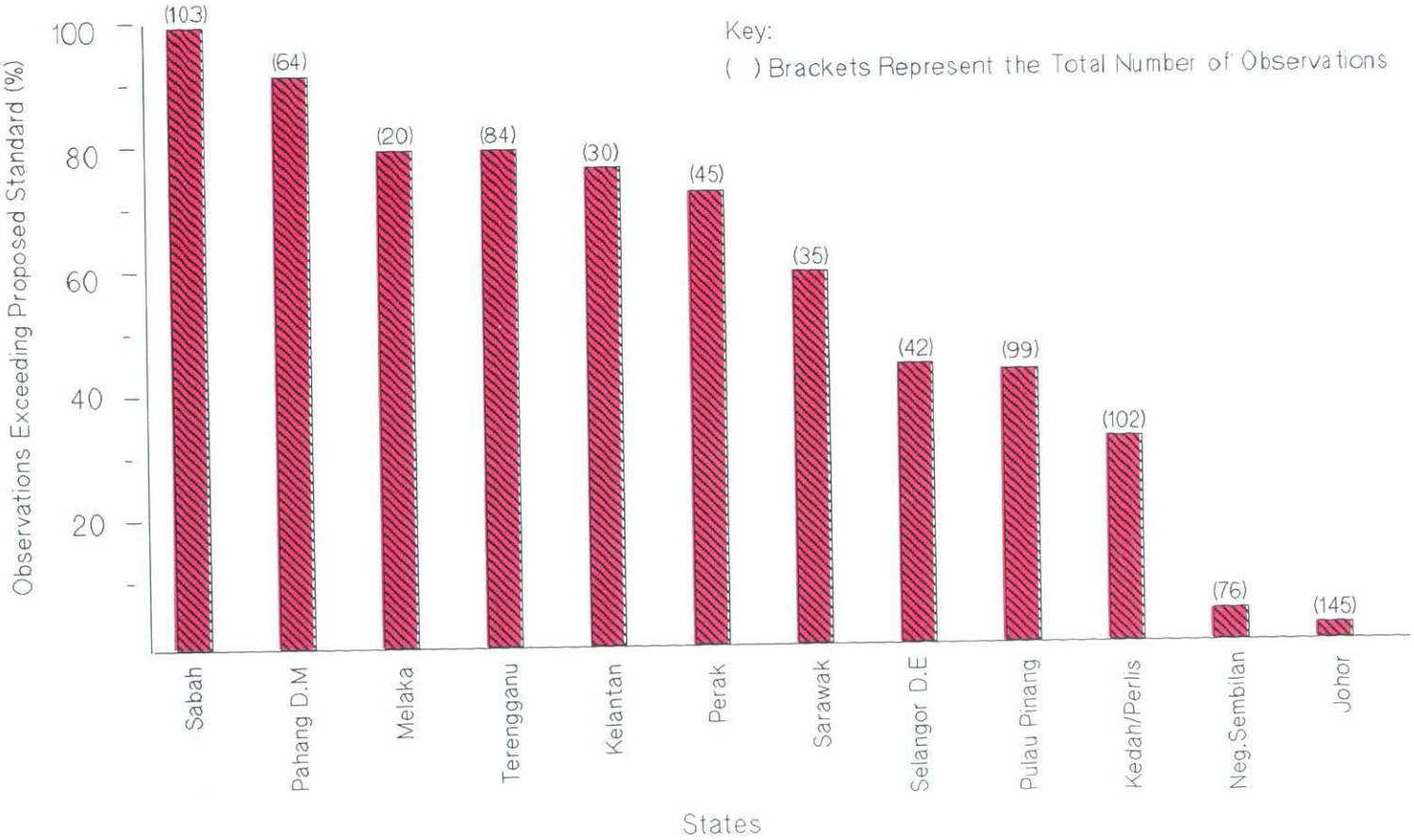


Figure 5.23. Malaysia: Status of Marine Water Quality in Terms of Total Suspended Solids by State, 1988

Note:

The Proposed Interim Standard of Total Suspended Solids for Recreationalf Purposes is 50 mg/l

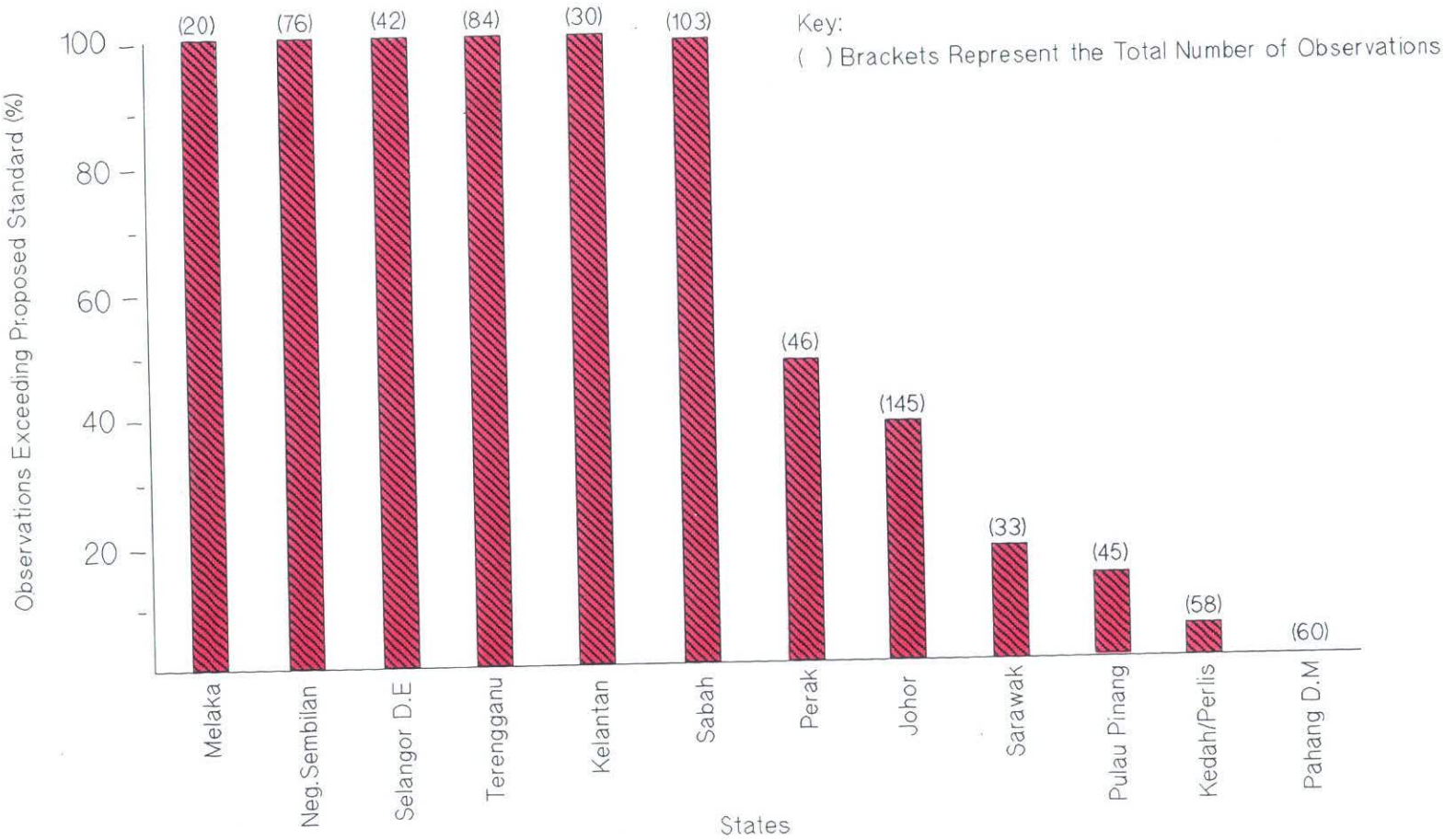


Figure 5.24. Malaysia: Status of Marine Water Quality in Terms of Oil and Grease by State, 1988

Note:

The Proposed Interim Standard of Oil and Grease for Conservation of Marine Aquatic Resources is 0.0 mg/l

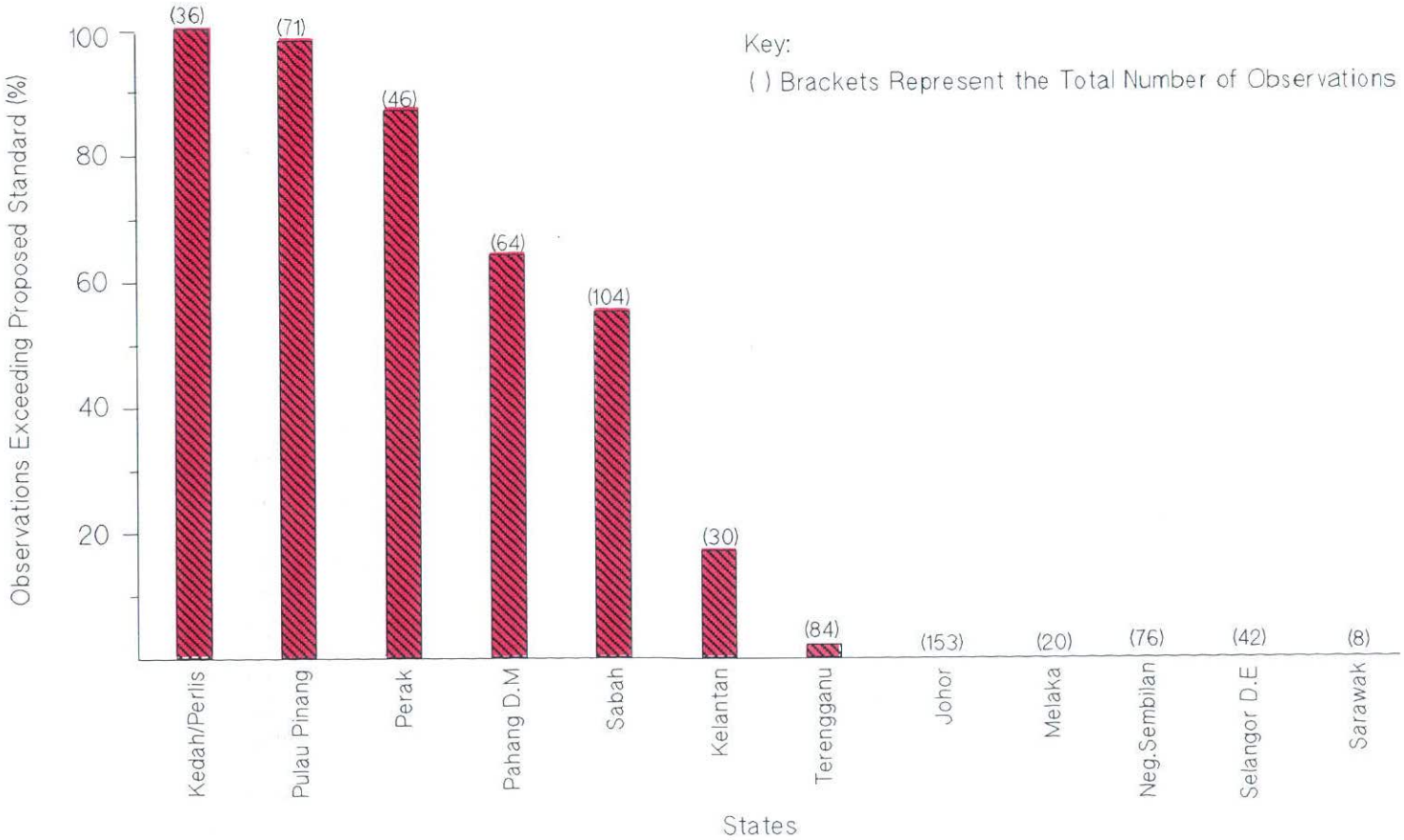


Figure 5.25. Malaysia: Status of Marine Water Quality in Terms of Cadmium by State, 1988

Note:

The Proposed Interim Standard of Cadmium on Conservation of Marine Aquatic Resources is 0.005 mg/l

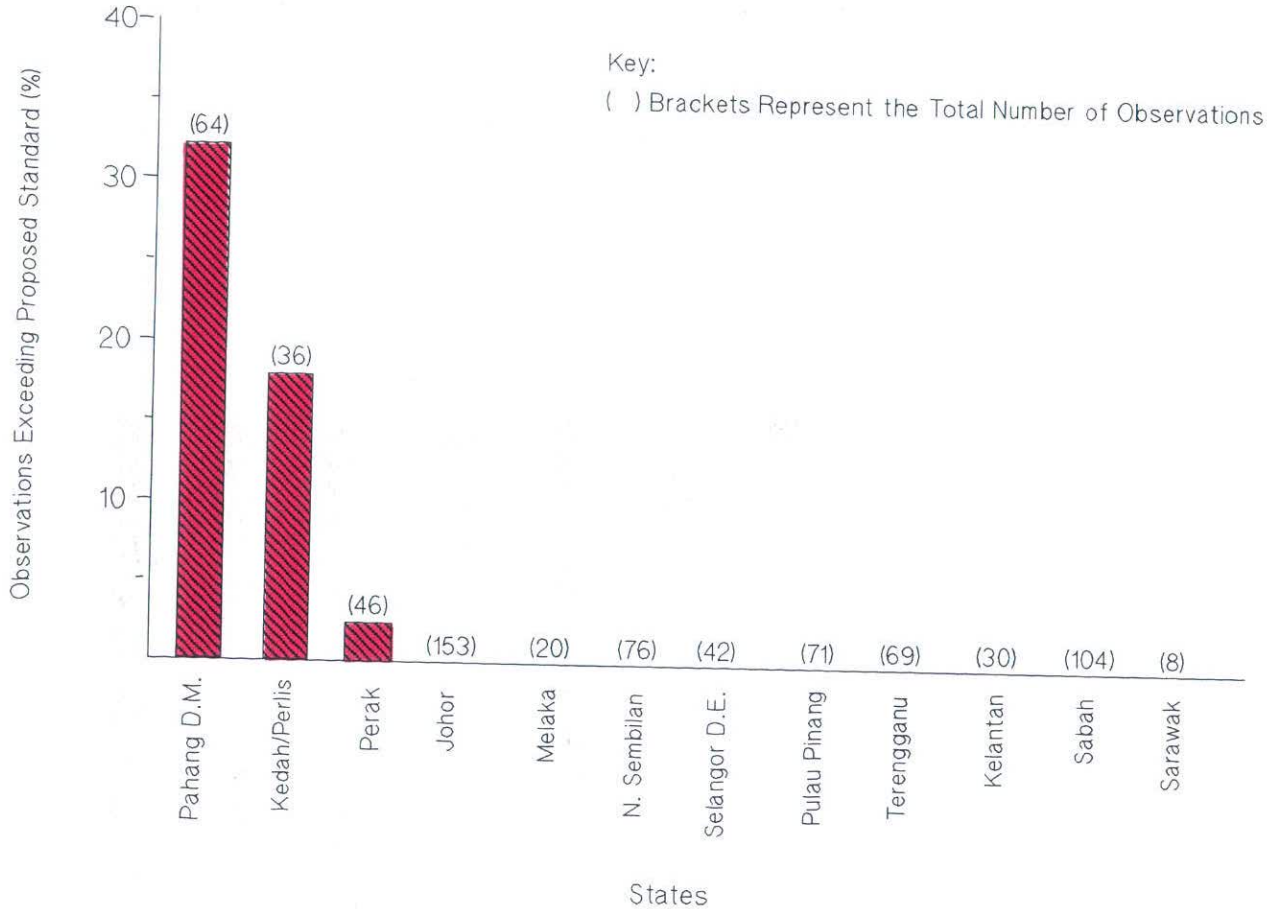


Figure 5.26. Malaysia: Status of Marine Water Quality in Terms of Chromium by State, 1988

Note:

The Proposed Interim Standard of Chromium on Conservation of Marine Aquatic Resources is 0.1 mg/l

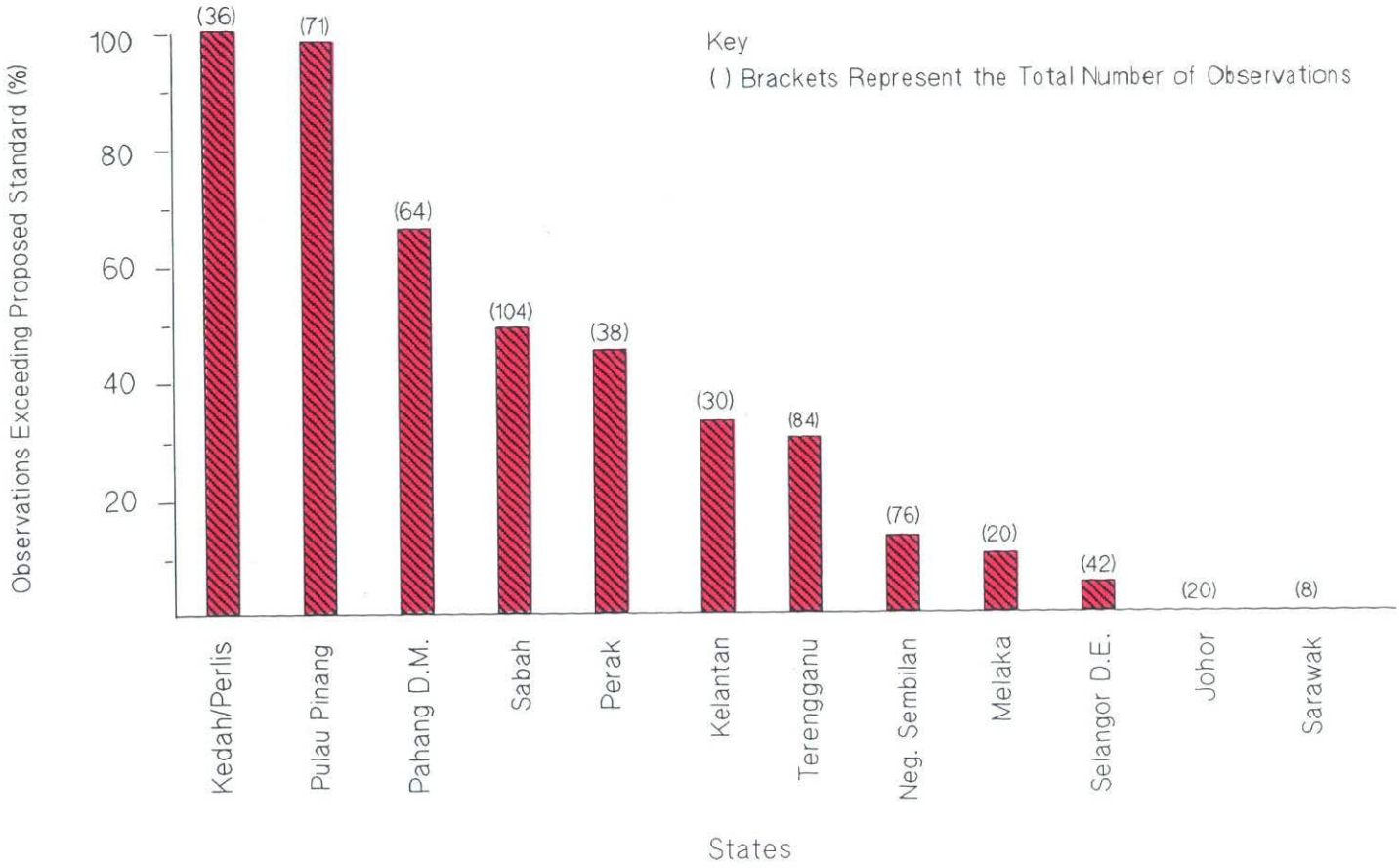


Figure 5.27. Malaysia: Status of Marine Water Quality in Terms of Copper by State, 1988

Note:

The Proposed Interim Standard of Copper on Conservation of Marine Aquatic Resources is 0.1 mg/l

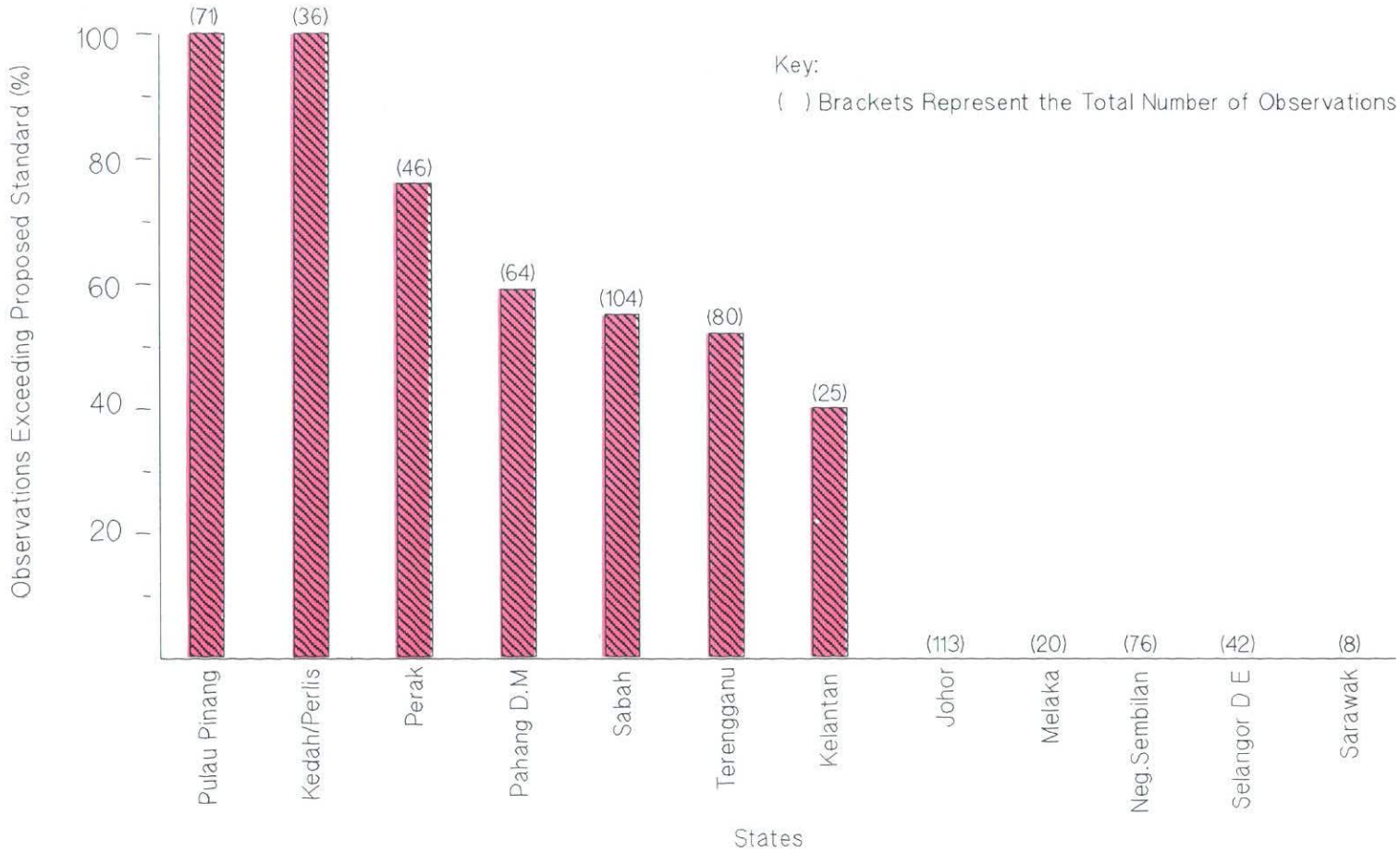


Figure 5.28. Malaysia: Status of Marine Water Quality in Terms of Lead by State, 1988

Note:

The Proposed Interim Standard of Lead on Conservation of Marine Aquatic Resources is 0.05 mg/l

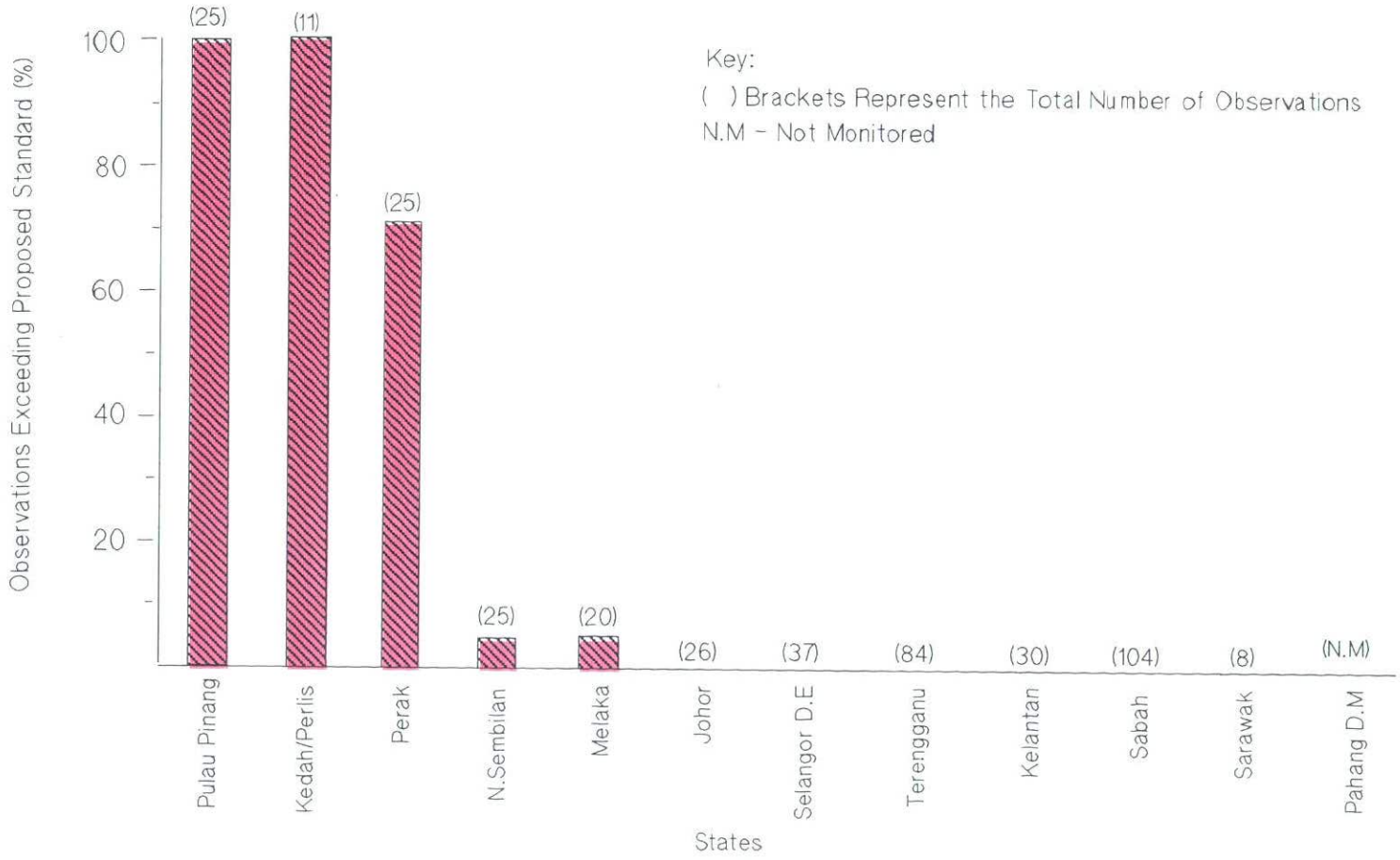


Figure 5.29. Malaysia: Status of Marine Water Quality in Terms of Mercury by State, 1988

Note:

The Proposed Interim Standard of Mercury on Conservation of Marine Aquatic Resources is 0.0005 mg/l

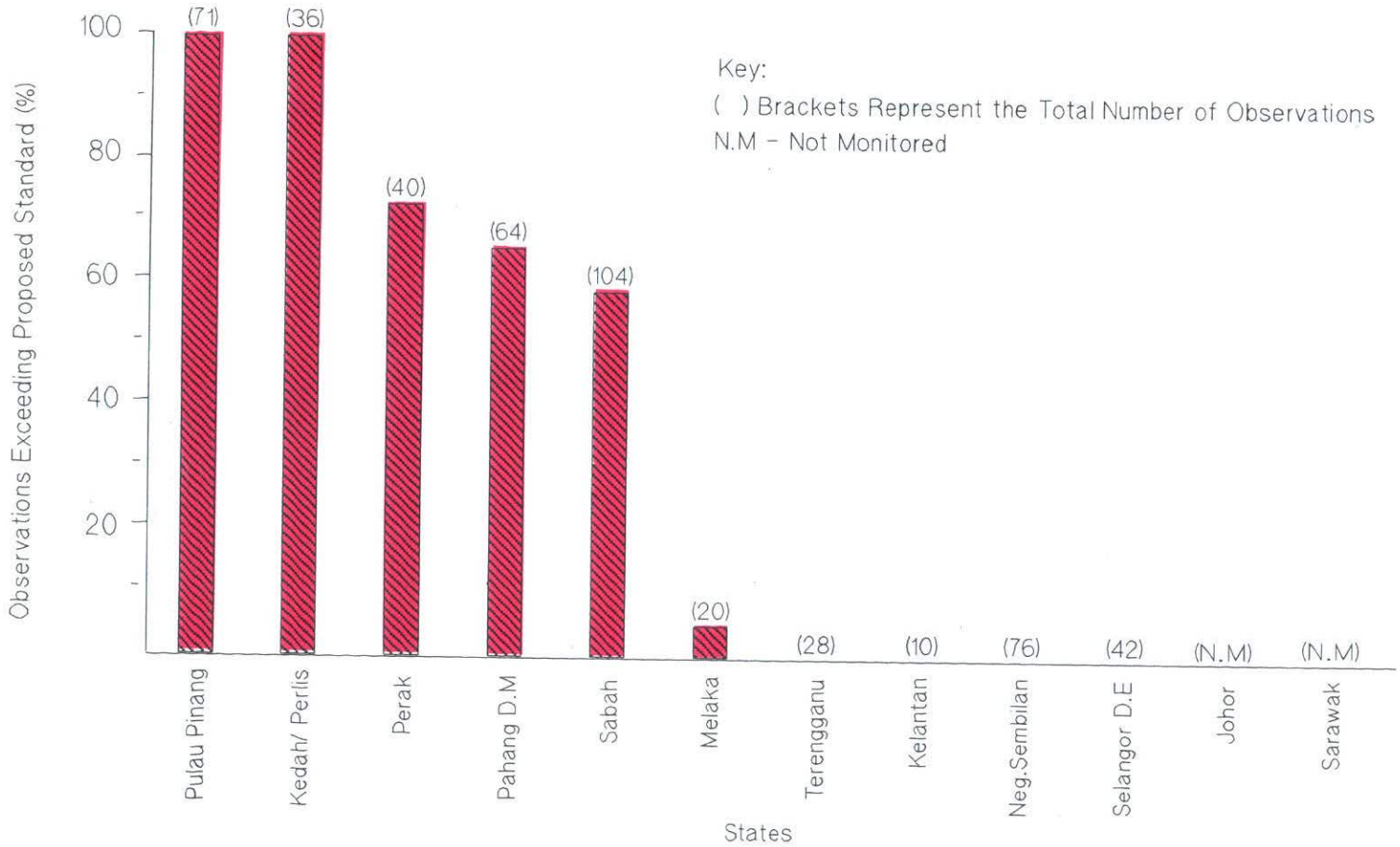


Figure 5.30. Malaysia: Status of Marine Water Quality in Terms of Nickel by State, 1988

Note:

The Proposed Interim Standard of Nickel on Conservation of Marine Aquatic Resources is 0.01 mg/l

Table 5.1

Malaysia : Status of Air Quality. Annual Mean Concentration of Total Suspended Particulates by Area Type, 1985-1988.

Year / Area	Annual Mean Concentration * of Total Suspended Particulates in ug/m^3			
	1985	1986	1987	1988
Traffic	154 (253)	128 (424)	99 (656)	107 (477)
Industrial	80 (116)	96 (138)	115 (352)	92 (456)
Commercial	190 (18)	-	152 (84)	76 (151)
Residential	90 (69)	78 937)	41 (960)	62 (243)
Rural	-	-	-	49 (53)

Note:

( ) Represents Number of Daily Observations
* Annual Arithmetic Mean of 24-hour measurements

Table 5.2

Malaysia : Status of Air Quality. Annual Mean Values of Lead by Area Type, 1985 - 1988.

Year / Area	Annual Mean Values of Lead			
	1985	1986	1987	1988
Traffic	1.43 (241)	1.13 (291)	0.55 (480)	0.80 (501)
Industrial	0.23 (30)	0.70 (125)	0.16 (345)	0.14 (305)
Commercial	0.63 (23)	-	0.02 (20)	0.08 (78)
Residential	0.12 (55)	0.56 (27)	0.29 (86)	0.20 (182)
Rural	-	-	-	0.02 (46)

Note:

( ) Represents Number of Daily Observations

Table 5.3

Malaysia : Status of Air Quality. Annual Mean Monthly Values of Dust Fallout by Area Type, 1985 - 1988.

Year / Area	Annual Mean Monthly Values of Dust Fallout (mg/m2/day)			
	1985	1986	1987	1988
Industrial	272.57	209.30	170.71	112.47
Residential	212.48	134.94	168.40	155.47
Commercial	196.80	168.20	200.00	139.70

Table 5.4

Water Quality Classification Based on Index Values

PARAMETER	INDEX RANGE (%)		
	Clean	Slightly Polluted	Very Polluted
Overall	>80	60-80	<60
BOD	>90	80-90	<80
Ammoniacal Nitrogen	>35	20-35	<20
Suspended Solids	>75	70-75	<70

Note:

Classification Of Water Quality Index Based on The National Water Quality Standard for Malaysia

Clean referring to Class I

Slightly Polluted referring to Class II and III

Very Polluted referring to Class IV or others

Table 5.5

Malaysia: Status and Trend Of River Water Quality, 1985-1988

Index	Clean Rivers	River water Quality			Net Rate of Change (%)	River Pollution			Polluted Rivers	
		Improved	Not Changing	Deteriorated		Improved	Not Changing	Deteriorated	Slightly Polluted	Seriously Polluted
General	13	8	2	3	+0.8	41	1	32	71	3
BOD-5 days	72	50	0	22	+0.2	0	12	12	3	3
Ammoniacal Nitrogen	48	22	3	23	+2.6	21	0	18	28	11
Suspended Solids	42	29	1	12	+1.5	19	0	26	10	35

Table 5.5a

Malaysia: Status and Trend Of River Water Quality, 1985-1988

Area	Status	WQI			AN			BOD-5days			SS			Total			
		+	0	-	+	0	-	+	0	-	+	0	-	WQI	AN	BOD	SS
A	clean	1	0	0	9	0	0	27	0	8	21	0	6	1	9	35	27
	slightly polluted	34	0	11	18	0	10	3	0	6	5	0	45	28	9	7	
	very polluted	0	0	2	3	0	8	0	0	4	7	0	7	2	11	4	14
B	clean	1	1	0	10	4	6	9	0	9	5	1	4	2	20	18	10
	slightly polluted	6	1	11	0	0	0	0	0	1	0	0	1	18	0	1	1
	very polluted	0	0	0	0	0	0	0	0	0	4	0	7	0	0	0	11
C	clean	6	1	3	2	0	17	14	0	5	5	0	2	10	19	19	7
	slightly polluted	1	0	8	0	0	0	0	0	0	1	0	1	9	0	0	2
	very polluted	0	0	0	0	0	0	0	0	0	2	0	8	0	0	0	10

Note:

A for Peninsular of Malaysia
B for Sarawak
C for Sabah
BOD for Biochemical Oxygen Demand

+ means improved
- means deteriorated
0 means not changing

Table 5.6

Peninsular Malaysia: The Levels and Non-compliances of Heavy Metals in Selected Rivers, 1988

Heavy Metals		River Name							
		Perlis	Kedah	Merbok	Perai	Juru	Jejawi	Kerian	Sepetang
Pb	Number of Samples	5	24	19	38	10	5	5	16
	Samples Exceeding Std (%)	100	100	100	97.3	100	100	100	6.25
	Minimum	0.04	0.04	0.06	ND	0.11	0.11	0.006	ND
	Maximum	0.07	0.12	0.22	0.22	0.29	0.18	0.007	0.02
	Median	0.07	0.07	0.11	0.07	0.215	0.14	0.006	ND
Hg	Number of Samples	3	-	6	13	4	1	1	16
	Samples Exceeding Std (%)	0	-	0	7.6	75	0	0	0
	Minimum	0.002	-	ND	ND	0.002	0.004	0.002	ND
	Maximum	0.002	-	0.00	40.006	0.010	0.004	0.002	0.001
	Median	0.002	-	ND	ND	0.006	0.004	0.004	ND
Cd	Number of Samples	3 6	24	20	8	10	5	5	16
	Samples Exceeding Std (%)	100	8.3	70.0	44.7	100	20	100	0
	Minimum	0.006	0.006	0.006	0.006	0.012	0.006	0.04	ND
	Maximum	0.012	0.012	0.018	0.03	0.018	0.012	0.14	ND
	Median	0.006	0.006	0.012	0.006	0.012	0.007	0.07	ND
Cu	Number of Samples	-	-	-	1	-	-	-	7
	Samples Exceeding Std (%)	-	-	-	-	-	-	-	0
	Minimum	-	-	-	0.11	-	-	-	ND
	Maximum	-	-	-	0.11	-	-	-	ND
	Median	-	-	-	0.11	-	-	-	ND
Zn	Number of Samples	-	-	-	-	-	-	-	2
	Samples Exceeding Std (%)	-	-	-	-	-	-	-	0
	Minimum	-	-	-	-	-	-	-	0.02
	Maximum	-	-	-	-	-	-	-	0.1
	Median	-	-	-	-	-	-	-	0.06
As	Number of Samples	6	24	19	5	10	4	5	16
	Samples Exceeding Std (%)	0	0	0	0	0	0	0	0
	Minimum	ND	ND	ND	ND	ND	ND	ND	ND
	Maximum	ND	ND	ND	ND	ND	ND	ND	0.01
	Median	ND	ND	ND	ND	ND	ND	ND	ND

Table 5.6(continuation)

Heavy Metals		River Name								
		Perak	Tengi	Selangor	Kelang	Langat	Linggi	Melaka	Muar	Batu Pahat
Pb	Number of Samples	28	3	7	105	13	48	17	42	48
	Samples Exceeding Std (%)	10.7	3.33	42.8	38.0	23.0	33.3	17.6	0	0
	Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Maximum	3.50	0.03	0.60	0.10	9.90	2.10	0.08	ND	ND
	Median	ND	ND	0.01	0.01	0.01	0.01	0.01	ND	ND
Hg	Number of Samples	27	3	6	101	11	45	17	5	7
	Samples Exceeding Std (%)	0	0	0	0	0	4.4	0	0	0
	Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Maximum	ND	ND	ND	0.001	0.001	0.028	ND	ND	ND
	Median	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cd	Number of Samples	27	4	8	106	13	48	17	42	48
	Samples Exceeding Std (%)	0	0	0	0	0	2.0	0	0	4.2
	Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Maximum	ND	ND	ND	0.001	0.001	0.040	ND	ND	0.100
	Median	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	Number of Samples	8	3	2	6	-	7	-	40	48
	Samples Exceeding Std (%)	0	0	100	33.3	-	71.4	-	2.5	0
	Minimum	ND	0.0	0.	0.01	-	ND	-	ND	ND
	Maximum	0.01	0.0	0.04	0.06	-	1.50	-	0.02	0.01
	Median	ND	0.03	0.035	0.01	-	0.02	-	ND	ND
Zn	Number of Samples	7	3	5	96	4	44	16	26	36
	Samples Exceeding Std (%)	0	0	0	0	0	2.3	0	0	0
	Minimum	ND	0.0	0.02	ND	0.05	ND	ND	ND	ND
	Maximum	0.05	0.16	0.04	0.26	0.1	0.88	0.21	ND	0.14
	Median	0.0	0.04	0.03	0.04	0.065	0.04	0.04	ND	ND
As	Number of Samples	27	4	8	105	13	49	17	41	48
	Samples Exceeding Std (%)	0	0	0	0	0	0	0	0	2.08
	Minimum	ND	ND	0.002	ND	ND	ND	ND	ND	ND
	Maximum	0.01	0.005	0.04	0.062	0.011	0.04	0.007	0.01	4.00
	Median	ND	0.003	0.0045	0.021	0.004	0.012	0.004	ND	ND

Table 5.6(continuation)

Heavy Metals		River Name								
		Rompin	Pahang	Kuantan	Balok/ Cherating	Paka	T'ganu	K'tan	Sungut	Labok
Pb	Number of Samples	6	138	40	16	8	12	20	44	18
	Samples Exceeding Std (%)	50.0	0	67.5	100	25.0	16.6	10.0	38.6	22.2
	Minimum	0.003	ND	ND	0.02	ND	ND	ND	ND	ND
	Maximum	3.35	0.22	0.63	0.76	0.25	0.2	1.00	3.80	0.46
	Median	0.015	0.01	0.025	0.215	ND	ND	ND	ND	ND
Hg	Number of Samples	-	44	-	-	8	11	20	2	-
	Samples Exceeding Std (%)	-	0	-	-	0	0	0	100	-
	Minimum	-	ND	-	-	ND	ND	ND	0.15	-
	Maximum	-	0.16	-	-	ND	ND	ND	2.00	-
	Median	-	ND	-	-	ND	ND	ND	1.075	-
Cd	Number of Samples	5	135	34	16	8	12	20	44	18
	Samples Exceeding Std (%)	0	0	0	0	0	2.0	0	0	4.2
	Minimum	20.0	0	8.8	50.0	25.0	0	0	2.2	0
	Maximum	0.03	0.05	0.02	0.18	0.22	ND	ND	5.6	ND
	Median	0.004	ND	0.003	0.015	ND	ND	ND	ND	ND
Cu	Number of Samples	6	71	28	11	8	12	20	31	17
	Samples Exceeding Std (%)	83.3	1.4	67.8	90.9	0	0	15.0	80.7	64.7
	Minimum	0.003	ND	0.01	0.01	ND	ND	ND	ND	ND
	Maximum	0.07	1.3	0.49	0.08	0.01	ND	ND	1.1	0.16
	Median	0.02	0.02	0.02	0.03	ND	ND	ND	0.02	0.02
Zn	Number of Samples	5	93	27	11	1	11	20	44	18
	Samples Exceeding Std (%)	20.0	0	3.7	0	0	0	0	0	0
	Minimum	0.03	ND	0.02	0.02	ND	ND	ND	ND	ND
	Maximum	1.00	1.9	0.42	0.17	ND	0.05	0.05	0.28	0.2
	Median	0.07	0.04	0.04	0.04	ND	ND	ND	0.05	0.04
As	Number of Samples	18	122	40	14	8	12	20	-	-
	Samples Exceeding Std (%)	0	0	0	0	0	0	0	-	-
	Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND
	Maximum	0.001	0.12	0.009	0.003	ND	ND	ND	-	-
	Median	ND	ND	ND	ND	ND	ND	ND	-	-

Table 5.7

Peninsular Malaysia: Nutrients Levels and Non-Compliance of River Water Quality, 1988

NAME OF RIVER	Nitrate Nitrogen (mg/l)					Sulphate (mg/l)					Phosphate (mg/l)				
	Number of Samples	Minimum	Maximum	Median	Samples Exceeding 7.0 mg/l (Per Cent	Number of Samples	Minimum	Maximum	Median	Samples Exceeding 1.0 mg/l (Per Cent)	Number of Samples	Minimum	Maximum	Median	Samples Exceeding 50.0 mg/l (Per Cent)
PERLIS	30	0.05	1.65	0.25	0	29	2	290	12	7	29	ND	19	0.09	45
KEDAH	60	0.05	1.65	0.25	0	58	1	530	12	2	58	ND	4.4	0.115	55
MERBUK	69	0.05	4.30	0.35	0	70	0.07	2480	31.5	19	69	ND	45	0.15	55
MUDA	79	0.05	8.40	0.20	1	79	ND	32	5	0	77	ND	5.8	0.08	48
PERAI	98	0.04	25.00	0.35	1	99	0.21	3500	14	12	94	ND	6.7	0.175	63
JURU	50	0.05	0.05	0.20	0	50	6	316	26	2	50	0.08	7.95	1.095	98
JEJAWI	20	0.1	0.46	0.25	0	20	3	2850	13	20	20	ND	0.84	0.13	60
KERIAN	15	0.1	0.35	0.2	0	15	5	59	14	0	15	0.07	1.93	0.16	67
KURAU	20	0.01	0.39	0.09	0	3	0.5	8.4	5.7	0	24	ND	0.2	ND	8
SEPETANG	30	0.02	0.02	0.14	0	15	0.13	33.7	3.8	0	36	ND	41	0.495	8
BERUAS	10	0.01	0.18	0.15	0	3	7.6	26	14.4	0	12	ND	0.12	ND	8
RAJA HITAM	12	0.02	0.30	0.105	0	4	8.8	36	12	0	15	ND	0.14	ND	13
PERAK	71	0.02	1.23	0.23	0	16	ND	11.8	2.8	0	81	ND	21	0.07	30
BERNAM	12	0.03	0.30	0.22	0	2	1.2	4.7	2.95	0	18	ND	21	0.07	0
TENGI	4	0.14	0.37	0.195	0	-	-	-	-	-	4	0.03	0.23	0.19	78
SELANGOR	23	0.06	0.65	0.26	0	-	-	-	-	-	24	0.01	0.31	0.135	75
BULUH	20	0.24	0.88	0.46	o	-	-	-	-	-	20	0.04	0.80	0.29	85
KELANG	226	0.01	2.20	0.36	0	-	-	-	-	-	211	ND	14	0.21	82
LANGAT	49	ND	1.50	0.41	0	1	0.16	0.16	0.16	0	45	0.01	0.31	0.13	55
SEPANG	14	ND	1.38	0.185	0	-	-	-	-	-	16	0.01	4	0.26	81
LINGGI	79	ND	1.5	0.56	0	1	0.21	0.21	0.21	0	79	0.01	4	0.16	84
MELAKA	40	0.04	8.7	0.56	2	-	-	-	-	-	43	0.01	0.7	0.19	77
DUYUNG	10	0.05	0.79	0.145	0	1	0.01	0.01	0.01	0	9	0.01	0.07	0.01	0
KESANG	10	0.05	0.60	0.26	0	-	-	-	-	-	15	0.01	0.14	0.09	33
MUAR	95	0.06	1.0	0.44	0	54	0.12	2400	9.15	7	94	ND	20	0.1	45
BATU PAHAT	72	0.02	0.8	0.2	0	36	ND	352	15	3	72	ND	8	0.02	15
BENUT	36	0.04	1.2	0.34	0	4	2.9	8.1	4.65	0	36	0.01	1.49	0.04	31
SKUDAI/ PONTIAN/ TEBERAU	114	0.06	0.8	0.32 0 0	0	30	1.6	960	4.6	3	114	ND	9.5	0.08	37
JOHOR	92	0.02	2.24	0.37	0	35	1.7	141	5.7	0	94	ND	3.18	0.05	30
SEDILI	60	0.04	1.0	0.16	0	-	-	-	-	-	60	ND	1.0	0.01	8
MERSING	8	0.06	0.24	0.14	0	-	-	-	-	-	8	ND	1.0	0.015	25
ENDAU	41	0.12	1.6	0.32	0	7	0.17	9.6	1.56	0	33	ND	14.0	0.06	48
ROMPIN	87	0.02	14.0	0.12	1	87	0.0	27	0	0	-	-	-	-	-
BEBAR	10	0.02	24.0	0.10	0	10	0.0	625	0	10	-	-	-	-	-
PAHANG	157	0.02	3.9	0.22	0	107	0.01	151	0	0	87	ND	1.4	0.01	16

NAME OF RIVER	Nitrate Nitrogen (mg/l)					Sulphate (mg/l)					Phosphate (mg/l)				
	Number of Samples	Minimum	Maximum	Median	Samples Exceeding 7.0 mg/l (Per Cent	Number of Samples	Minimum	Maximum	Median	Samples Exceeding 1.0 mg/l (Per Cent)	Number of Samples	Minimum	Maximum	Median	Samples Exceeding 50.0 mg/l (Per Cent)
KUANTAN	60	0.02	1.8	0.14	0	60	0	4	0	2	-	-	-	-	0
BALOK/	24	0.06	0.19	0.075	0	5	12	275	151	40	1	1	1	1	100
KEMAMAN	48	0.15	3.62	0.05	0	-	-	-	-	-	48	ND	0.3	ND	1
CHUKAI	15	0.10	2.14	0.46	0	-	-	-	-	-	15	ND	0.3	ND	20
PAKA	20	0.19	4.49	0.415	0	-	-	-	-	-	20	ND	0.4	0.01	15
DUNGUN	30	0.02	1.7	0.4	0	-	-	-	-	-	30	-	0.2	ND	10
IBAI	12	0.2	3.6	1.01	0	-	-	-	-	-	12	ND	0.5	0.05	25
TERENGGANU	36	0.1	2.6	0.395	0	-	-	-	-	-	36	ND	0.5	N D	14
SETIU	8	0.12	0.43	0.345	0	-	-	-	-	-	8	ND	0.2	0.475	13
BESUT	18	0.2	4.62	0.475	0	-	-	-	-	-	18	ND	0.2	0.475	17
KEMASIN	8	0.3	1.98	0.64	0	-	-	-	-	-	8	ND	0.25	0.475	25
KELANTAN	67	0.14	1.8	0.43	0	-	-	-	-	-	67	ND	0.3	ND	1
GOLOK	12	0.2	2.62	0.575	0	-	-	-	-	-	12	ND	0.25	0.05	17

Table 5.8

East Malaysia: Nutrient Levels and Non-compliance, 1988

NAME OF RIVER	Nitrate Nitrogen (mg/l)					Sulphate (mg/l)					Phosphate (mg/l)				
	Number of Samples	Minimum	Maximum	Median	Samples Exceeding 7.0 mg/l (Per Cent	Number of Samples	Minimum	Maximum	Median	Samples Exceeding 1.0 mg/l (Per Cent)	Number of Samples	Minimum	Maximum	Median	Samples Exceeding 50.0 mg/l (Per Cent)
SARAWAK															
Btg. Kayan	24	0.05	0.90	0.15	0	-	-	-	-	-	24	ND	0.10	ND	0
Sarawak/ Samarahan	68	0.02	0.80	0.20	0	-	-	-	-	-	68	ND	0.45	0.03	13
Btg. Sadong	35	0.04	1.15	0.20	0	1	8	8	8	0	39	ND	1.00	ND	
Btg. Lupar	41	ND	0.65	0.25	0	-	-	-	-	-	47	ND	1.00	ND	2
Btg. Saribas	2	0.35	0.35	0.35	0	-	-	-	-	-	3	ND	ND	ND	0
Kerian	3	0.20	0.40	0.35	0	-	-	-	-	-	5	ND	ND	ND	0
Btg. Rajang	56	0.05	0.55	0.20	0	2	ND	0.5	0.5	0	63	ND	89.00	ND	6
Btg. Oya	6	0.15	0.55	0.30	0	-	-	-	-	-	5	ND	0.03	ND	0
Btg. Mukah	10	0.10	0.55	0.30	0	-	-	-	-	-	10	ND	ND	ND	0
Btg. Balingian	2	0.30	0.50	0.40	0	-	-	-	-	-	4	ND	0.07	ND	0
Btg. Tatau	5	0.04	0.16	0.08	0	-	-	-	-	-	5	ND	0.05	ND	0
Btg. Kemena	7	ND	0.10	0.06	0	-	-	-	-	-	4	ND	0.07	0.03	0
Simi Lajau	3	0.03	0.16	0.12	0	-	-	-	-	-	2	0.04	0.24	0.14	0
Suai	3	0.03	0.20	0.14	0	-	-	-	-	-	2	0.04	1.30	0.67	50
Niah	9	0.14	0.32	0.20	0	-	-	-	-	-	6	0.03	0.51	0.19	50
Sibuti	12	0.06	2.00	0.18	0	-	-	-	-	-	7	0.04	1.71	0.10	43
Miri/Lutong	9	0.04	0.24	0.12	0	-	-	-	-	-	3	0.03	0.05	0.03	0
Btg. Baram	6	0.10	0.40	0.14	0	-	-	-	-	-	3	ND	0.15	0.08	33
Limbang	8	0.06	0.16	0.09	0	-	-	-	-	-	4	ND	2.3	0.26	75
Btg. Trusan	2	0.12	0.28	0.20	0	-	-	-	-	-	-	-	-	-	-
Lawas	2	0.06	0.06	0.06	0	-	-	-	-	-	-	-	-	-	-
											2	0.06	0.06	0.06	0

Table 5.8 (continuation)

NAME OF RIVER	Nitrate Nitrogen (mg/l)					Sulphate (mg/l)					Phosphate (mg/l)				
	Number of Samples	Minimum	Maximum	Median	Samples Exceeding 7.0 mg/l (Per Cent	Number of Samples	Minimum	Maximum	Median	Samples Exceeding 1.0 mg/l (Per Cent)	Number of Samples	Minimum	Maximum	Median	Samples Exceeding 50.0 mg/l (Per Cent)
SABAH															
Mengalong	18	ND	1.20	0.01	0	-	-	-	-	-	3	ND	0.01	0.01	0
Padas	37	ND	0.04	ND	0	-	-	-	-	-	7	ND	0.01	ND	0
Membakut	6	ND	0.06	ND	0	-	-	-	-	-	1	ND	ND	ND	0
Kimanis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Papar	6	ND	0.08	ND	0	-	-	-	-	-	6	0.02	0.02	0.02	0
Putatan	25	ND	0.53	0.04	0	-	-	-	-	-	5	ND	1.80	0.04	40
Damit	10	ND	0.01	ND	0	-	-	-	-	-	2	ND	ND	ND	0
Kadamaian	5	ND	0.05	ND	0	-	-	-	-	-	1	0.01	0.01	0.01	0
Bingkongan	10	ND	1.20	ND	0	-	-	-	-	-	2	ND	0.03	0	-
Rakit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bengkoka	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Paitan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sugut	44	ND	0.09	ND	0	44	-	-	-	-	-	-	-	-	-
Labok	18	ND	0.02	ND	0	18	-	-	-	-	-	-	-	-	-
Kaya	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kinabatangan	10	ND	0.02	ND	0	10	-	-	-	-	-	-	-	-	-
Segama	4	ND	0.02	0	4	-	-	-	-	0.04	0.04	0.04	0	-	-
Silabukan	2	ND	0.03	0	2	-	-	-	-	-	0.05	0.05	0.05	0	
Tingkayu	3	ND	0.04	ND	0	3	-	-	-	-	-	0.01	0.01	0.01	0
Kalumpang	4	ND	0.03	0	4	-	-	-	-	-	-	-	-	-	
Tawau	8	ND	0.06	ND	0	8	-	-	-	-	-	-	-	-	-
Merotai Besar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Umas-Umas	4	ND	0.05	0	4	-	-	-	-	-	-	-	-	-	
Brantian	4	ND	0.01	0	4	-	-	-	-	-	-	-	-	-	
Kalabakan	3	ND	0.03	0.02	0	3	-	-	-	-	-	-	-	-	-

Table 5.9
Malaysia: Sampling Sites of the Coastal Beaches by State

State	Beach
Johor	Pantai Lido
	Pantai Teluk Mahkota
	Pantai Desaru
	KedahPantai Merdeka
	Pantai Kampung Temiang
	Pantai Kuah
	Pantai Pasir Hitam
	Pantai Tanjung Rhu
	Pantai Teluk Ewa
	Pantai Chenang
	Pantai Tengah
	Pantai Tanjung Lembang
	Pantai Langkawi Island Resort
Kelantan	Pantai Cinta Berahi
	Pantai Kampung Ruku
	Pantai Irama Bachok
Melaka	Pantai Tanjung Keling
	Pantai Kundur
	Pantai Tanjung Bidara
Negeri Sembilan	Pantai Port Dickson
Pahang	Pantai Kampung Tekek
	Pantai Kampung Teluk Salang
	Pantai Tioman Island Resort
	Pantai Teluk Chempedak
	Pantai Cherating
Perak	Pantai Pasir Bogak
	Pantai Teluk Batik
Pulau Pinang	Pantai Batu Feringghi
	Pantai Gertak Sanggul
	Pantai Teluk Tempoyak
	antai Miami
	SabahPantai Manis
	Pantai Dalit
	Pantai Tanjung Aru
	Pantai Lokawi
	Pantai Layang-Layangan
	Pantai Tanjung Aru, Labuan
Sarawak	Pantai Bako
Selangor	Pantai Morib
Terengganu	Pantai Bukit Keluang
	Pantai Rantau Abang
	Pantai Teluk Mengkuang
	Pantai Kampung Telipot
	Pantai Kampung Chendering
	Pantai Kampung Bukit Tengah
	Pantai Batu Burok

CHAPTER 6

POLLUTION ABATEMENT ANDCONTROL

POLLUTION ABATEMENT AND CONTROL

LEGISLATION AND CONTROL

As at 31 December 1988, the following legislations are being enforced by the Department of Environment for the control, abatement and protection of the environment:

(i) Environmental Quality Act, 1974 and the Environmental Quality (Amendment) Act, 1985;

(ii) Environmental Quality (Prescribed Premises) (Crude Palm Oil) Order, 1977;

(iii) Environmental Quality (Prescribed Premises) (Crude Palm Oil) Regulations, 1977;

(iv) Environmental Quality (Licensing) Regulations, 1977;

(v) Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Order, 1978;

(vi) Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Regulations, 1978;

(vii) Environmental Quality (Clean Air) Regulations, 1978;

(viii) Environmental Quality (Compounding of Offences) Regulations, 1978;

(ix) Environmental Quality (Sewage and Industrial Effluents) Regulations, 1979;

(x) Environmental Quality (Control of Lead Concentration in Motor Gasoline) Regulations, 1985;

(xi) Environmental Quality (Motor Vehicle Noise) Regulations, 1987;

(xii) Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order, 1987; and

(xiii) Motor Vehicle (Control of Smoke and Gas Emissions) Rules, 1977 made under the Road Traffic Ordinance, 1958.

AIR POLLUTION CONTROL

Air Pollution Sources

As in the 1988 inventories, the air emission sources have been divided into three major groups: stationary manufacturing industries , open burning practices and mobile sources. Summaries of inventories are given in Tables 6.1 and 6.2. Their distribution by the States are shown in Table 6.3. Approval for the installation of fuel burning equipment and the type of fuel used were given to 183 new installations in 1988. The breakdown of various types of equipment approved is given in Table 6.4.

Air Pollution Emission Load

Estimates of emission of Particulate, CO, NOx, SOx and HC were made based on emission factors derived from production rate, use of material, quantity and type of fuel and control equipment used. Some preliminary estimates on pollution load which were generated by various industries and mobile sources are shown in Tables 6.5, 6.6, 6.7, and 6.8. The estimate for load emission resulting from open burning practice at disposal sites is reproduced in Table 6.9.

Table 6.10, shows reported cases of open burning practised by the agricultural sectors in land -clearing for replanting.

Some wood- based industries were granted permission to carry out open burning on their premises. The distribution and loads are shown in Table 6.11 and Table 6.12.

A paper survey to identify the sources and quantity of flared gases is underway.

Abatement and Control

Manufacturing Industries

Air emission was abated and controlled under the Environmental Quality (Clean Air) Regulations 1978. Guidelines drawn up by the Department of Environment, DOE on the prevention and control of air pollution from specific industries such as the wood-based, fishmeal and palm oil industries are used by the industries concerned, as a guide in their planning and operation.

Emissions from major sources such as power stations, cement works, petroleum refineries, pulp and paper mill, fertilizer, metallurgical works and asphalt plants were under control except during plant upsets.

There were also improvement in the control of black smoke and dust from palm oil mills. Felda installed new boilers of bigger capacities equipped with high efficiency multicyclones and higher stacks in seven of its mills. Mardec also replaced the old dryers in their rubber process-

ing mills and equipped the new ones with wet scrubbers.

In general, power stations owned by the National Electricity Board, NEB performed satisfactorily and it was noted no complaint of black smoke was received.

Generally, the chemical industries encountered little problems in terms of gas and particulate discharges.At Chemical Company of Malaysia, CCM in Shah Alam plans are underway for a study to look into suitable NOX abatement technology to further control emission from its nitric acid plant. The cement industries, being a major source of particulate emissions, reportd little problem in compliance except that power supply, which is essential to operate dust control equipment especially electrostatic precipitator, encountered more interruptions than before and the supply authority had been duly alerted. Perak Hanjoong Cement Works was still a subject of public complaint.

There were increased activities in the metal industries with process alteration and dormant plants reactivated. The operations of Perwaja Terengganu Sdn. Bhd. caused serious dust problems. Change in the manufacturing process and charge cycles utilising more scrap iron have caused serious upset to existing pollution control equipment. Application from Dah Yung Steel to run its old furnace was approved on condition that an efficient dust collection system is installed. Warning has been given to the plant that its progress was not up to expectation.

Odour from cup lump storage yard in rubber processing mills especially those located nearby to residential areas, was still a concern to the Department. Solutions to the problem such as storing fresh lumps only and smaller lump stock are not yet practicable.

The National Rice Board installed and experimented on two Producer Rice Mill (PRM) energy reactors in their mills in Sekinchan and Pasir Puteh to produce carbon black and dry steam. These reactors utilised rice husk which hitherto were improperly disposed off through open burning. Dust and smoke emissions from small rice mills continued to plague residents nearby whenever the harvesting is in season. While the lack of buffer zone and improper siting are some of the roots of the problem that require the planning authorities to make quick decision on their continued presence at the existing sites, the other main concern is the absence of effort in the utilisation of the husk generated and until such practices are evolved and practised, the problem would see no solution.

Mobile Sources

Control of excessive black smoke emission from diesel powered motor vehicles under the Motor Vehicles (Control of Smoke and Gas Emission) Rules 1977 were conducted with the assistance of the traffic police.

In 1988, DOE had conducted about 440 enforcement campaigns throughout the country. A roving squad was also formed for Kuala Lumpur and Petaling Jaya area to speed up checking and avoid causing inconvenience to the general public . From these campaigns, 44,978 vehicles were tested; 7360 drivers/vehicle owners were served with summons for violating the above Rules. The overall percentage of compliance is 84 percent.

Figure 6.1. shows the breakdown for the types and number of vehicles summoned and their compliance percentage. The highest percentage of compliance is by lorries (87 percent), followed by buses (85 percent), others (vans and pick-ups)(80 percent), taxis (87 percent)and the private cars (67 percent).

In terms of numbers being summoned, the highest violator were the lorries, followed by vans and pick-ups, taxis, buses and the private cars. Table 6.13 shows the above enforcement statistics, the total number of campaigns and the amount of compounds collected. Enforcement data according to states are given in Table 6.14.

The roving squad with her operations focussed within Kuala Lumpur and Petaling Jaya areas had made its presence felt . A total of 196 were summoned through the process. The introduction of this squad has shown the public, especially for diesel vehicle drivers/owners the continued presence of enforcement and that they could be nabbed anytime if their vehicle was found to emit excessive black smoke which is posing health threat to the public.

As one of the preventive approach, DOE have carried out smokechecks to the new vehicle models at the local assembly plants. From these random checks, a total of 22 lorries, 15 vans, 14 buses and 2 pick-ups were tested. All the above models met the stipulated smoke level/standards.

The mobile sources unit of the Department has also responded to the public complaints made to the Department. The smoky vehicles complained were traced and the vehicle owners were directed to bring their vehicles to have them checked for compliance; officers also went down to the respective depots/workshops to check the stage buses. By this system, stage buses from 9 companies operating within Kuala Lumpur and Petaling Jaya were regularly tested at their own workshops.

The Department had also arranged suitable sites for the testing of other types or individual motor vehicles including taxis (11 tested with 4 failures), lorries (12 tested, 3 failed), mini buses (8 tested, 1 failed) and vans/pick-up (8

tested with 1 failure). All failed vehicles were subsequently rectified to meet emission standards.

Lead samplings of petrol were also regularly conducted to monitor the content of lead level. In 1988, a total of 87 samples of both premium and regular grade petrol from all petrol manufactures/suppliers in Malaysia were taken for analysis. Of the 87 samples, 50 were taken from oil refineries and storage depots, while the remaining 37 samples were from the petrol kiosks selected at random. The results from the analyses show that all samples met the stipulated standard of 0.4 grams/litre.

Motor Vehicle Noise

A two-tier ed compliance check was introduced. At the manufacturing/assembly plant, compliance test was carried out for the model, this was followed by the random sample test for the vehicles assembled and before offered for sale. Kerbside compliance test at user level was performed to check operational maintenance. In the year of review, enforcement for 2- wheelers was carried out at both levels while for 4 -wheelers (and above), tests were mostly restricted to type/random test level as a result of test site suitability consideration.

For motorcycles (2 or 3- wheelers), 12 models from the four manufacturers/assemblers were type-tested and all reported compliance with the stipulated noise limits.

For other motor vehicles (4 -wheelers and above), 13 models of passenger car were tested with full compliance. For light commercial vehicles such as vans, trucks, compliance was generally satisfactory. However, for heavy vehicles such as lorries, 50% of the models were unable to comply fully. Representations had been received from some manufacturers and assemblers that there were certain constraints attributable to local construction rules. Modification and verification are currently being carried out.

After a series of awareness campaigns conducted at most major towns throughout the country, the enforcement of the Environmental Quality (Motor Vehicle Noise) Regulations 1987 was officially commenced on 1 January 1988. Enforcement was carried out by DOE officers with the continued cooperation of the Traffic Police.

For the 2 wheelers category (motorcycles), 52 campaigns were conducted for kerb side testing, out of which 26 were for awareness purposes while the others were enforcement campaigns. From the awareness campaigns, 587 motorcycles were tested; 446 complied while 141 failed the test. While from the enforcement campaigns, 684 motorcycles were tested with 488 passes while 196 failed to comply and penalty was imposed accordingly. The overall percentage of compliance from the above campaigns was about 74%

WATER POLLUTION CONTROL

Water Pollution Sources

The Department conducted an assessment for the existing water pollution sources in 1988. The assessment covers 23 major river basins and an island, selected based on their rapid state of development and also the fact they accomodate the major population centres.

Distribution of Pollution Sources

The distribution of population and economic activities greatly influence the distribution pattern of the water polution sources in the country. The West Coast of Peninsular Malaysia being the most developed area has the highest concentration of sources. This area has the largest number of agro-based industries (66 percent) and this is followed by the East Coast with 30 percent and the rest are at Sabah and Sarawak. Similar distribution pattern has been observed for the manufacturing sector with 86 percent on the West Coast of Peninsular Malaysia, 8 percent on the East Coast, and 4 percent at Sabah and Sarawak. Table 6.15 indicates the industries among the main river basins and this include both the agro-based and the other manufacturing sectors.

There are numerous small-scale pig farms. At present there are about 6,000 farms. However only 291 have been identified as having standing pig population (SPP) above 1,000. It has been estimated that these farms accounted for more the 50 percent of the total SPP. In terms of their distribution 82 percent of them are located on the West Coast of Peninsular Malaysia, 16 percent on the East Coast and only 2 percent in Sabah and Sarawak.

Another major source of water pollution is the organic wasteload discharges from urban areas. There are 13 cities with a population greater than 100,000 persons and 10 others within the population range of 50,000 to 100,000 persons (Table 6.16).

Pollution Load

As a whole , the total wasteload discharge is more prominent on the West Coast Of Peninsular Malaysia. This is indicated by Table 6.17.

Organic Load

The organic wasteload (BOD) for the areas being assessed amounts to 136,000 tonnes in 1988 and the load comprise 69 percent sewage, 23 percent livestock effluent, 5 percent discharges from manufacturing industries and 2 percent from both palm oil and the rubber processing industries.

On the distribution pattern, the discharges of organic load occur largely in places on the West Coast which comprise 66 percent, followed by places in the East Coast with 22 percent and the remainder in Sabah and Sarawak. In terms of the ratio of the organic wasteload (BOD) to basin area, The Klang River is already overloaded. In this respect there are a, number of other rivers which need more attention. These are the Skudai River, Perai/Juru Rivers, Linggi River, Langat River, Muar River and Perak River (Figure 6.2).

Siltation and Soil Erosion

Like most developing countries especially those in the tropical region, Malaysia experiences problem of excessive soil erosion result in siltation and high suspended solids content in rivers. The sources are logging,agriculture activities, earthworks and mining. The affected rivers arranged according to decending magnitude of sediment transport are Rajang, Kelantan, Perak, Langat, Pahang and Kedah.

Heavy Metals

The contributors of heavy metals to the watercourses in the country are the electroplating works, the semiconductor industries and to a certain extent the discarges from the rubber-based industries which in the recent years have been fast growing due to the high demand in the world market. In terms of the distribution of the heavy metals contributor, most of the sources are on the West coast itself. The main basins involved are Klang River, Linggi, Melaka and Penang (Table 6.18).

Problem Areas

Over the years, with the control imposed on the major industrial sources the load discharge attributable to industrial sources into the water cources have reduced significantly. Table 6.19 shows the discharged loads (BOD) from the main polluting sectors. To this end, sewage and animal wastes remain to be the major contributor of the organic waste load. Figure 6.3 - 6.7 illustrate the distribution of BOD load by the various Sectors as compared to the BOD index of the river water while Figure 6.8 and 6.9 show the distribution of nitrogen as compared to the ammoniacal nitrogen index for the same rivers, for sewage and animal waste.

Abatement and Control

Palm Oil Industries

A total of 247 mills processing crude palm oil was licensed under the Environmental Quality Act, 1974. Although the method of renewal was the same as the previous years, there were still cases of late application after the stipulated period month of March. Penalty was accordingly imposed and the fees collected amounted to $ 11,368.50 (Table 6.20). As compared to last year, there was a 91% increase in the charges collected under Section 13 of the Act. The increase in the number of late application had created various problems especially in ensuring issue of licence before the expiry date. Such practices, other than creating difficulty for the mill itself, also increase administrative work loads, e.g. additional visits that have to be carried out by the Regional Offices to certify whether or not the mill is in operation. It would appear that the late fees imposed are mere pittance which some mills willingly paid up rather than apply early. In future, mills which apply late will be required to suspend operation until licence is finally processed.

At the Departmental level, collection procedures for effluent related fees were reviewed and further streamlined to expedite early payment. The Prescribed Premises Unit also took over preparation of licence to increase productivity.

A total of 5 mills were given approval to increase their processing capacity after they had satisfied the Department on increased effluent handling capacity, 3 mills were required to extend their effluent disposal sites and 5 others had their points of discharge reviewed and varied to accomodate for land application or upgrading of the treatment system.

In 1988 itself, the Tripartite Consultative Committe (TCC) (comprising of the Department of Environment, Malaysian Oil Palm Growers Council and Malaysian Rubber Producers Council with representatives from Rubber Research Institute of Malaysia and Palm Oil Research Institute of Malaysia) recognized that the land application of effluent as a valuable resource would provide organic fertilizer for crops such as oil palm, rubber, cocoa and pasture. In line with Department of Environment's strong stand on waste utilization, a joint working committee comprised of the above organisations drew up a set of Guidelines for Land-Application of Effluents. These guidelines incorporate the principles of land application of effluent, the procedural and monitoring requirement for such practices, and approved practices and definitions on what constitute effluents utilisation as opposed to mere disposal on land. While the land application of such effluents is expected to save millions in fertilizer bills, the industries also argued that fees charged under the Environmental Quality Act 1974 were high when compared to watercourse discharge. Two mills had successfully applied to use treated effluent. It is anticipated that more applications of this kind will be forwarded to the Department for approval.

With the improved atmosphere for cooperation, the Consultative Committe agreed to look into problems on

additional control parameters, Nitrogen Levels in Treated Latex Concentrate Effluent and Control of Air Pollution from the natural rubber processing factories.

Analysis on performance record of the palm oil industry suggests that there was increased trend towards increased violation. This could be attributed to the rising price and demand for palm oil. In some instances, improper management of the treatment system and disposal site as well as overfeeding the boilers had occurred. Over the year itself, 24 cases of complaints were received of which 13 were from water pollution problem and 11 due to air pollution (Table 6.21).

Rubber Industries

In 1988, 209 licenses were issued under the Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Regulation, 1978 compared to 206 in 1987. The increase in the number of factories was due to the operation of 3 new latex concentrate plants. There was no case of application for renewal after expiry of licence. However late applications after the stipulated period of month of December still occurred and penalty under Section 13 of the Act reduced by 29% from $ 7124.19 in 1987 to $ 5120.00 in 1988 (Table 6.20). A total of 10 SMR and conventional grade factories were given approval to process latex concentrate due to the high demand for the product especially from the rubber based manufacturing industries. 4 factories were also given approval to utilise effluent as an organic fertilizer as outlined under the heading "Palm Oil Industries".

However with the rapid increase in rubber-based manufacturing industries, particularly of glove factories, illegal practices, ignorance and insufficient supervision by the relevant authority had led to the contamination of technically specified rubber by vulcanised rubber (VR).

In this regard, the control of flow of such wastes could not be over-emphasized. Unfortunately, in its haste to seek a solution, the Malaysian Rubber Exchange and Licensing Board (MRELB) had unilaterally directed all wastes to be burnt as a means of disposal. The Department of Environment, while expressing its serious concerns on the potential dangers of voluminious hydrocarbon particle release, odour problems and SOx discharges by factories carrying out haphazard and indiscriminate burning, had alerted the Board on the needs for long-term solution in minimising wastes and reutilization. It has stressed to the Board that for the protection of public health, if open burning could not be avoided, then such burning must be carried out in a controlled manner and at selected sites only. It had assured all parties concerned of its shared concern for the protection of the SMR industries and would provide every assistance in its power to do so.

Generally, performance record for the raw natural rubber industries also showed trend of increased noncompliance. The number of complaint cases increased over the year and mainly concerned malodour. This was attributable to the increase in the product as well in the number of latex concentrate factories in operation. This has resulted overloading as the treatment system available was not designed appropriately to cater for the increase in effluent discharge.

Manufacturing Industries

Manufacturing industries, other than the prescribed premises, are regulated under the Environmental Quality (Sewage and Industrial Effluents) Regulations 1979.

With the improvement of the economy of the country many manufacturing industries recovered from the recession and consequently there were increased production activities resulting in increased effluent discharges.

The rubber-based industry continued to mushroom as demands for rubber gloves and condoms increased. The DOE continued to promote development of appropriate effluent treatment systems to reduce zinc and COD loads. It was however noted that some premises abused the accomodating stand of the DOE of this indigenous raw material based industry. This had hampered the progress of treatment technology development. Inadequate reference to the DOE prior to project approval also led to substandard operational discharge. It was noted that the standard of discharge was comparatively more stringent than for the raw rubber processing mills.

The discharges of produced water from platforms offshore of Terengganu were being more closely monitored. Efforts are underway by operators to further improve quality of such discharges. All crude oil terminals have also now complied.

The coconut-based product industry is a new emerging industry. Its effluent has a high BOD and Oil and Grease content. Efforts towards developing affordable and suitable treatment technology is very lacking from the industries. Every assistance is being rendered by the DOE to enable staggered compliance and one company S & P Coconut had reported some progress. Advice is still being given to the others.

Following the DOE's directive to comply with the discharge standards, majority of the palm oil refineries have responded. The progress of others are being closely monitored.

The lack of space in the old premises continue to plague the food and beverages industry in their effort to

install effluent treatment systems. In some cases, the slow process in obtaining local authority's approval to start construction have held back effluent treatment system projects. The DOE has alerted the planning authority concerned that such delay would give excuses for non-compliance and deterioration of water quality in the locality concerned and affected the beneficial uses of its river system.

Some local authorities such as Kuala Lumpur Seberang Prai and Shah Alam Municipal Council have agreed to DOE's proposal to accept pretreated industrial effluent into their central treatment systems. Progress in physical work is however, very slow.

Marine Pollution Control

Oil Spill Incident

In 1988, 29 cases of oil spills were reported, 10 of which were in Johore Bahru, Kuantan, Pelabuhan Kelang, and Penang Ports, 12 in South China Sea areas, 5 in the Straits of Malacca, and the remaining were in areas of the Straits of Singapore (which affected Malaysian waters). A cleaning cost of $53,675.99 was recovered mostly for cleaning the spills in ports areas. Table 6.22 shows the occurance and expenditures incurred and Table 6.23 shows the nature of spill attributable. There was no case involving legal actions against the spillers.

Various steps have been taken to strenghten the marine pollution enforcement programmes, particularly for oil pollution. An Enforcement Work Manual has been prepared and training for the officers from the marine related agencies on proper procedures for carrying out oil pollution enforcement work has been conducted. Meanwhile in order to assist marine pollution control team to systematically record all the activities including the equipment utilised, the cost involved related to oil spill clean-up work, cost analysis and daily work report forms were prepared. These forms were distributed to the marine related agencies.

Oil Spill Response Planning

The South China Sea Contingency Plan for combatting oil spills comprising of five sub-plans has been reviewed and reconstructed to cover the areas of East Coast of Peninsular Malaysia, East of Johore, Sarawak and Sabah. Cooperative response plan in Brunei Bay is being examined. Effort to integrate the South China Sea Contingency Plan and the Straits of Malacca Contingency Plan to form a national plan is in progress. This national plan which would be based on the concept of tiered system would be finalised in 1989. Survey on the state of readiness at local level particularly the oil terminals/depots to response to an oil spill has been completed. The result of the survey conducted on this aspect revealed that whilst most of the oil terminals/depots have their own emergency response plans, some inadequacy has been identified. On the other hand many of the port authourities were totally lacking in terms of preparedness and equipment. Steps are being taken to alert them on the needs of having their own contingency plans and also to posses adequate oil spill response capabilities.

Meanwhile regular updating of the Marine Pollution Communication and Response Procedures was carried out during the year and some of the significant changes include the availability of the side looking air-borne radar (SLAR) at the Department of Civil Aviation for the detection of oil spills, and the role of the Maritime Enforcement Coordination Centre as the coordinator for any request made on the use of the armed forces vehicles, aircraft, and vessels in combatting oil spills. The information and data on the coastal resources sensitive to oil spill was also updated with the help of the Fisheries Department. In this respect effort has been made to compile the monetary values/costs of the sensitive areas identified.

The guidelines on the use of the dispersants for combatting oil spills has been formalised and accepted by the National Oil Spill Response Committee. As a guide, Table 6.24 is the provisional list of approved dispersants for use in Malaysia. So far little progress was made on the research aspect of the effectiveness testing of the dispersants. To overcome this, procedure for dispersant evaluation is being prepared giving consideration to work done in Asean region.

Specifications for the oil booms and skimmers have been finalised by the Technical Committee drawing expertise from the Marine Department. Tender has been awarded and the equipment was expected to arrive in the late December/early 1989. With the purchase of these new oil booms and skimmers the capability of the Department in combatting oil spill will be enhanced. In relation to this, storage facilities for the booms and skimmers in Port Klang and Johor Bahru being prepared with cooperation from the Marine Department.

Recommendation by the sub-committee on Communication on improving the Department's communication capability is being realised with the establishment of the Communication Centre. Installation of communication equipment is underway and expected to be completed by end of the year or early 1989. The Centre is also expected to complement operational capabilities of other operation centres at Petronas, Marine Department and Maritime Enforcement Coordination Centre. With the setting up of the Communication Centre, the Department should be able to communicate with all vessels and other marine related

agencies. Hence, there would be quick disseminaation of information during time of emergency.

Contravention Licence

In cases of non-compliance to acceptable conditions of discharge of wastes into the atmosphere or effluent into inland waters, contravention, with valid reasons, is allowed under Section 22(1) and Section 25(1) of the Environmental Quality Act 1974.

In 1988, 74 applications were received and processed under Section 22(1) of the Act, to contravene the acceptable conditions of emission or discharge of any waste into the atmosphere as provided for in the Environmental Quality (Clean Air) Regulations 1978. There was an increase of 32 percent in the number of applications received as compared to 56 applications received in 1987. The breakdown for the applications according to types of industries and types of contravention required are as shown in Table 6.25 and 6.26. Applications for contravention licence were received mainly from the wood-based industries where contravention was required for the disposal of woodwastes either by open burning practices or by burning in incinerators which were of non-approved design. Disposal of wastes remained a major problem for the wood-based industries as well as the rice mills which generated large quantities of wastes that remained largely unutilised. Applications for licence for open burning were also received from the rubber-based industry, especially the rubber glove manufacturing industry, which had been directed by the rubber licensing authorities to burn off vulcanised rubber wastes to prevent SMR contamination due to resale of these wastes as rubber cuplumps by unscrupulous persons. However, licences for contravention were approved to genuine cases only where there were no other alternatives or where contravention would not pose a serious pollution problem. Contravention was also allowed in view of efforts carried out to utilise or recycle the wastes, in the case of wood-based industries and rice mills,wastes were utilised as a source of heat for drying purposes and in the case of rubber-based industry, recyling of wastes into other products.

For the contravention of acceptable conditions of effluent discharge under Section 25(1) of the Act and as specified in the Environmental Quality (Sewage and Industrial Effluents) Regulations 1979, 75 applications were received and processed in 1988 as compared to 81 in 1987. Applications were received from the various industries but the majority came from the food and beverage industries, which were established before the Regulations came into force and thus had no provision for land to set up effluent treatment systems. The breakdown of the number of applications according to type of industries and justifications are as shown in Table 6.27 and Table 6.28. In 1988, a number of applications were also received from the rubber-based industry, which had mushroomed almost overnight to meet the increased world demands for rubber-related products, such as examination gloves and condoms. These industries, anxious to get a share of the world market, went speedily into production with inadequate/no provision for pollution control systems. The accelerated approval for the setting up of these industries by MIDA and the local authorities without adequate provisions for pollution control systems left the Department of Environment little choice but to allow for contravention in order "to enable production and construction of effluent treatment systems to progress in parallel". Licences for contravention under Section 25(1) of the Act were mainly issued to enable the industries to set up or upgrade effluent treatment system or in some cases to allow the industries to make preparations for connection to the central sewerage treatment plants operated by the local authorities. The licences approved were issued with strict imposition of effluent related fees as provided for under Regulation 22(1), Environmental Quality (Sewage and Industrial Effluents) Regulations 1979. Therefore the industries with effluent treatment systems have to pay for the discharges. The issue of licences was monitored closely by the Department whereby certain industries with no treatment systems, during the licensing period had increased the quantity of effluent discharged with no due regards to the increase in pollutant loads. Such actions were viewed seriously and the industries were warned to comply with the conditions of the licences, and failure to comply would result in the licences being revoked.

Enforcement

Enforcement Programme Coordination

Industrial sources were recategorised after evaluating the latest enforcement and monitoring data with a view of identifying enforcement priority. The schedules of visits were also revised to be more cost effective. These have resulted in an increase in the number of sources visited by twelve percent over the number in 1987, to 3574 cources.

Legal Action

Upon detection of violation or non-compliance of the Environmental Quality Act, 1974/ (Amendment), 1985, warning letters and advices are given, specific order may also be issued. Repeated violation, gross negligence cases may warrant imposition of fines/compounds. Normally prosecution in court is reserved as a last resort.

Offers of compound were applicable only for cases under the Environmental Quality (Clean Air) Regulations, 1978.

In 1988, a total of 28 cases were prosecuted and a fine of $48,850 was collected. Analysis of DOE's records indicate the majority of cases prosecuted in court were the food and wood-based industries. A number of the food industries were unable to meet the required discharge standards mainly due to improper maintenance of existing treatment plants and gross negligence in the operation of the treatment plants. As for the wood-based industries, open burning of wood wastes and the installation of fuel-burning equipment/chimney without approval as required under the Environmental Quality (Clean Air) Regulations, 1978 were the main offences committed. There were still the industries pleading ignorance to the said Regulations. The increase in the number of cases of violation from the wood-based industries could be attributed to the increased production activities, as a result of improved demand, and coupled with irresponsible attitude in seeking the easiest way to dispose the wastes in order to cut costs and maximise profits.

A total of 87 compounds were issued and a sum of $33,000 was collected. The wood-based industries continued to be the highest sector to be fined. Records also indicate that there are indeed industries that faced problems in disposing of wastes due to a number of reasons such as distance to disposal sites, absence of local R & D support to recycle wastes generated. The breakdown of compounds offered and prosecutions in courts are as shown in Tables 6.29, 6.30, 6.31 and 6.32.

Public Complaints

The Department of Environment received a total of 536 complaints with respect to alleged environment pollution in 1988. It was the highest recorded over the past six years (Figure 6.10). Analysis of the complaints received showed that majority of the complaints was received from the state of Selangor followed by Kuala lumpur Federal Territory, Perak and Kedah. The detailed breakdown of complaints received by state is shown in Figure 6.11.

As in previous years, complaints of air pollution which also included noise accounted for a major part of the pollution complaint received (Figure 6.11). Complaint on the dust particulate were still the highest and constitute 33 percent of the total air pollution complaints (Table 6.33). In term of air pollution sources complained against wood based industries remained the highest, however the number has declined compared to 1987. Other significant sources consist of metallurgical work, chemical industries, rice mills and quarries as shown in Table 6.34.

In respect of water pollution complaints, the most complaints (16) originated from Selangor Darul Ehsan. Complaints were also received from Perak (14), Kedah (12), Negeri Sembilan (7) and Johor 6 (Figure 6.12). Analysis showed that other industries and other non-industries sources were also major contributors to water pollution complaints besides the palm Oil mills and rubber Mills (Figure 6.13).

Analysis on the complaints received showed that the nature, types and sources of alleged pollution were fairly similar to those of previous years. With the more systematic and coordinated inspection regularly carried out by the respective Regional Officers, there is no evidence to suggest the increase of number of complaints was due to serious shortcoming in law enforcement. The following are the possible contribution:

(i) The general public, the Public Complaint Bureau and thelocal authorities are more aware of the Department of Environments function, capability, and effectiveness in dealing with pollution problems;

(ii) The general public are now more environmentally educated and aware of their right; and

(iii) The recovery in economy led to increased activities which constrasted greatly to previous lulls.

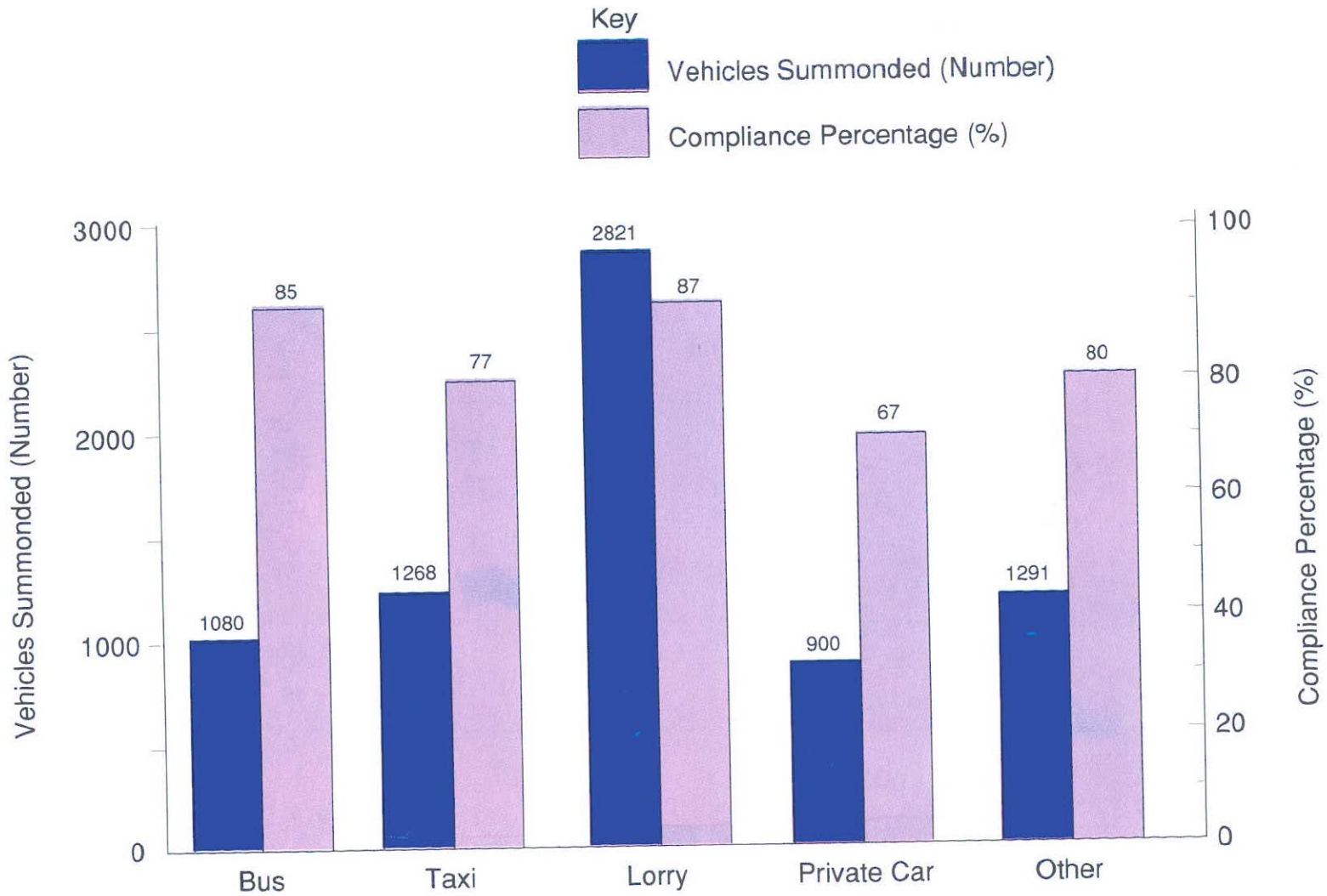


Figure 6. 1. Malaysia: Enforcement of Motor Vehicles (Control of Smoke and Gas Emission According to type of Vehicles-1988

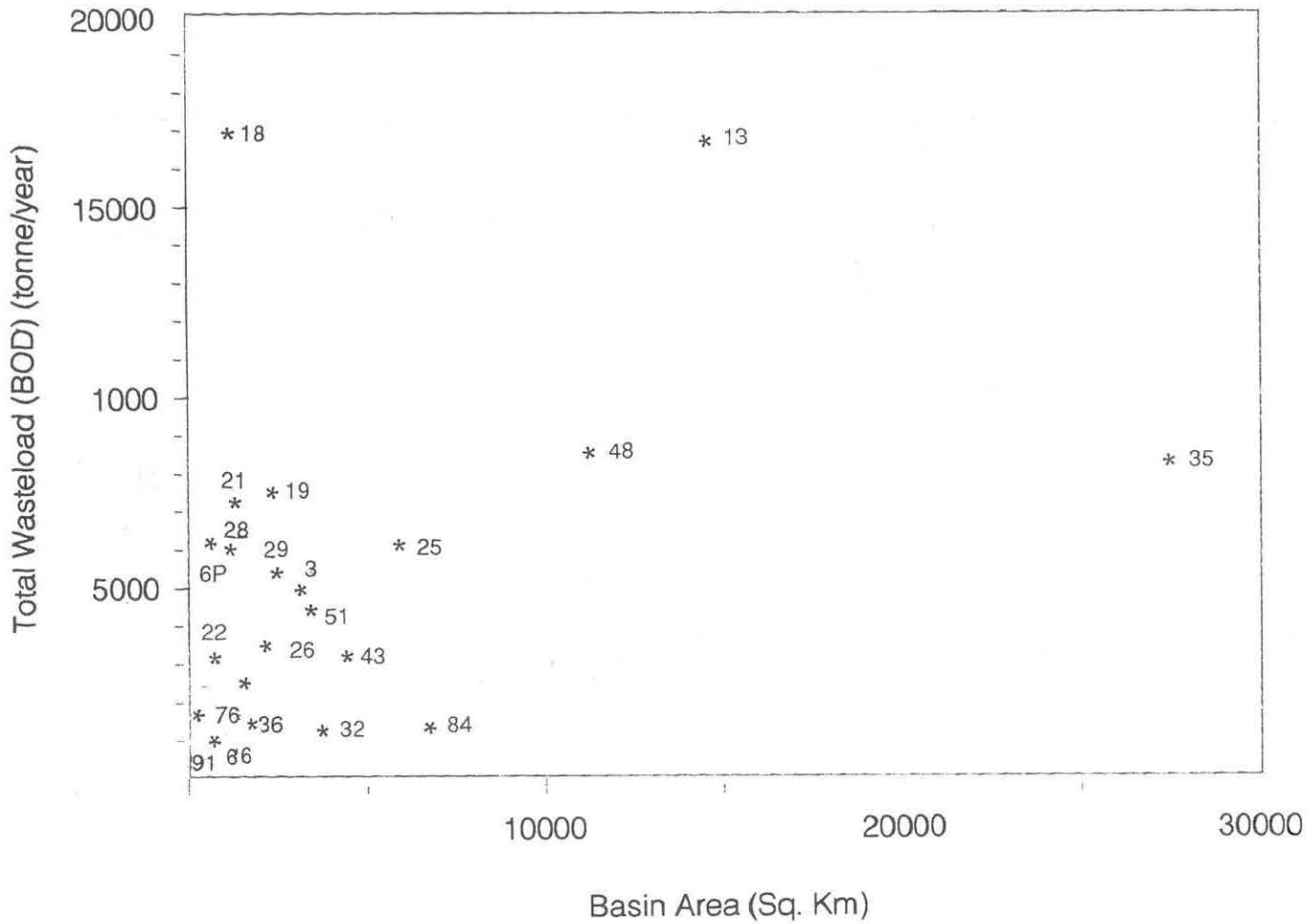


Figure 6.2. Malaysia: Distribution of Total Wasteload (BOD) in Selected River Basins, 1988.

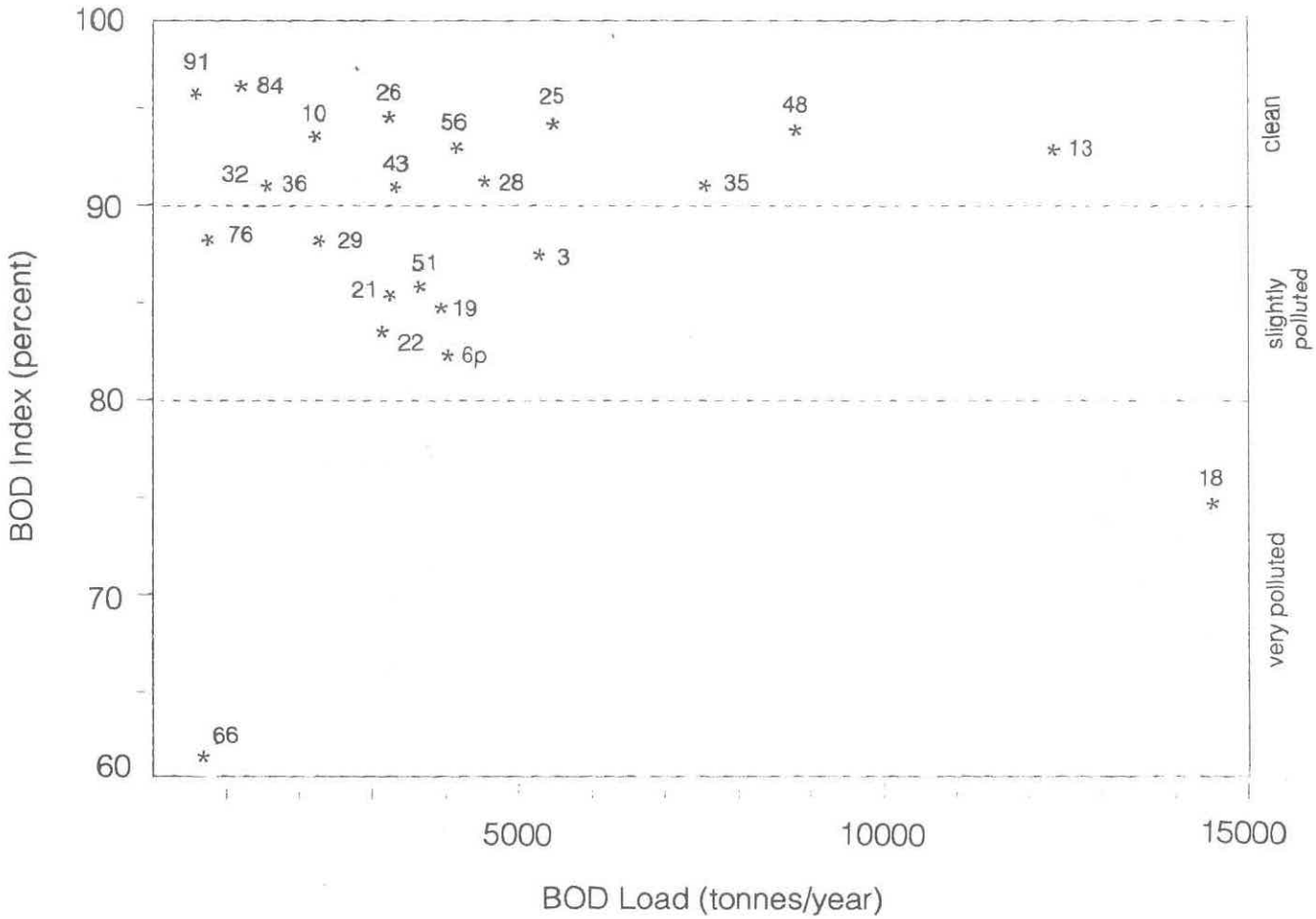


Figure 6.3. Malaysia: Wasteload (BOD) From Sewage Disposal in Selected River Basins, 1988.

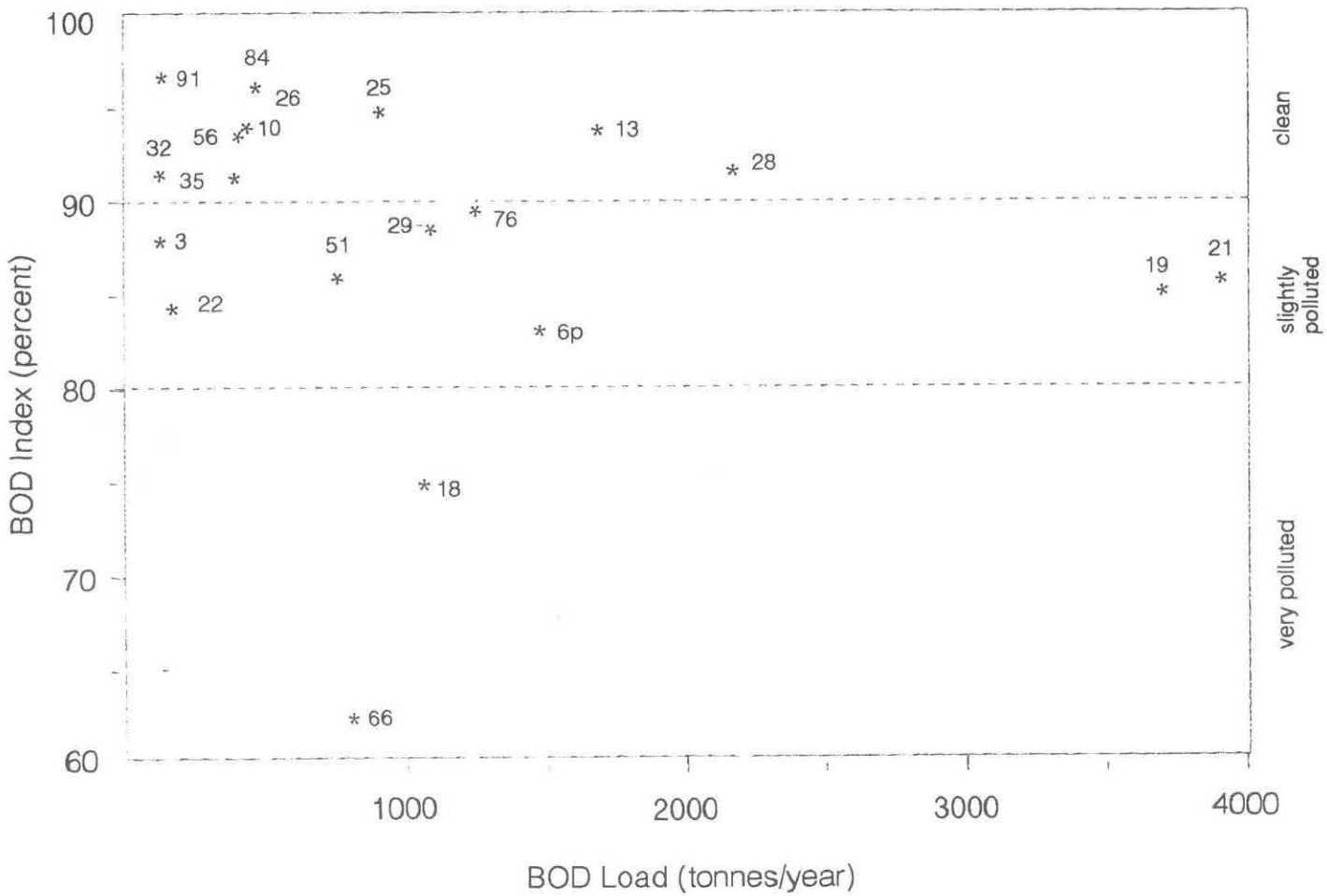


Figure 6.4. Malaysia: Wastedload (BOD) From Animal Husbandry in Selected River Basins, 1988.

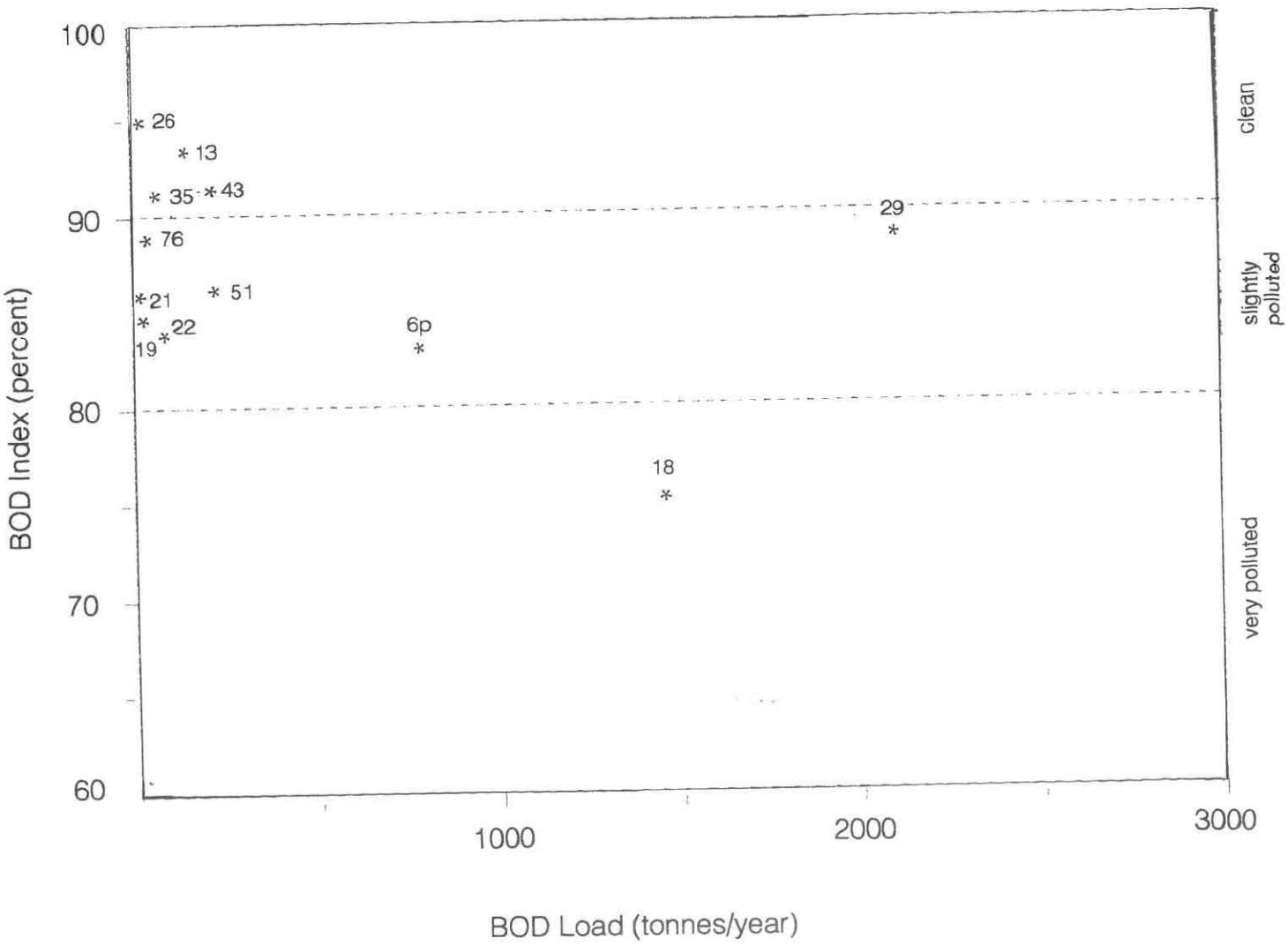


Figure 6.5. Malaysia: Wasteload (BOD) From Manufacturing in Selected River Basins, 1988.

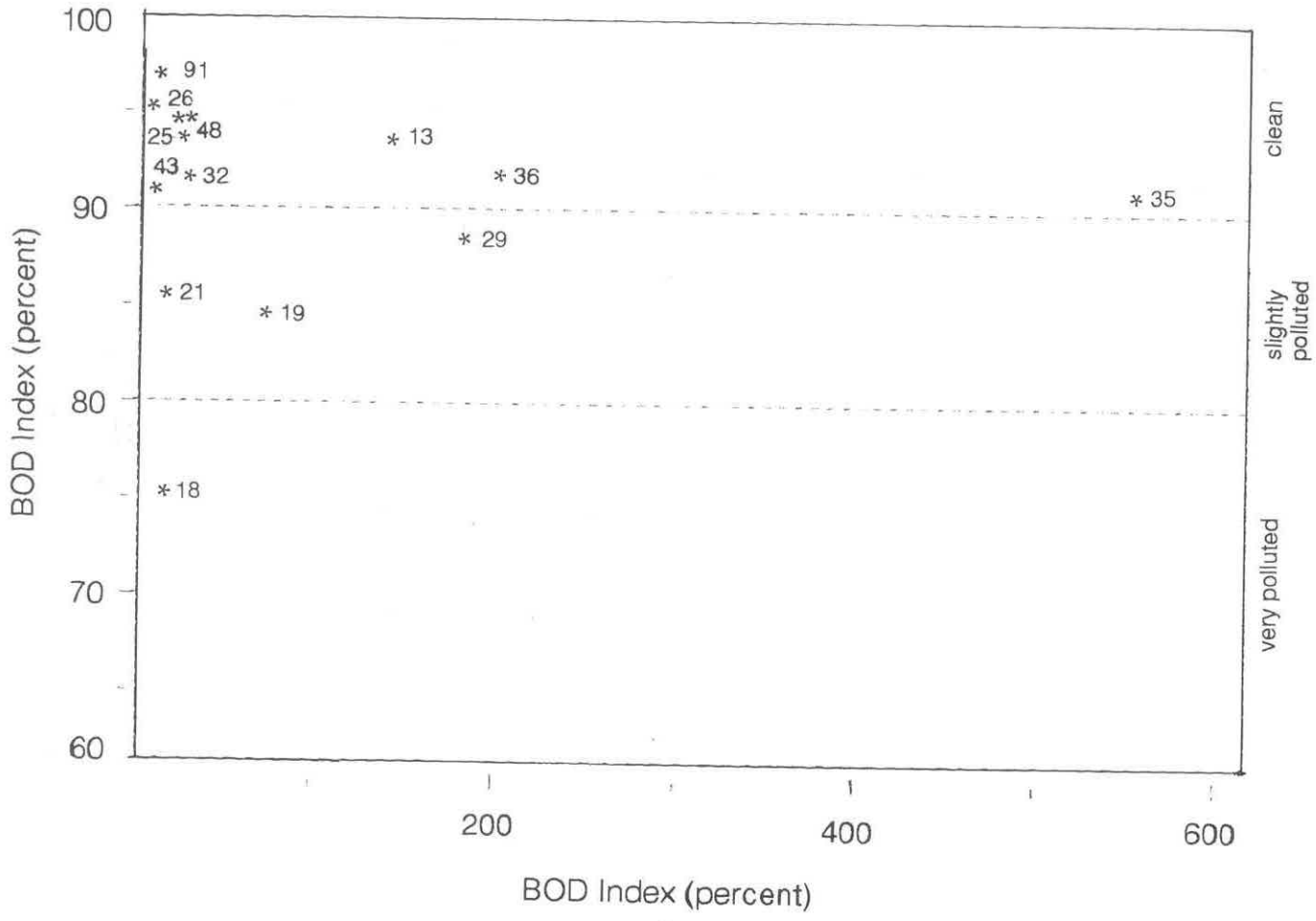


Figure 6.6. Malaysia: Wasteload (BOD) From Palm Oil Mills in Selected River Basins, 1988.

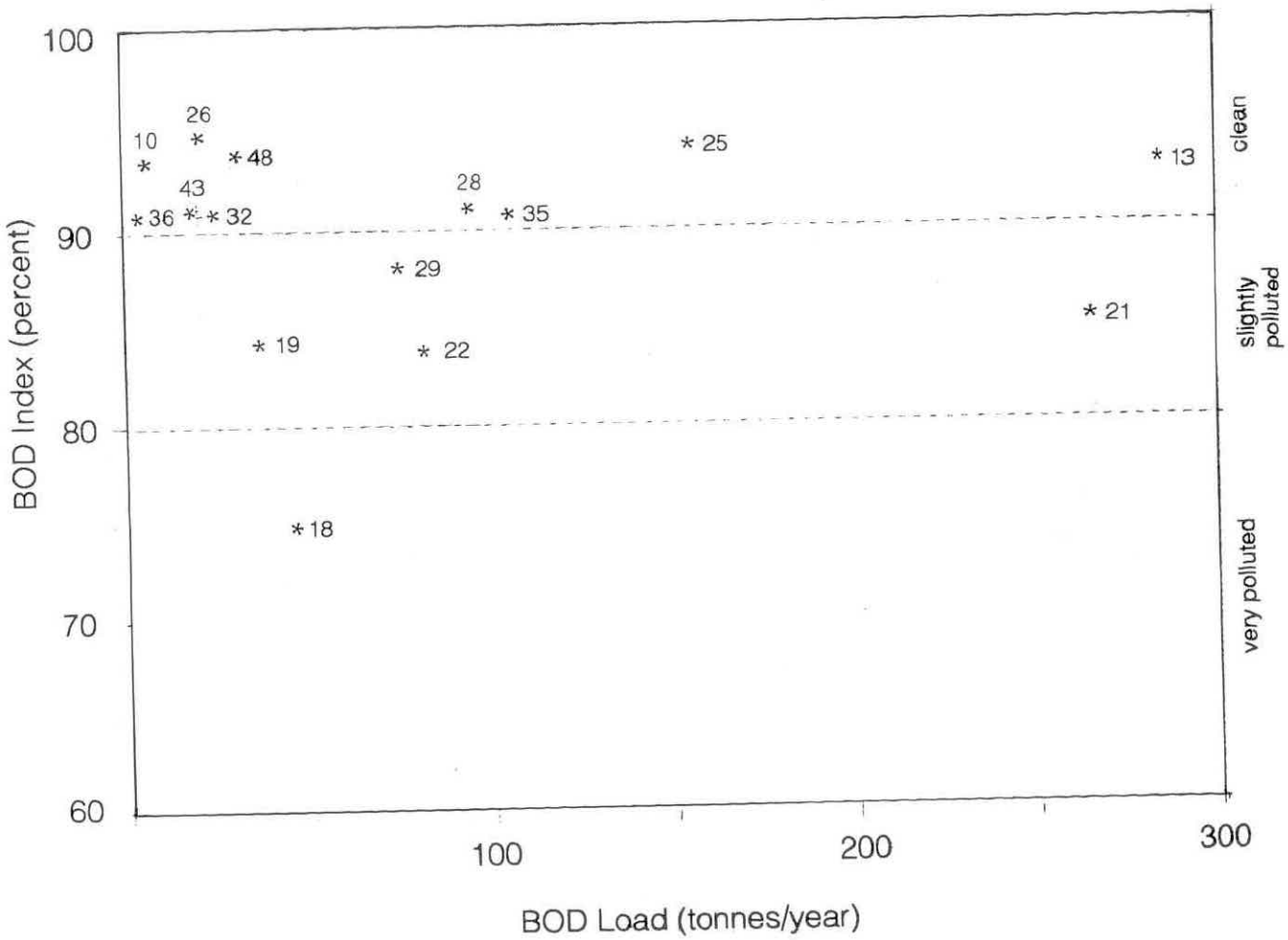


Figure 6.7. Malaysia: Wasteload (BOD) From Rubber Mills in Selected River Basins, 1988.

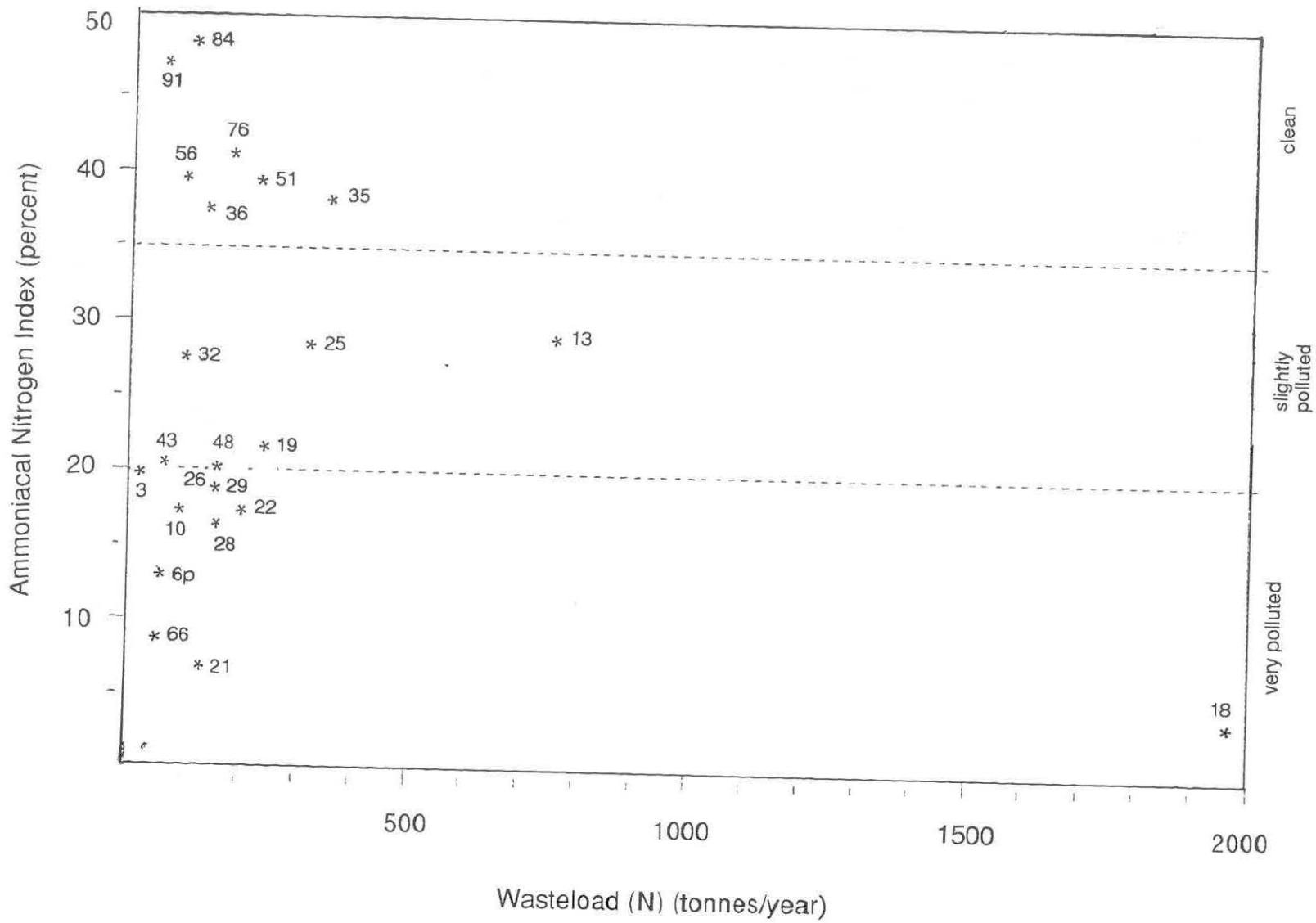


Figure 6.8. Malaysia: Wasteload (N0) From Sewage Disposal

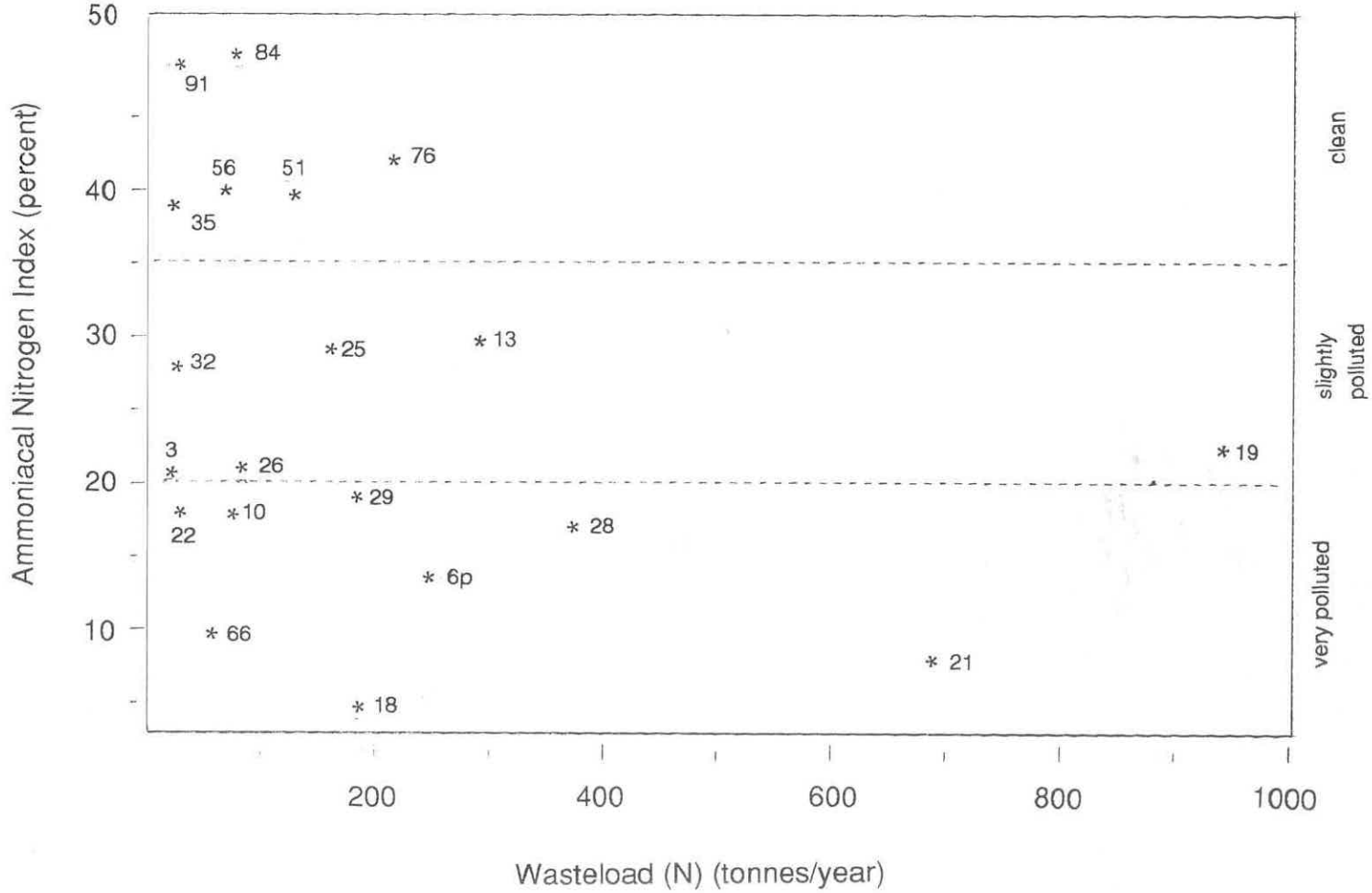


Figure 6.9. Malaysia: Wasteload (N) From Animal Husbandry in Selected River Basins, 1988.

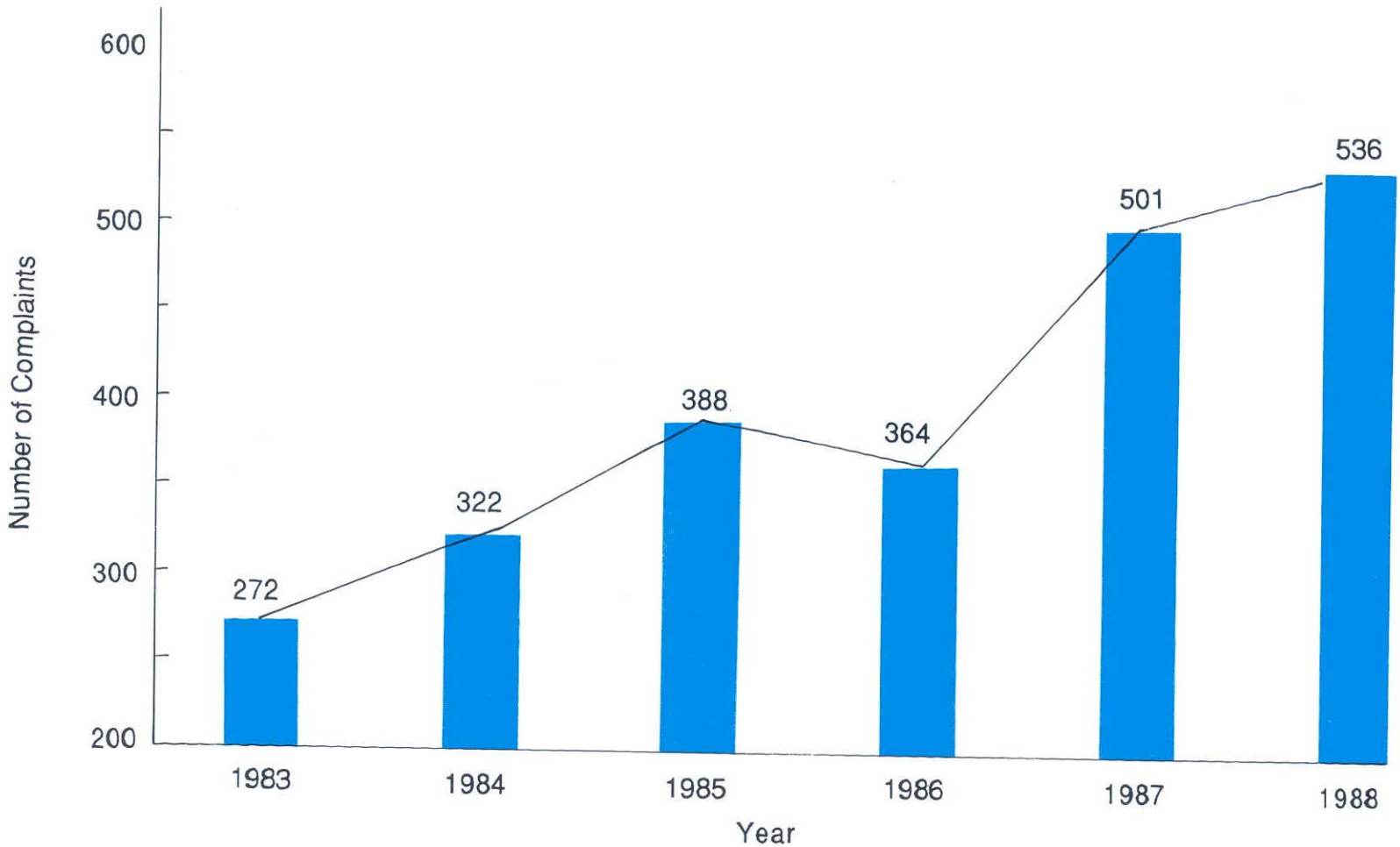


Figure 6. 10. Malaysia: Trend in the Total Number of Complaints Received by the Department of environment, 1983-1988

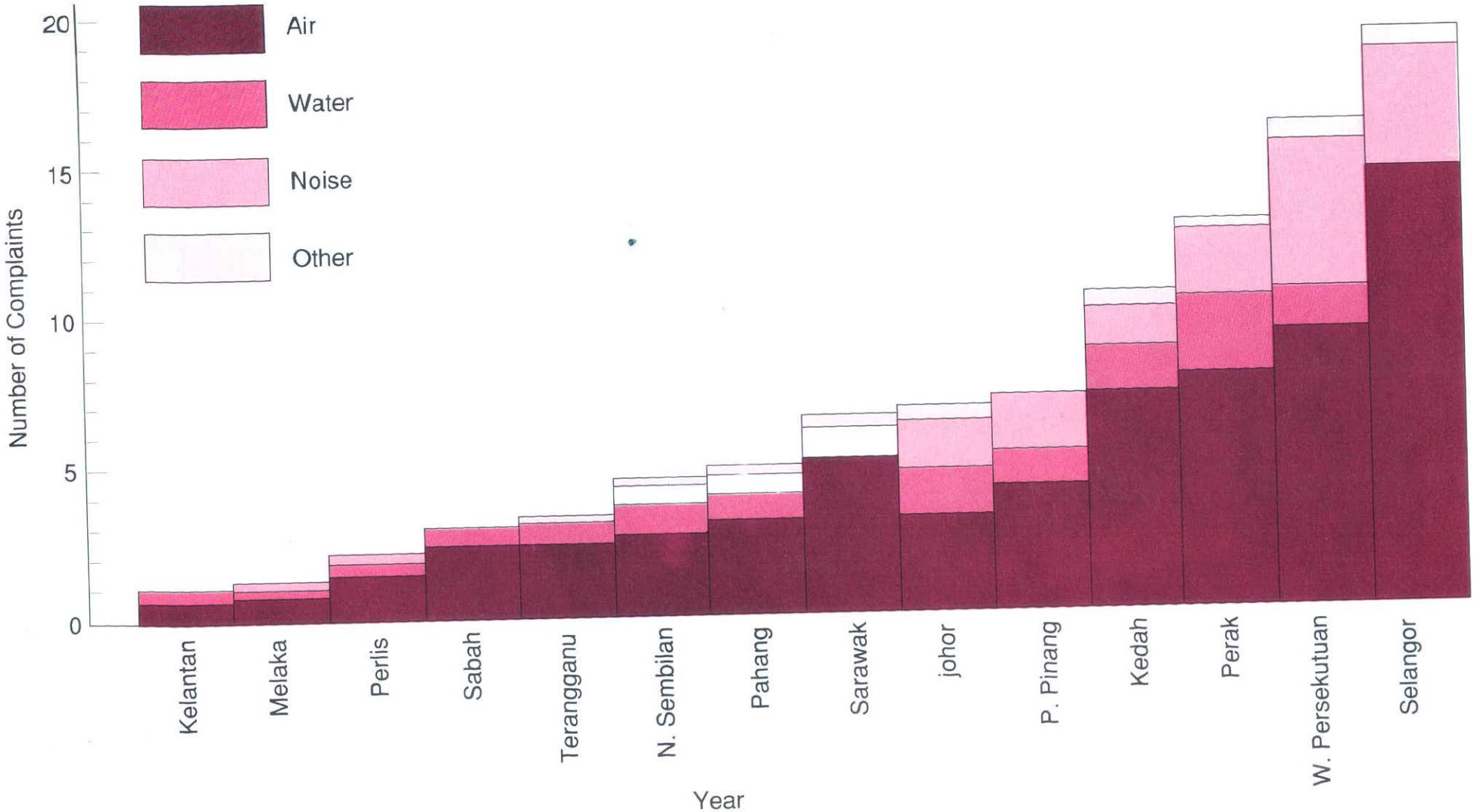


Figure 6.11. Malaysia: Nature Of Pollution Complaints Received By The Department Of Environment, 1988

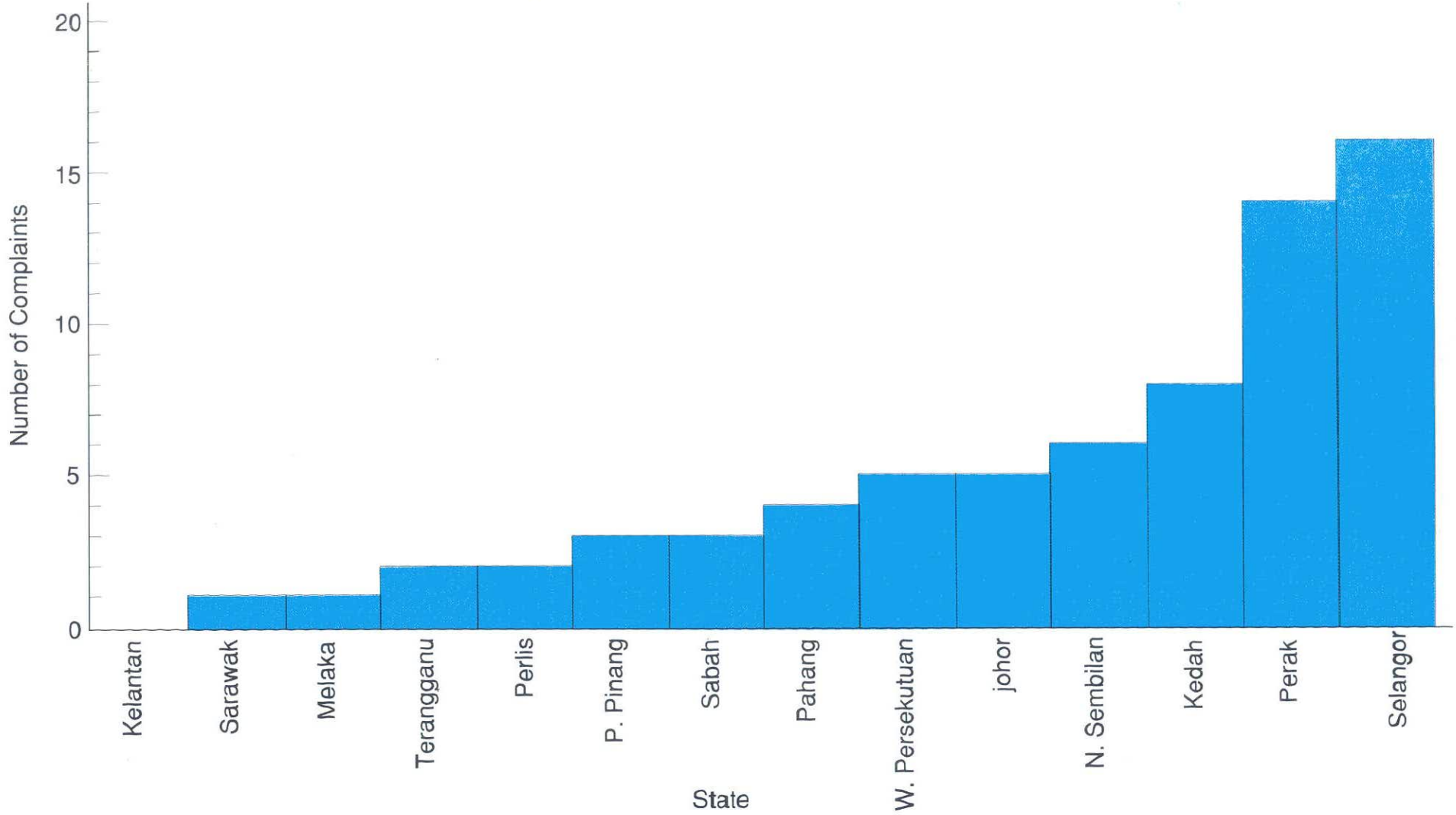


Figure 6.12. Malaysia: Number of Waste Pollution Complaints Received By State, 1988

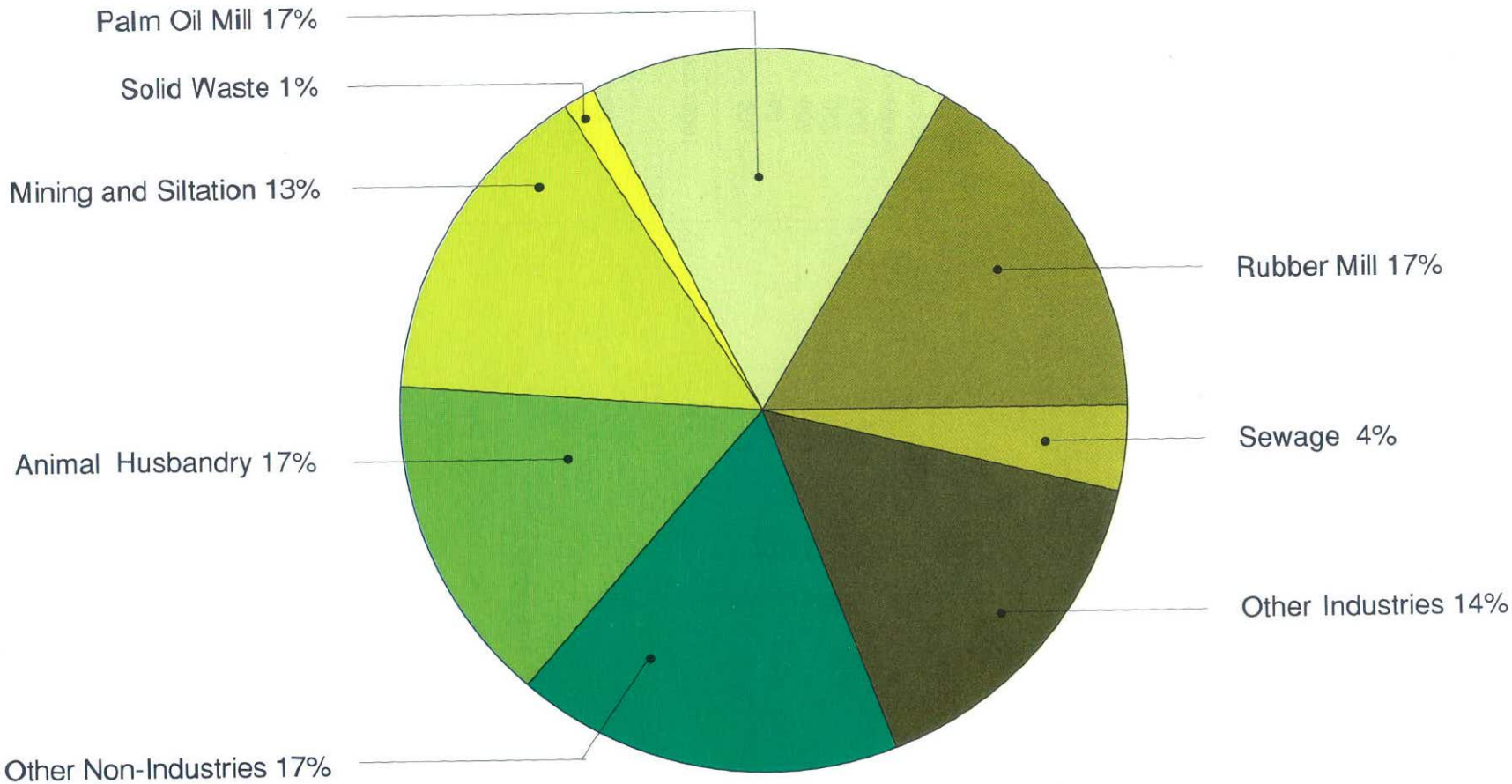


Figure 6.13. Malaysia: Sources Of Water Pollution Complaints, 1988

Table 6.1

Malaysia: Potential Air Pollution Sources, 1988

Type of Sources	No.of Sources	
	1987	1988
I. Stationary Sources		
a. Chemical Industries		
- Pesticides and Fertilizer	5	5
- Acid Manufacturing	6	6
- Chemical Manufacturing	198	198
- Paint and Vanish	19	19
- Plastics and Resin	88	92
- Soaps and Detergents	9	9
	325	329
b. Food Agriculture		
- Animal Feed	-	4
- Fishmeal	189	189
- Palm Oil Mill	250	250
- Rice Mill	250	373
- Rubber Mill	209	209
- Rubber Products Manufacturing	69	77
- Smoke House	700	700
	1667	1802
c. Metal Industries		
- Aluminium Works	19	19
- Foundries	295	297
- Iron and Steel Mill	24	24
- Lead Smelter and Related Works	4	4
- Tin Smelting	4	4
	346	348
d. Mineral Products		
- Asbestos Works	5	5
- Asphalts and Concrete Batching	60	62
- Bricks Work Clay and Clay Works	94	98
- Cement Products	176	178
- Glass Work	28	29
- Lime and Plaster Works	321	321
- Portland Cement Manufacturing	5	5
- Stone Quarrying	305	355
	994	1053

e. Petroleum Industry			
- Petroleum Refineries		5	5
- Miscellaneous Petroleum Process		28	.28
- Gas Processing		24	24
		57	57
f. Woodbased Products and Others			
- Charcoal Making		520	547
- Pulp and Paper Recycling		6	6
- Paper Products		51	54
- Sawmills		1047	1079
		1624	1686
g. Fuel Combustion Sources			
- Thermal Power Station		14	14
- Boiler and Furnaces		2040	2141
- Incinerator		214	223
		2268	2378
	Total I	7276	7596
II. Mobile Sources			
- Motor Vehicles		4211566	3974845
- Petrol Powered		353508	274913
- Diesel Powered			
	Total II	4565074	4249758 (**)
III. Solid Waste Disposal			
- Municipal Waste Disposal Site (*)		89	38
- Municipal Incinerator		2	2
	Total III	91	40
GRAND TOTAL		4572441	4257394

Note:

(*) : Open Burning Practice

(**) : Number of Motor Vehicles Until December, 1988 for Peninsular Malaysia only.

Table 6.2

Peninsular Malaysia: Number of Motor Vehicles Until Dec, 1988

Type of Vehicle	No. of Vehicles			
	Petrol Powered	Diesel Powered	Total	Per centage
Motorcycles	2544186	-	2544186	59.0
Taxi	6615	13754	20369	0.6
Private Car	1274752	36682	1311434	30.8
Van & Lorries	136763	123412	260175	6.2
Buses	1382	18413	19795	0.5
Others	11147	82652	93799	2.2
Total	3974845	274913	4249758	100.0
Percentage	93.0	7.0	100.0	
Total For Malaysia 1987	4211566	353500	4565074	100

Table 6.3

Malaysia: Distribution of Significant Air Pollution Sources by State, 1988

Type of Sources / State	Stationary Sources	Solid Waste * Disposal Site	Mobile Sources
Perlis	31	1	47027
Kedah	228	3	301192
Seberang Perai/Penang	308	2	458045
Perak	363	5	573476
Selangor	506	5	817381
Wilayah Persekutuan	311	2	392741
Negeri Sembilan	165	3	226121
Melaka	162	2	175986
Johor	298	4	705168
Pahang	314	2	242367
Terengganu	165	3	114598
Kelantan	124	1	197054
Sabah	139	1	-
Sarawak	153	2	-
Labuan		1	-
Total	3267	31	4249758 **
Total (1987)	3200	89	4565074

NOTE

* : Open Burning Practice

**: Not Including Sabah and Sarawak

Table 6.4

Malaysia: Inventory of Fuel Burning Equipment (FBE) Approval in 1988

Type of FBE	Fuel Consumption (Tonnes/year)	No.Approval	Percentage
I. BOILER			
1. Solid Fuel	79.1	43	22.4
2. Liquid Fuel	5.7	58	31.7
II. INCINERATOR			
1. Wood Based	80.1	6	3.3
2. PalmOil Mill	74.2	6	3.3
3. Others	2.6	3	1.6
III.OTHER FBE			
1. Kiln	-	-	-
2. Furnace	3.8	3	1.6
3. Heater	0.1	19	10.4
4. Generator	16.3	29	16.9
5. Dryer	0.3	8	4.4
6. Asphalt Plant	0.1	3	1.6
7. Burner	0.1	2	1.1
8. Reactor	1.2	3	1.6
TOTAL FBE APPROVED	260.6	183	100
TOTAL FBE (1987)	257.3	196	

Table 6.5

Malaysia: Emission of Air Pollutants from Fuel-Burning Sources, 1988

Sources	Fuel Burning	Consumption (000 tonnes/ year)	Major Pollutants (000 Tonnes/year)				
			Particulates	SOx	NOx	HC	Co
Power Station	Natural Gas Fuel Oil Diesel	818 2086 183	0.2 2.2 -	16.3 165.8 -	0.4 27.5 -	0.02 0.3 -	0.3 1.4 -
Total I		3087(45.3)	2.4	182.1	36.9	0.32	1.7
Industry	Natural Gas LPG Kerosene Diesel Fuel Oil Coal	387 77 12 1793 524 327	0.1 0.03 0.04 3.8 1.5 2.2	7.7 0.002 0.04 36.4 1.1 6.2	1.4 0.2 0.03 13.4 3.9 2.5	0.02 0.005 0.005 0.7 0.2 0.2	0.1 0.03 0.003 0.7 0.2 0.3
Total II		3120(45.8)	7.7	51.4	21.4	1.1	1.3
Domestic & Commercial	Natural Gas LPG Kerosene Diesel Fuel Oil	74 253 257 15 3	0.03 0.03 0.7 - -	0.01 0.005 0.4 - -	0.1 0.5 0.6 - -	0.01 0.04 0.1 - -	0.03 0.06 0.06 - -
Total III		602(8.9)	0.8	0.5	1.2	0.2	0.2
Grand Total		6809 (100)	10.9 (3.8)	234.0 (81.3)	38.1 (13.2)	1.6 (0.6)	3.2 (0.1)
Grand Total 1987		6323	10.4	252.9	58.7	1.5	3.0

NOTE
( ): Indicate percentage value

Table 6.6

Malaysia: Estimate of Emission of Air Pollutants from Mobile Sources, 1988

Type of Vehicle	* Number	Pollutant Load ('000 MT)				
		Particulates	SOx	NOx	HC	CO
GASOLINE FUEL						
Motorcycles	1526512	0.1	0.01	0.04	5.4	9.3
Taxi	3969	0.04	0.01	0.2	0.3	9.1
Private Cars	764851	1.8	0.5	9.2	13.0	344.2
Lorry and Vans	82058	0.5	0.1	2.5	3.3	96.0
Bus	830	0.006	0.002	0.07	0.1	0.9
Others	6688	-	-	-	-	-
Total	3974845	2.4	0.6	12.0	22.1	459.5
DIESEL FUEL						
Taxi	8252	0.08	0.2	0.4	0.08	1.7
Private Cars	2201	0.005	0.007	0.02	0.005	0.09
Lorry and Vans	74047	0.6	1.5	17.8	1.5	11.1
Bus	11048	0.2	0.4	5.7	0.6	3.5
Others	49591	-	-	-	-	-
Total	274913	0.9	2.1	23.9	2.2	16.4
TOTAL	4249758	3.3	2.7	35.9	24.3	475.9
Percentage		0.6	0.5	6.6	4.5	87.85

NOTE:

* : 60% of the total vechicles registered in P. Malaysia considered running on the road

Table 6.7

Malaysia: Pollutant Emission Load From Major Fuel Burning Equipments by Industrial Sectors, 1988

Industry	Emission Load (metric tonnes)						Total (MT)
	From Liquid Fuel		From Solid Fuel				
	SOx	Particulate	SOx	NOx	CO	HC	
Rubber Factory	37.2	-	-	-	-	-	37.2
Palm Oil Mill	32.9	976.0	18.0	56.7	32.3	31.1	1147.0
Quarries	79.6	-	-	-	-	-	79.6
Food	179.6	-	-	-	-	-	179.6
Textiles	73.8	11.0	11.0	2.3	31.9	57.9	187.9
Leather	17.2	-	-	-	-	-	17.2
Woodbased	4.4	162.0	99.7	92.6	48.1	73.0	912.7
Paper & Print.	50.6	8.9	12.2	8.9	17.5	37.6	135.7
Chemicals	405.2	-	-	-	-	-	405.2
Rubber Product	364.0	47.0	30.4	24.2	104.0	188.0	757.6
Metal Fabric	19.1	-	-	-	-	-	19.1
Non Metal	30.4	-	-	-	-	-	30.4
Iron & Steel	-	-	-	-	-	-	-
Electrical	-	-	-	-	-	-	-
Others	42.3	1.7	1.1	1.7	26.3	14.5	468.3
Total	1717.1	1207.0	172.1	187.0	693.0	396.0	4185.2

Table 6.8

Malaysia: Estimated Emission Loads From Various Industrial Processes,1988

Industry	Emission Load (MT/Year)				
	Particulate	SOx	NOx	HC	CO
Sea Food	10.1	-	-	-	-
Sago Tapioca	1121.0	-	-	-	-
Malt Liq.	12.8	-	-	-	-
Paper & Pulp	1439.6	44.7	-	203.0	311.8
Paint Var.	0.7	-	-	-	-
Fertilizer & Pesticides	700.9	-	1687.4	-	-
Chemical Products	2668.9	-	87.9	-	-
Petroleum Refin.	340.1	9521.5	88.1	-	843.2
Clay Prod.	553.6	-	-	-	-
Cement & Cement Products	8321.9	-	-	-	-
Quarrying	8467.1	-	-	-	-
Iron,Steel Foundries & Tin	64.4	-	-	-	-
Total	23701.1	9521.5 1	863.4	203.0	1136.0

Table 6.9

Malaysia: Pollutants Load Estimated from Open Burning Practice at Refuse Disposal Grounds, 1988

State	No. of Site	Estimated Waste Burned (MT/day)	Pollutants Load(MT)				
			Particulates	NOx	CO	HC	SOx
Perlis	1	4	9.6	3.6	50.4	18	0.6
Kedah	3	30.4	72.5	27.2	380.5	127.9	4.5
S.Perai/Penang	2	84	204	76.5	1071	382.5	12.8
Perak	5	52.1	54	31.4	500.2	121.9	3.4
Selangor	5	200.6	766	180.5	2527.6	902.7	30.2
Wilayah Persekutuan	2	400	960	360	5040	1800	60
Negeri Sembilan	3	21.4	51.4	19.3	269.6	96.3	3.2
Melaka	2	83.2	391.2	74.9	1048.3	374.4	12.5
Johor	4	91.2	218.9	82.1	1149.1	410.4	13.7
Terengganu	3	22.4	53.8	20.2	1098.7	100.8	3.4
Pahang	2	19	45.6	17.1	239.4	85.5	2.9
Kelantan	1	21.6	51.8	19.4	272.2	97.2	3.2
Sabah	1	7.8	18.7	7	98.3	35.1	1.2
Labuan	1	4	9.6	3.6	50.4	18	0.6
Sarawak	2	32	76.8	28.8	403.2	144	4.8
Total	38	1082.3	3002.6	958.6	14297.2	4750.8	158.2

Table 6.10

Malaysia: Pollutants Load Estimated from Open Burning Practice at Refuse Disposal Grounds, 1988

Location	Type of Waste	Area (Hectar)	Date of Burning
Tong Peng	Rubber Wood	155	5/July-31/Aug
Lenggeng	Rubber Wood	72	24/Feb
Sg. Siput	Rubber Wood	-	30/June
Sg. Siput	Rubber Wood	90	17/Feb-30.Apr

Table 6.11

Malaysia: Pollutants Load Estimated from The Burning of Industrial Waste, 1988

Location	Type of Wastes	Quantity (Tonnes)	Pollutants Load (Tonnes/yr)				
			Particulate	NOx	SOx	CO	HC
Bukit Mertajam	Wood	1.6	0.01	0.003	0.006	0.1	0.01
Kodiang	Rice Husk	1724	-	-	-	-	-
Kulim	Wood	183	0.9	0.4	0.06	12.8	1.6
Kuching (Sarawak)	Wood	58.5	0.3	0.12	0.02	4.1	0.6
Total	-	1967.1	1.21	0.523	0.086	17.0	2.21

Table 6.12

Malaysia : Summary of Emission of Pollutant (Uncontrolled) to the Atmosphere by Sources ('000 MT), 1988

Sources / Emission	Mobile	Stationary Sources				Burning Practice		
		Power Station	Industrial Fuel	Domestic	Industrial Processes	Municipal Disposal	Industrial Trade Waste	Agriculture Clearing
Particulate	3.3	2.4	8.9	0.001	23.7	3.0	1.21	-
SOx	2.7	182.1	53.3	0.06	9.5	0.2	0.086	-
NOx	35.9	36.9	21.6	0.008	1.9	1.0	0.523	-
CO	24.3	0.3	1.8	0.004	1.2	4.7	17.0	-
HC	475.9	1.7	1.7	0.02	0.2	14.2	2.21	-
Total	542.1	223.4	87.3	0.093	36.5	23.1	20.976	-
Percentage	58.1	23.9	9.4	0.001	3.9	2.5	2.2	-

Table 6.13

Malaysia : Enforcement of Motor Vehicles (Control of Smoke and Gas Emission) Rules 1977, for 1986-1988.

Subject	Year														
	1986					1987					1988				
Total Number of diesel vehicles Registered	260,423					265,651					275,913				
Number of Enforcement Campaigns	206					302					440				
Total number of Vehicles Stopped for Inspection	22,932					35,513					44,978				
Type of Vehicles	L	B	T	O	PC	L	B	T	O	PC	L	B	T	O	PC
Number of summons Issued	1576	695	925	404	371	1751	881	771	656	653	2821	1080	1268	1291	900
Total number of summons Issued	3,971					4,712					7,360				
Type of Vehicles	L	O	B	T	PC	L	O	T	B	PC	L	B	O	T	PC
Percentage Compliance	87	86	82	71	69	90	87	85	84	68	88	85	80	77	67
Overall Percentage of Compliance (%)	83					87					84				
Compound Collected (M$)	23,615.00					25,580.00					30,265.00				

NOTE :
Type of Vehicles

L = Lorry PC = Private car
B = Bus O = Others
T = Taxi

Table 6.14

Malaysia : Number of Offences by Motor Vehicles Under the Motor Vehicles (Control of Smoke and Gas Emission)Rules 1977, by State, 1987-1988.

State	Number of Vehicles					
	Stopped for Inspection		Summoned		Compliance (Percent)	
	1987	1988	1987	1988	1987	1988
Perlis	261	327	16	9	94	97
Johor	9,274	7,231	494	380	95	95
Kedah	3,687	3,701	367	260	90	93
Sabah	810	471	85	33	90	93
Pahang	3,973	10,773	341	886	91	92
Pulau Pinang	3,358	2,309	449	197	87	91
Trengganu	648	805	93	91	86	89
Sarawak	1,004	1,482	162	246	84	83
Kelantan	806	1,003	82	176	90	82
Perak	2,281	3,722	371	751	84	80
W.Persekutuan (Kuala Lumpur)	3,408	2,405	1,002	725	71	70
Selangor	2,894	7,990	516	2,600	82	67
Negeri Sembilan	1,851	1,523	408	496	78	67
Melaka	1,258	1,236	326	510	74	59
Total	35,513	44,978	4,712	7,360	87	84

Table 6.15

Malaysia: Distribution of Industries for River Basins under Assessment, 1988

Region	Industry / River	Agrobased						Manufacturing												
		Palm Oil Mill	Rubber Mill	Tapioca/ Sago	Pine apple	Marine Pdts.	Total	Food	Beverage	Textile	Leather	Paper	Chemical	Rubber Pdts.	Non Metallic Minerals	Metal Works	Elec.& Semi Cond.	Vehicle & Parts Mfg	Total	Grand Total
Peninsular Malaysia (West Coast)	Kedah	-	1	-	-	2	3	8	-	-	-	-	-	2	1	15	-	-	26	29
	Prai/Juru	3	12	2	-	35	52	41	3	34	1	6	17	6	15	30	10	7	140	192
	Penang Island	-	1	-	-	3	4	-	-	-	-	-	-	-	-	-	-	-	-	4
	Sepetang	4	9	-	-	12	25	2	1	4	1	1	3	-	7	-	-	-	19	44
	Perak	17	21	10	-	4	52	18	1	4	1	-	-	-	-	-	-	-	24	76
	Klang	5	12	-	-	12	29	58	14	15	8	19	121	24	88	214	29	22	612	641
	Langat	9	8	-	-	5	22	8	-	5	-	5	3	2	5	14	8	4	54	76
	Linggi	6	17	-	-	1	24	9	-	1	1	1	5	2	7	4	8	-	38	62
	Melaka	-	19	-	-	5	24	25	-	5	4	2	2	-	4	7	8	-	57	81
	Muar	10	27	2	-	1	40	12	5	2	1	1	4	1	2	12	1	1	42	82
	Batu Pahat	7	16	7	-	1	31	9	-	10	4	1	-	-	-	3	1	4	32	63
	Pont./Skudai/ Tebrau	4	15	1	4	8	32	9	5	14	5	3	17	2 1	2	17	5	190	122	
	Subtotal	65	158	22	4	89	338	199	29	94	26	39	172	39	134	293	70	39	1134	1472
Peninsular Malaysia (East Coast)	Johor	16	13	-	-	8	37	23	1	-	-	-	3	-	3	16	5	-	51	88
	Endau	16	4	-	-	5	25	1	-	1	-	1	-	-	-	2	-	-	5	30
	Pahang	39	20	-	-	2	61	4	-	-	-	-	-	-	2	1	2	2	11	72
	Kuantan	5	2	-	-	-	7	3	-	-	-	-	-	-	4	3	-	-	10	17
	Terengganu	1	2	-	-	4	7	3	-	1	-	-	-	1	-	-	1	-	6	13
	Kelantan	5	11	-	-	2	18	4	1	-	1	-	-	-	5	4	3	-	18	36
	Subtotal	82	52	-	-	21	155	38	2	2	1	1	3	1	14	26	11	2	101	256

Table 6.15 (continuation)

Region	River	Agro-based						Manufacturing												
		Palm Oil Mill	Rubber Mill	Tapio-ca/ Sago	Pine-apple	Marine Pdts.	Total	Food	Beve-rage	Tex-tile	Leath-er	Paper	Chem-ical	Rubber Pdts.	Non Metallic Minerals	Metal Works	Elec.& Semi Cond.	Vehicle & Parts Mfg	Total	Grand Total
Sarawak	Sarawak	-	4	-	-	1	5	12	5	-	-	2	1	-	5	9	3	1	38	43
	Rajang	-	1	-	-	-	1	-	1	-	-	-	-	-	-	1	-	-	2	3
	Miri	3	-	-	-	-	3	-	-	-	-	-	1	-	1	2	-	-	4	7
	Subtotal	3	5	-	-	1	9	12	6	-	-	2	2	-	6	12	3	1	44	53
Sabah	Puttan	1	2	-	-	5	8	6	5	2	-	5	3	6	2	5	5	-	34	42
	Sandakan	1	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	1	2
	Tawau	3	1	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	4
	Sub-total	5	3	-	-	5	13	6	5	2	-	6	3	6	2	5	-	-	35	48
Grand-Total		155	218	22	4	116	515	225	42	98	27	48	180	46	156	336	84	12	1314	1829

Table 6.16

Malaysia : Population in Cities/Town Under Local Authorities Administrative, 1980 and 1987

Region	River Basin	City	Population 1980 *	1987 **
P.Malaysia (West Coast)	Kelang	Kuala Lumpur	919,610	1,500,000
	Perak	Ipoh	293,849	338,821
	Penang Island	Georgetown	241,095	277,271
	Skudai/Tebrau	Johor	246,395	305,220
	Kelang	Petaling Jaya	207,805	251,771
	Kelang	Kelang	192,080	247,687
	Sepetang	Taiping	146,002	170,349
	Linggi	Seremban	132,911	157,970
	Melaka	Melaka	87,494	102,493
	Perai	Butterworth	77,982	92,025
	Kedah	Alor Setar	69,435	83,739
	Muar	Muar	65,151	78,181
	Batu Pahat	Batu Pahat	64,727	77,672***
	Hulu Langat	Kajang	45,795	58,618***
	Endau	Keluang	50,315	61,384***
P.Malaysia (East Coast)	Terengganu	K. Terengganu	180,2922	23,686
	Kelantan	Kota Bahru	167,872	207,040
	Kuantan	Kuantan	142,055	157,574
Sarawak	Sarawak	Kuching	72,555	88,880***
	Miri	Miri	52,125	63,853***
	Rajang	Sibu	85,231	104,408***
Sabah	Kaya	Sandakan	70,420	86,265***
	Putatan	K. Kinabalu	55,997	68,596***

Notes:

* Based on Census

** Not including Migration (estimates by Statistic Department, Malaysia)

*** Not including Migration (estimates by Department of Environment, Malaysia)

Table 6.17

Malaysia: Organic Wasteload by River Basin, 1988

Wasteload Basins/Island	BOD (ton/yr)	COD (ton/yr	Nitrogen (ton/yr)	Phosphorus (ton/yr)	Suspended Solids (ton/yr)	Grease & Oil (ton/yr)
Kedah	5,341	7,342	31	20	7,156	-
Penang	6,222	14,424	1,160	231	9,476	0
Perai/Juru	6,480	13,156	338	100	8,616	28
Sepetang	2,648	4,405	198	33	3,882	16
Perak	17,133	30,363	1,310	165	22,345	186
Kelang	17,207	31,657	2,352	290	166,704	158
Langat	7,735	15,816	1,335	216	13,725	135
Linggi	7,547	16,605	917	216	14,189	4
Melaka	3,491	5,587	290	34	4,626	1
Muar	6,548	11,288	734	84	9,148	68
Batu Pahat	3,904	8,548	314	43	5,554	40
Pontian/ Sekudai/Tebrau	6,751	12,617	615	128	285	5
P. Malaysia (West Coast)	91,007	171,808	9,594	1,559	265,706	641
Johor	5,706	18,173	911	73	7,171	348
Endau	1,733	3,412	302	20	2,490	93
Pahang	8,416	17,935	1,102	50	12,958	308
Kuantan	1,786	4,126	172	17	2,983	
Trengganu	3,588	5,323	68	8	4,546	11
Kelantan	8,898	13,108	185	9	11,814	15
P. Malaysia (East Coast)	30,127	62,077	2,740	177	41,962	775
Sarawak/Samarahan	4,676	7,933	355	65	6,600	10
Rajang	4,533	11,635	173	32	6,360	
Miri/Lutong	1,483	3,050	116	24	1,643	
Sarawak	10,692	22,618	644	121	14,603	10
Putatan	2,053	4,718	388	83	3,545	2
Kaya	1,695	3,001	200	36	2,576	10
Tawau	778	1,372	89	14	858	68
Sabah	4,526	9,091	677	133	6,979	80

Table 6.18

Malaysia: Wasteload (Heavy Metals) by River Basin, 1988

Wasteload Basins/Island	Mercury (kg/yr)	Lead (kg/yr)	Total Chromium (kg/yr)	Copper (kg/yr)	Zinc (kg/yr)
Kedah	-	-	-	-	-
Penang	-	93	-	-	-
Perai/Juru	-	-	-	-	-
Sepetang	-	-	-	-	-
Perak	-	-	-	-	-
Kelang	77	89	-	2,399	330
Langat	-	15	-	-	-
Linggi	-	-	-	310	-
Melaka	-	-	310	-	-
Muar	-	3	-	-	-
Batu Pahat	-	-	-	-	-
Pontian/ Sekudai/Tebrau	-	-	-	-	3
P. Malaysia (West Coast)	77	200	310	26,109	333

Table 6.19

Malaysia: BOD Load Distribution, 1980 and 1987-1988.

Source	BOD Load (Tonne/Day)		
	1980	1987	1988
Agrobased Industries			
- Palm Oil Mill	60	5	5
- Rubber Mill	50	5	5
Manufacturing	105	20	19
Agriculture			
- Animal Husbandry	117	55	55
Population			
- Sewage	220	348	358
Total	552	433	442

Table : 6.20

Malaysia : Revenue Obtained from Prescribed Premises, 1987-1988

Year	Industry	Processing Fees (M$)	Effluent Related	Late Fees (M$)	Recovery of Fees (M$)	Total Revenue (M$)
1987	Crude Palm Oil	24,400.00	284,406.14	930.00	276.93	310,013.07
	Raw Natural Rubber	20,600.00	41,780.17	7,124.19	725.56	70,229.92
	Total	45,000.00	326,186.28	8,054.19	1,002.49	380,242.99
1988	Crude Palm Oil	24,700.00	299,101.81	11,368.80	375.90	335,546.51
	Raw Natural Rubber	20,900.00	42,350.80	5,120.00	961.01	69,331.81
	Total	45,600.00	341,452.61	16,488.80	1,336.91	404,878.32

Table : 6.21

Malaysia : Environmental Complaints Received for Palm Oil Industries

Year	Industry	Water Pollution	Air Pollution	Total
1987	Crude Palm Oil	22	15	37
	Raw Natural Rubber	17	17	34
1988	Crude Palm Oil	13	11	24
	Raw Natural Rubber	13	31	44

Table : 6.22

Malaysia : Oil Spill Sighting and Recovered Cleaning Cost by Location 1988

Location	No. of Sighting	Cost (M$)
1. Port	10	48,309.41
2. Straits of Malacca	5	5,365.95
3. South China Sea	12	-
4. Straits of Singapore	2	-
Total	29	53,675.21

Table : 6.23

Malaysia : Oil Spill Incident Number of Sources, 1988

Sources	No. of Cases
1. Bilge/Bunkering	1
2. Grounding	2
3. Load Transfer	1
4. Tank Cleaning/ Ballasting	5
5. Oil Platform	3
6. Not Known	17
Total	29

Table : 6.24

Malaysia : Provisional List of Approved Dispersant

Type of Dispersant	Use	Type of Oil
Hydrosol DN-40	Sea and Beach	All types of oil
Servo CD-2000	Sea and Beach	Diesel, heavy emulsion, fuel oil, heavy crude, light crude, medium crude
Hydrosol SE-4	Sea and Beach	All types of oil
BP 1100 X	Sea	All types of oil
BP 1100 WD	Sea	All types of oil
Shell LTX	Sea	All types of oil
Shell VDC	Sea	All types of oil

Table : 6.25

Malaysia : Contravention Licence Applications Under Section 22(1), Environmental Quality Act 1974. Number by Typeof Applicant, 1986-1988

Type of Applicant	Year		
	1986	1987	1988
Wood-based Industries	26	40	55
Palm Oil Mills	1	4	3
Government Departments	4	3	2
Project Developers	1	-	1
Rice Mills	-	4	4
Rubber-based Industries	-	-	2
Others	5	5	7
TOTAL	37	56	74

Table : 6.26

Malaysia : Contravention Licence Applications Under Section 22(1), Environmental Quality Act 1974. Number by Type of Contravention, 1986-1988

Type of Contravention		Year	
	1986	1987	1988
Open Burning of Wastes	24	45	51
Operation of Incinerator not of Approved Design	10	5	16
Emission of Dark Smoke	2	4	2
Emission of Particulates	-	1	3
Non-use of Best Practicable Means	-	1	2
Emission of Unburnt Ash	1	-	-
TOTAL	37	56	74

Table : 6.27

Malaysia : Contravention Licence Applications Under Section 25(1), Environmental Quality Act 1974. Number by Type of Industry, 1986-1988

Type of Industry	Year		
	1986	1987	1988
Beverage	17	9	10
Chemical	6	6	9
Electrical Goods	2	1	2
Food	19	21	20
Paper	2	4	2
Palm Oil Refineries	20	13	6
Textile	16	8	6
Rubber-based	-	-	-
Others	17	19	12
TOTAL	99	81	75

Table : 6.28

Malaysia : Contravention Licence Applications Under Section 25(1), Environmental Quality Act 1974. Number by Justification, 1986-1988

Justification	Year		
	1986	1987	1988
Lack of Land	19	20	10
Financial Constraint	4	4	5
Upgrading of Treatment Plant	11	12	8
Construction of Treatment Plant	23	26	34
Lack of Treatment Technology	5	3	4
Discharge into Central Sewerage Plant	13	11	9
Others	19	5	5
TOTAL	99	81	75

Table 6.29

Malaysia: Enforcement Actions Under the Environmental Quality Act,1974. Number by Action, 1986 - 1988

Action	Year		
	1986	1987	1988
Factory inspections	2197	3052	3574
Directives/ Warnings	899	986	1718
Compounds	182	307	87
Prosecutions	41	26	28

Table 6.30

Malaysia: Offences Prosecution Under the Environmental Quality Act, 1974. Number by Type, 1986-1988

Section	Type of offence	Year		
		1986	1987	1988
16	Failure to comply with conditions of licence.	15	8	4
18	Operation and use of prescribed premises without licence.	1	-	-
25	Emission of wastes into any inland water without licence.	5	1	13
31	Failure to comply with notice.	-	-	-
37	Failure to furnish information	6	4	1
	Total	27	13	18

Table 6.31

Malaysia: Offences Prosecuted Under the Environmental Quality (Clean Air) Regulations, 1978. Number by Type, 1986-1988

Regulation	Type of Offence	Year		
		1986	1987	1988
11	Open burning of wastes	6	6	6
15	Emission of dark smoke	1	2	2
36	Installation of fuel burning equipment without approval.	1	2	1
38	Erection of chimney without approval.	1	2	1
40	Operation of facilities without control equipment	1	1	-
	Total	10	13	10

Table 6.32

Malaysia: Offences Compounded Under the Environmental Quality (Clean Air) Regulations,1978. Number by Type, 1986-1988

Regulation	Type of offence	Year		
		1986	1987	1988
7	Using incinerator not of approved design.	1	5	-
8	Installation of incinerator without approval	16	13	-
11	Open burning of wastes	157	150	46
15	Emission of dark smoke	25	32	9
36	Installation of fuel burning equipment without approval.	41	66	15
38	Erection of chimney without approval.	36	38	13
40	Operation of facilities without control equipment	6	3	4
	Total	282	307	87

Table 6.33

Malaysia : Air Pollution Complaints, Number by Nature, 1985-1988

Nature of Complaints	1985		1986		1987		1988	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Particulate	132	37	135	35	155	32	154	33
Smoke and Fumes	56	16	72	19	108	22	97	21
Noise	77	21	67	18	105	21	100	21
Odour	55	15	51	13	73	16	75	16
Gas	12	3	8	2	39	8	23	5
Others	30	8	50	13	6	1	21	5
Total	362	100	383	100	486	100	470	100

Table 6.34

Malaysia : Air Pollution Complaints, Number by Type of Industries 1985-1988

Industries	1985		1986		1987		1988	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Woodbased	43	15	53	16	91	23	77	22
Chemical	29	13	19	6	31	8	35	10
Feedmill & Fishmeal	21	7	19	6	37	10	26	7
Rice mill	20	7	30	10	28	7	26	7
Quarries	19	7	19	6	22	6	20	6
Engineering & Workshop	19	7	10	3	33	9	5	1
Metallurgical work	16	6	31	10	21	5	41	11
Concrete	9	3	3	1	8	2	9	3
Rubber based Industries	-	-	-	-	17	4	4	1
Others	108	35	121	42	104	26	115	32
Total	284	100	305	100	392	100	358	100

CHAPTER 7
ENVIRONMENTAL PLANNING

ENVIRONMENTAL PLANNING AND MANAGEMENT

Introduction

The strategy adopted by the Department to achieve the objectives of sound development and minimal environmental degradation, places emphasis on a preventive approach to environmental management rather than on curative measures.

This is to be achieved through :

a) the application of environmental impact assessment in planning;

b) the development of specific guidelines for various activities to minimise adverse environmental impacts;

c) the incorporation of environmental considerations into development planning.

The preventive strategy complements the existing programme of pollution control through the enforcement of the Environmental Quality Act, 1974 and legislations made under it as well as other legislations for pollution control within the responsibilities of other agencies.

Environmental Impact Assessment (EIA)

Environmental impact assessment or EIA is a mandatory requirement under section 34A of the Environmental Quality (Amendment) Act, 1985. The section provides powers to the Minister, to prescribe any activity which is likely to have significant impacts on the environment, as prescribed activity. In line with the provisions, the Environmental Quality (Prescribed Activity) (Environmental Impact Assessment) Order, 1987 was gazetted on 5 November 1987. The Order was enforced from 1 April 1988.

Administration of EIA

The Department of Environment is the main agency administering the EIA requirements in the country. The Department's role in the administration of the procedure include :

a) Providing information and advice to project initiators, consultants, project approvingand supervising agencies as well as the public;

b) Providing necessary guidelines to project initiators and assessors for carrying out EIA studies;

c) Reviewing and/or facilitate the review of EIA reports and providing recommendations to project approving authorities and project initiators ; and

d) Providing training on EIA on its own and in collaboration with other training institutions, government agencies and private organisations.

The principal activity of the EIA Unit is concern mainly with the review of EIA reports submitted to the Department by project proponents. During the year, staff of EIA Unit were also actively involved in preparatory work to ensure effective implementation of the EIA Order. This included updating a list of experts for the review panel and a list of consultants capable of undertaking EIA studies. An exercise was also carried out to assess the cost of EIA in relation to the overall project cost. During the period, preparation of specific guidelines for all ca tegories of projects listed in the EIA Order were initiated. Other activities completed during the year included a program to promote the use of EIA guidelines and handbook. This included organising training courses/workshops/seminars either inhouse or with the cooperation of other agencies. In addition, staff of the EIA Unit were actively involved in giving talks on the subject at various other forums. A description of these activities is given in Table 7.1.

Projects Subjected To Environmental Assessment

During the year, 54 cases were received and processed by the staff of EIA Unit, out of this 18 environmental assessment reports were received and subjected to review. The numbers and category of projects received is shown in Table 7.2. During the first quarter of the year, the implementation of EIA was still made on an informal basis through administrative arrangements with project initiators and project approving authorities. However, since 1 April 1988 the implementation of EIA was made mandatory and legally enforced on all prescribed activities listed in the Order.

All preliminary environmental impact assessment reports received were reviewed internally by staff of the Department. No detailed environmental impact assessment reports were received in the year.

Environmental Input To Development Planning

An integrated approach necessitating the incorporation of environmental dimensions in planning, besides economic consideration, has to be adopted in order to prevent environmental degradation and achieve sustainable development. Towards this end, the Department of Environment has taken steps to promote this concept for projects and plans that are being planned by various agencies. In addition to responding to requests to review projects and plans submitted by various agencies and providing the necessary recommendations, the Department has participated by providing data and information for the preparation of reports related to the projects in question. Besides, the Department also assisted in the preparation of specific chapters or reports on environmental implications of the plans or projects proposed. A total of 31 projects were handled by the Department in the year, compared to 35 the previous year (Table 7.3).

Regional And Urban Planning And Development

The Town and Country Planning Act, 1976 provides for the planning, regulation and control of development and use of land and buildings within local authority areas. The Department of Town and Country Planning in conjuction with local authorities has been actively involved in the carrying out of structure and development plan studies in the country. Such studies also require that environmental factors be taken into consideration. The Department provided more than 24 man month of officer input to assist in the preparation of environmental reports for various government agencies involved in regional and urban planning and develoment. The 6 regional or urban plans in which the Department participated are shown in Table 7.3.

Natural Resources Planning And Development

The Department reviewed and provided inputs to 17 projects related to resource planning and development in the period of 1988. Projects included those related to forestry,wildlife conservation, mining of minerals, agriculture, aquaculture and water resource development. A list of which is indicated in Table 7.3. The Department noted with satisfaction that environmental concerns are increasingly being taken into account in natural resource planning and development as seen by the increase in number of agencies referring such cases to the Department for evaluation.

Infrastructure Planning And Development

Eight projects were referred to the Department in 1988 compared to fourteen the previous year. Of these number, three were related to sewerage development for the townships of Seremben, Port Dickson and Muar.

Four other projects were related to the flood mitigation. The study for the development of comprehensive plans for the control of pig farming and waste control for Negeri Sembilan which started in 1987 extended into 1988.

Project Evaluation

Presiting Evaluation

As one of the preventive approaches to environmental management, Presiting Evaluation of development projects at the planning stage ensure that the project is compatible with respect to the various components of the environment. Applications for proposed development projects are submitted to the Department for assessment to ensure that the siting of the project is compatible with the surrounding land use, and that environmentally sensitive areas including residential areas, schools, water catchment areas, forest reserve, national park etc, are adequately buffered to avoid any adverse environmental impacts arising due to the development activity. Presiting Evaluation also ensures that the potential project operator has taken appropriate measures to control and abate pollution at the planning stage of the project.

All Presiting Evaluation applications are investigated and assessed by the Regional Offices of the Department and only problematic cases are referred to the Headquarters for final decision. However, rubber and palm oil mill applications are referred to Headquarters together with the site assessment report from the regional office in view of the licensing requirements for these two industries. Based on the site evaluation report, appropriate comments on site suitability as well as envrionmental control requirements are submitted to project planning authorities at the state level prior to a final decision being made on the application.

A total of 1,505 applications for Presiting Evaluation was received by the Department (Figure 7.1). For this year there is a 10 percent increase in the number of applications compared with the number received last year. From the total number of applications received, 20 percent were from the state of Pulau Pinang, 19 percent from Johor, 13 percent from Selangor and 48 percent from the other states of Malaysia.

Of the types of projects processed, the most number of applications were for building and food industries (Figure 7.2).

Approval of Pollution Control Equipment

Approval in the form of a Written Permission from the Director-General must be obtained prior to construction of any facility that is likely to result in the discharge or

emission of pollutants into the environment. This is to ensure adequate pollution control measures are incorporated to meet the emission and effluent discharge standards stipulated under the Environmental Quality (Prescribed Premises)(Crude Palm Oil) Regulations of 1977, Environmental Quality (Prescribed Premises)(Raw Natural Rubber) Regulations of 1978, Environmental Quality (Clean Air) Regulations of 1978, and the Environmental Quality (Sewage And Industrial Effluents) Regulations of 1979. This requirement also enables the Department to compile a comprehensive data base for inventory and monitoring purposes.

(i) Water Pollution Control

For the year, a total of 90 applications for Written Permission of water pollution control were received and 51 of these applications were for new industrial projects. Of the 51 new industrial projects proposed, 36 will be equipped with effluent treatment systems as they have been identified to be potentially polluting either by the type of pollutants present in the wastewater stream or by the pollution load of the effluent.

In the case of existing factories, 26 applications for installation of effluent treatment facilities were received. Generally, these include factories that failed to comply with the effluent discharge limits specified in the related regulations as well as those found operating without any wastewater treatment facilities.

Twelve applications from the manufacturing industry were received by the Department for factory expansion and increased manufacturing capacity while 1 application was received from a palm oil mill to convert its mode of treated effluent disposal from land to watercourse.

Figures 7.3 and 7.4 show the number of applications received under this category by type of development projects and by state respectively.

(ii) Air Pollution Control

Under the Environmental Quality (Clean Air) Regulations 1978, any erection, installation, resiting or alteration of fuel burning equipment requires prior approval from the Director-General. This is a preventive strategy taken by the Department to screen the impact of every installation on the air quality at the planning stage and appropriate control measures can be incorporated in advance.

Fuel burning equipment and facilities used for heating or generating power e.g. boiler, furnace, kiln, engine generators etc., rated to consume 15 kg or more of liquid or gaseous fuel per hour, or 30 kg or more solid fuel per hour are required to comply with this Regulation. As for incinerators, this Regulation applies irrespective of their size or capacity. This provision also apply to the erection or alteration of any chimney except that serving a private residence.

The total number of applications received for approval for fuel burning equipment was 307 (Figure 7.5) whereby 44 percent of these applications were referred to the Regional offices and the remaining to the Headquarters. Compared with last year, there was a slight increase in the number of applications by 35. Applications from the state of Selangor alone made up 33 percent of the total received.

From the total applications received by the Headquarters, 70 applications were for boiler installations, 66 for generators and 19 for building incinerators (Table 7.4). Applications for fuel burning equipment with fuel consumption less than 7,000 lb/hr were referred to the Regional Offices while all other applications for fuel burning equipment, generators and incinerators using solid fuel were referred to the Headquarters.

Environmental Technology Documentation

As part of its supporting function, this unit is responsible for collecting, compiling and disseminating current and appropriate waste control technology.

Information on treatment technology for palm oil and rubber industries effluent were collected. Effort has been made to document that information.

Other activities involving this unit included attending some of the meetings, seminars or courses on various pollution control technologies either held in the Department of Environment itself or at other relevant agencies.

New Programme Development

Toxic and Hazardous Waste

As a follow-up from findings and recommendations of a feasibility study on treatment and disposal of toxic and hazardous waste in Malaysia which has been conducted by a team of U.S Consultant in Cooperation with the Department of Environment in 1987, a paper was prepared and tabled to the cabinet ministers in November 1988 for the cabinet to decide and endorse on the implementation of treatment and disposal facilities proposed by the consultant.

The cabinet has decided to invite private investment for the construction of the storage, treatment and disposal facilities for toxic and hazardous waste.

In the effort to identify suitable sites for the establish-

ment of toxic and hazardous waste disposal facility, three sites located in Kuala Muda Basin were investigated by the Department of Environment with the assistance of Geological Survey Department and other related Government Agencies. All the three sites investigated were recommended to the Kedah State Government to carry out detailed geological and hydrogeological study to determine the suitability of the sites. Meanwhile, detailed information of one of the three proposed sites in Sepang which have been recommended by the Department to Selangor State Government in 1987 to carry out detailed geological and hydrogeological study has been forwarded to the State Government for their further action to enable detailed geological and hydrogeological survey be carried out to determine the suitability of the site.

Finalising of the final draft on the proposed regulations to control the generation, storage, treatment, transportation and disposal of toxic and hazardous waste were made before it was resubmitted to the Attorneys General Department for final review and gazett.

Development of Air and Water Quality Criteria and Standards

The Department of Environment had commissioned a local consultant team comprising Syed Muhammad, Hooi dan Binnie Sdn. Bhd. (SMHB) in association with the University Pertanian Malaysia (UPM), the University of Technology of Malaysia (UTM) and the University of Malaya (UM) to undertake a study into the Development of air and water quality standards for Malaysia.

Signing of the project between the Ministry of Science, Technology and the Environment and the local consulting firm Syed Muhammad Hooi and Binnie Sdn. Bhd. was done on 3 August 1988. The total cost of the Consulting Services is about M$337,102.50. The project is one of the Department's Research and Development projects under the Fifth Malaysia Plan and is expected to complete in early 1989. The consultants commenced work on the study on 18 August 1988. Two committees had been set up to monitor the progress of the project, namely a "Steering Committee" which had the overall supervision of the project and a "Technical Committee" which could be responsible for the technical control of the project.

Air Quality Criteria and Standards

The objectives of the study on air quality criteria and standards is to develop a set of criteria and standards for ambient air quality and also to develop a quality assurance programme for air quality monitoring. The study is envisage to form the basis of the entire work of air quality planning and management.

Air quality parameters for consideration for primary standards are Total Suspended Particulates, Particles less than 10 micrometer, Sulphur Dioxide, Carbon Monoxide, Lead, Nitrogen Dioxide and Ozone. The secondary standards considered were Dustfall (for its nuisance effects) and Ozone, on an 8 hour averaging period (for its effect on vegetation).

As of December 1988, the consultants had submitted two sets of projects reports for review and approval by the committee. The reports comprised of an Inception and Interim Report.

Water Quality Criteria and Standards

The water quality criteria and standards study comprise phase II of an extensive programme commissioned by the Department of Environment into the development of water quality assurance programme and manuals and classification of six major river basins according to beneficial uses. The six major river basins are Sg. Kelang, Sg. Linggi, Sg. Muar, Sg. Pahang, Sg. Perak and Sg. Muda.

Preliminary reviews have been carried out of the Department's water quality monitoring programme, which includes criteria for samping site location, methods of sampling and analysis, reporting of analytical results and data processing. Visits have been made to some of the Department of Environment regional offices to review their sampling procedures, visit selected sampling sites, and carry out in-situ analysis to investigate the representativeness of the samples collected using the existing methods.

In addition to reviewing the methods by which the Department obtain data, the data base itself was examined to determine the variation of results obtained and the estimate whether this variation is likely to be a true reflection of the river water quality, or whether variations are due to inadequacies in the sample collection and analysis methods.

An integrated river basin information system is being developed for the six river basins included in this study. The integrated system will incorporate water quality data, pollution source data, flow data, and land use data. The integrated system will incorporate programs for entry, retrieval and analysis of data contained in the database.

The accumulated data will be used to classify sections of each of the six rivers according to the existing beneficial uses. Known future (short-term) beneficial uses will also be taken into account.

A modified water quality index system is being developed taking account of the apropriate standards corresponding to the beneficial uses applying at each site.

The Drainage and Irrigation Department's hydrological data collection network has been reviewed to determine its adequacy for calculation of flows at Department of Environment's water quality monitoring sites. Methods are proposed for flow determination at ungauged water quality sites.

A seminar was conducted on 25 and 26 November 1988 by the consultant. The topic delivered was on the aspects of river management related to water quality control in Malaysia. A workshop was held on 17 and 19 December to discuss all the subject matters in this study.

Industrial Noise Survey

The survey was conducted in order to gather some basic data which are required in the formulation of Industrial Noise Control Regulation and Guidelines. The Regional Offices were asked to cooperate in determining those industries which emit excessive noise as well as in conducting the actual measurements.

The study for the Perak Region has been conducted between 26 to 30 July 1988, whereas for Northern Region it was done between 17th to 22 October 1988. The survey for the other regions will be continued in 1989.

Noise Control Programme

Two noise control experts under the Technical Aids programme from the Government of the Federal Republic of Germany were attached to the Department of Environment for 5 man-months (February to May, 1988). The Consultants, Dr. Thomassen and Dr. Fiederer were assigned to study the existing Noise Control situation in the country and to propose the management and mitigating measures to be adopted in the future.

During their period of attachment, a workshop on the Principles of noise control in planning was also conducted where both of them served as resource persons.

Participations at the workshop were extended to other various government agencies.

At the end of their stay, the consultants presented their findings in a report titled "Study On the State of Noise Control and Future Development of Noise Abatement in Malaysia" to the National Committee on Noise Control.

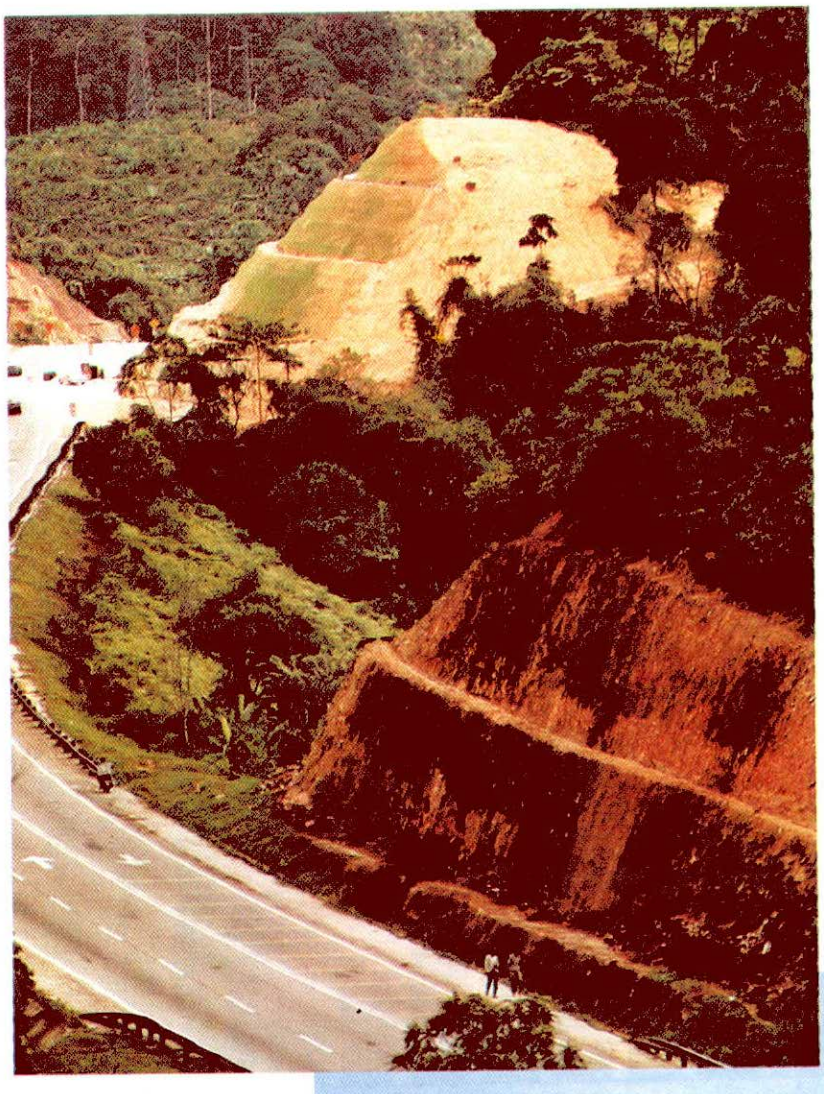
Identification and Registration Scheme for Hazardous Chemicals

From the survey conducted by the Department in 1986, a total of about 300 chemicals used in Malaysia have been identified. Registration of these chemicals have been processed manually and registered according to chemical Abstract Service Registry Numbers and RTECS Registry Number. These informations being updated using LOTUS 123 software.

ENVIRONMENTAL IMPACT ASSESSMENT: EXAMPLES OF PRESCRIBED ACTIVITIES

Oil and gas fileds development

Housing development covering 50 hectares or more



Construction of national highways

Construction of new townships

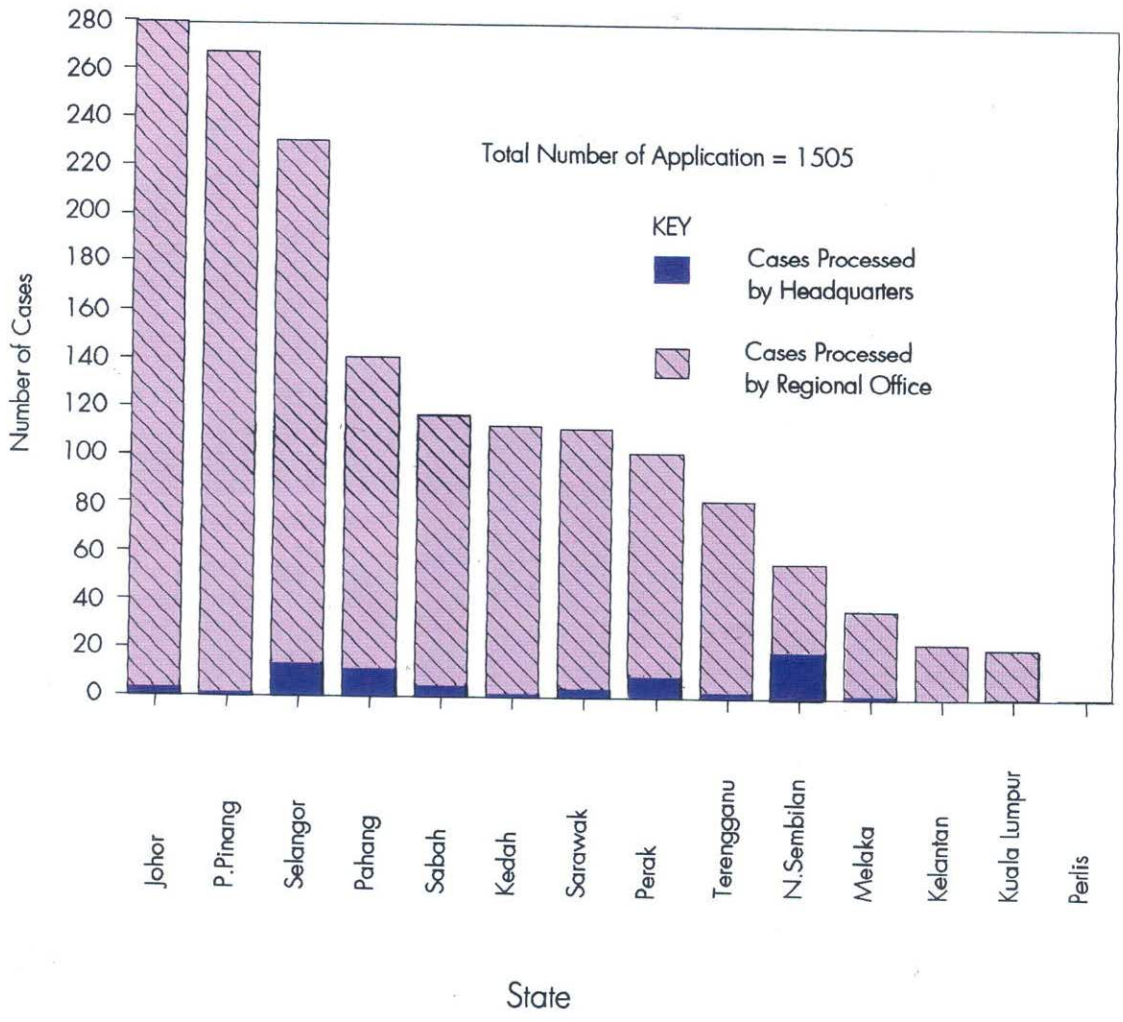


Figure 7.1. Malaysia: Application for Presiting Evaluation of Development Projects by State, 1988

Figure 7.2. Malaysia: Application for presiting evaluation by Type of Development Projects, 1988

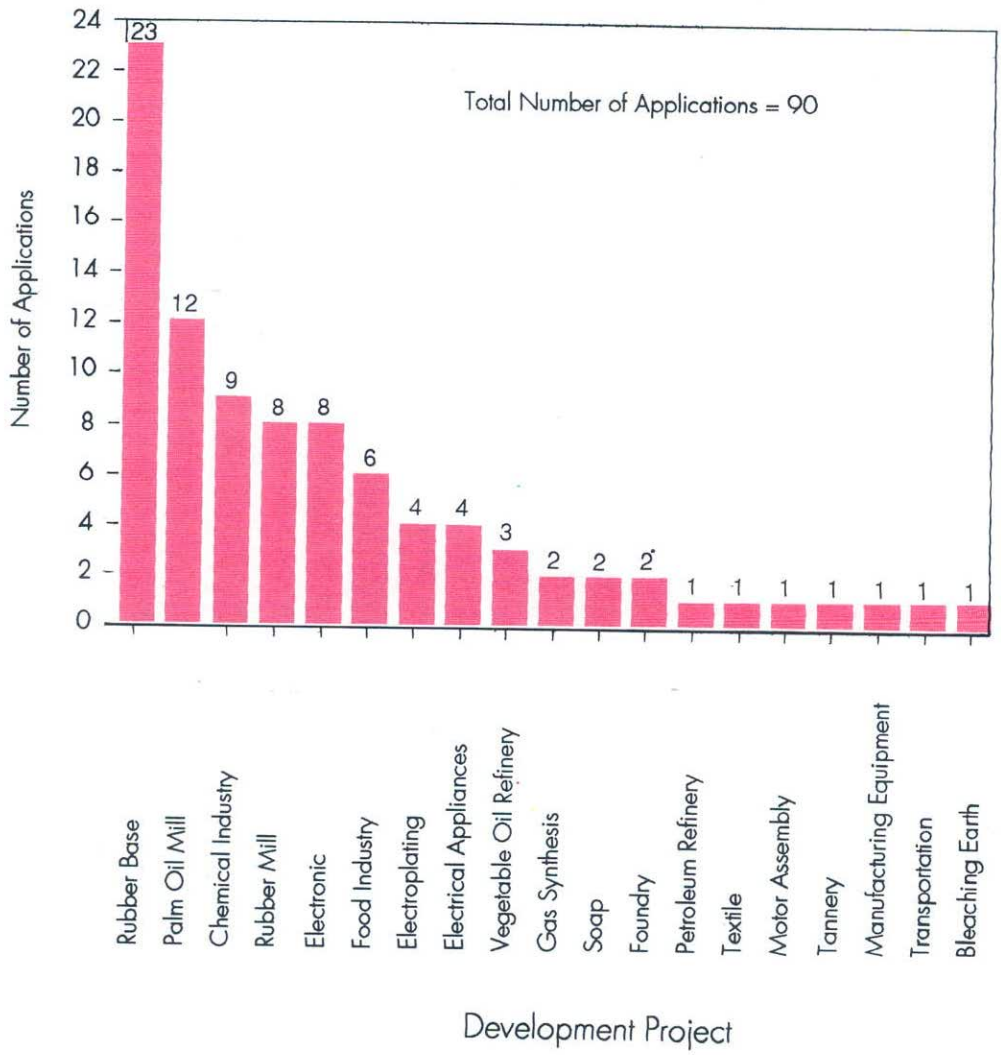


Figure 7.3. Malaysia: Application of Written Permission for Construction of Effluent Discharge Facilities by Development Project, 1988

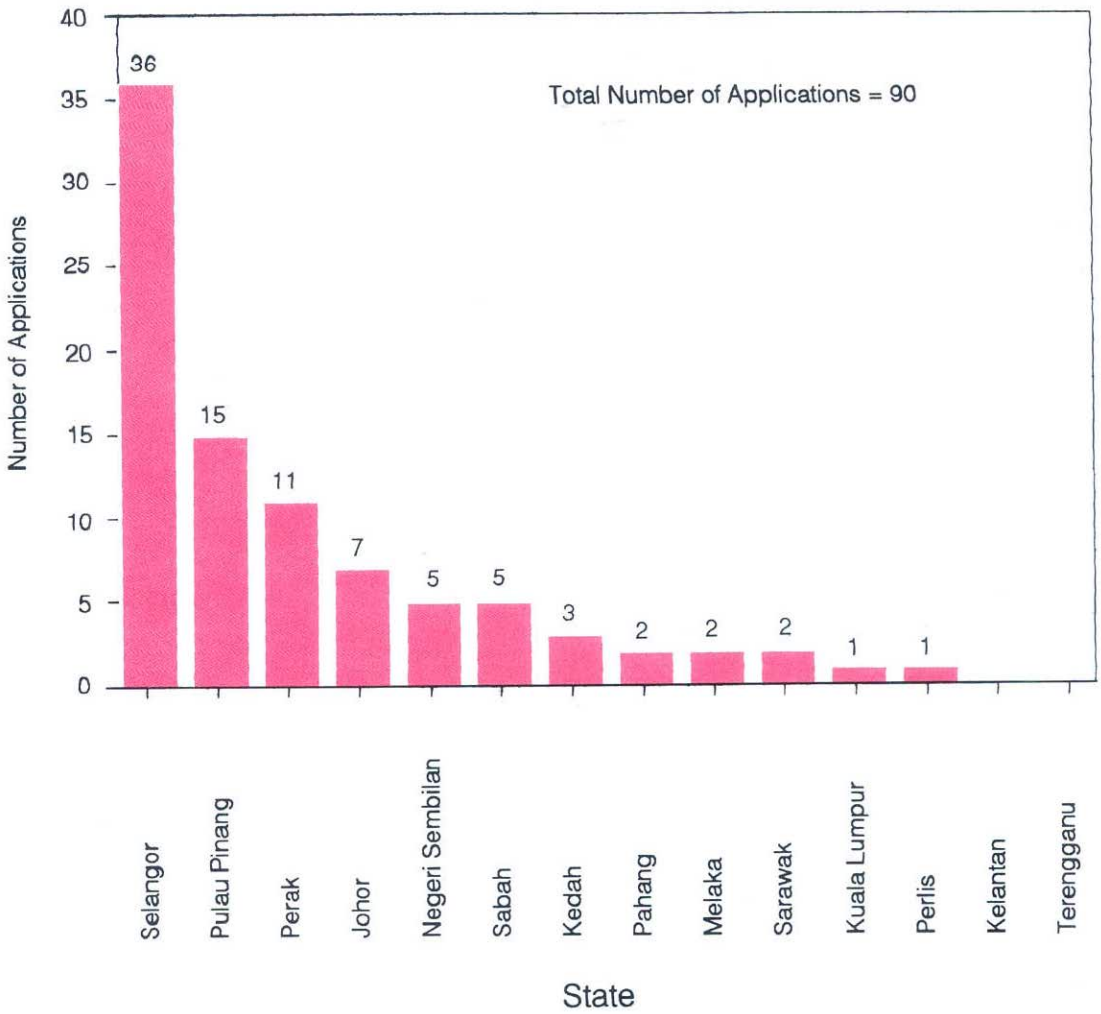


Figure 7.4. Malaysia: Application of Written Permission for Construction of Effluent Discharge Facilities by State, 1988

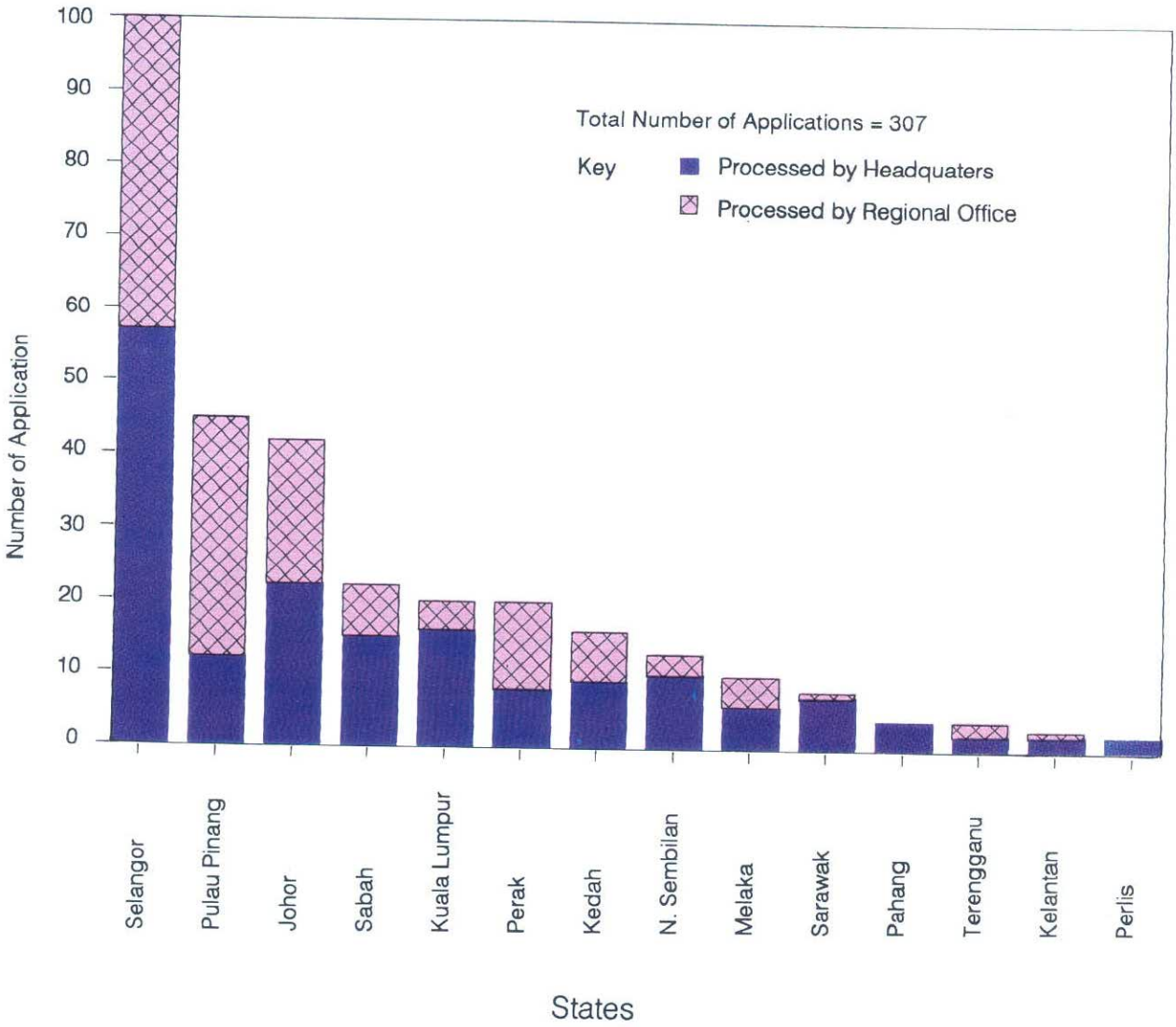


Figure 7.5. Malaysia, Department of Environment: Application for Installation of Fuel Burning Equipment, by State, 1988.

Table 7.1
EIA Talks and Papers Presented by Department of Environment Staff

No.	Name of course/seminar/ workshop	Place and date	Organisation/ sponsoring agency	Subject
1.	Course on EIA	INTAN Bukit Kiara 25-27/2/88	INTAN	EIA procedures in Malaysia
2.	Fundamental Course on Infrastructure	INTAN 18/3/88	INTAN	EIA requirement in Malaysia
3.	Workshop on EIA	Shangri-La Hotel	ENSEARCH	EIA procedure in Malaysia
4.	Course on EIA	Penang 27/6/88	CETDEM	EIA procedure and requirement in Malaysia
5.	Workshop on Environ mental Planning and Development	Griffith Univer-sity Australia 28/6/88	UNEP	Country paper/report on EIA
6.	Talk on EIA for Petronas Contractor	PETRONAS Kuala Lumpur 7/7/88	PETRONAS	EIA requirement in Malaysia
7.	EIA Seminar	Kuala Trengganu 18/7/88	ENSEARCH	EIA procedure and requirement in Malaysia
8.	Inhouse Training on Air Pollution	Meteorological Department Petaling Jaya 23/7/88	Meteorological Department	EIA requirement and procedure in Malaysia
9.	Project Feasibility Study Course	DID Ampang 18/8/88	DID	EIA requirement for drainage and irrigation
10.	Workshop on EIA	Kota Kinabalu Sabah 23-25/8/88	CETDEM	EIA requirement and procedure in Malaysia
11.	Environmental Day Celebration Seminar	Air Keroh Melaka 26/9/88	State Government	EIA requirement and procedure in Malaysia
12.	Planning & Management for Infrastructure Project	INTAN Kuala Lumpur 8/10/88	INTAN	EIA requirement for infrastructure project
13.	EIA for Industrial Planning and Forestry Sector	UPM Serdang 5/10/88	UPM/UNDP	EIA requirement for forestry sector

No.	Name of course/seminar/ workshop	Place and date	Organisation/ sponsoring agency	Subjects
14.	Course on EIA	Kuantan 9/10/88	CETDEM	EIA procedure and requirement in Malaysia
15.	Briefing on EIA to Indonesian Visitors	DOE (HQ) 16/8/88	-	EIA procedure and requirement in Malaysia
16.	Seminar on EIA	Johor Bharu 9/11/88	ENSEARCH/IKM	EIA procedure and requirement in Malaysia
17.	Course on EIA	Kuala Lumpur 21/11/88	CETDEM	The use of EIA Handbook
18.	Workshop on Strategy for Environmental Monitoring	Kota Kinabalu/ Sepitang 22/11/88	Ministry of Tourism and Environmental Development Sabah	The use of EIA in Malaysia
19.	EIA For Forestry	Kuala Lumpur 6/12/88	Forestry Department (HQ)	Legal requirement of EIA for forestry projects in Malaysia
20.	Seminar on EIA	JKR (HQ) 4/12/88	JKR/Road Depts.	EIA policy. Requirement and use of Handbook and Guidelines

TABLE 7.2

CATEGORY & NUMBER OF PROJECTS SUBJECTED TO ENVIRONMENTAL IMPACT ASSESSMENT (EIA),1987-1988

No	Category Of Project 1	Number And Type Of EIA Reports Recieved			
		1987		1988	
		P.A	D.A	P.A	D.A
1	Agriculture	1		1	
2	Airport				
3	Drainage And Irrigation			1	
4	Land Reclamation		1		
5	Fisheries				
6	Forestry			1	
7	Housing			1	
8	Industry	1		2	
9	Infrastructure	2		2	
10	Ports				
11	Mining			2	
12	Petroleum	2	1	3	
13	Power Generation	4		3	
14	Quarries	1			
15	Railways				
16	Transportation				
17	Resort And Recreational Development	2		2	
18	Waste Treatment		1		
19	Water Supply				
	Total	13	3	18	

KEY :

P.A : Preliminary Assessment

D.A : Detailed Assessment (involving Panel Review)

1 : Category of Projects According To EIA Order 1987

Table 7.3

Planning And Development Incoporating Environmental Inputs Provided By The Department Of Environment.

Type of Plan/Project	Number	
	1987	1988
Regional/Urban (Regional,Structure,Development Plans)	10	6
Natural Resources (Living & Non-living Resources)	11	17
Infrastructure (Sewerage,Drainage,Roads,Industrial - areas etc.)	14	8
Total	35	31

List of Projects for 1988

Regional / Urban - Structure Plans Tanah Merah-Pasir Putih-Jeli, Petaling-Shah Alam, Johor Barat, Dungun-Marang, Kuantan and Melaka Tengah.

Natural Resources - Conservation-Wilayah Persekutuan;

Climate Change - UNEP; Elephant Migration Routes; Tropical Forestry Action Plan; Taman Negara Development; Gold Mining Serting (3), Mk. Gemencheh and Mk. elai; Tin Mining Mk. Pengkalan Baru (2); Prawn Culture Kuala Abang;PulauRedang Pollution;WatershedManagement (FAD); Conservation (ESCAP); Hydropower Generation Ulu Jelai.

Infrastructure - Flood Mitigation Sg. Klang, Sg.Kerian, and Pulau Pinang; Clean-up of Sg. Klang; Sewerage Plans for Port Dickson, Seremban and Muar.

* Note : Industrial estates are subjected to the requirements of environmental impact assessment.

Table 7.4

Malaysia : Headquarters. Application for Installation of Fuel Burning Equipment by Type of Equipment, 1988

Types of Fuel Burning Equipment.	Application Received
Boiler	70
Generator	66
Incinerator	19
Dryer	5
Asphalt Burner	3
Rice Husk Reactor	2
Others	7
Total	172

CHAPTER 8

ENVIRONMENTAL EDUCATION AND INFORMATION

ENVIRONMENTAL EDUCATION AND INFORMATION

Environmental Education

World Environment Day

World Environment Day was celebrated at the national level outside the federal capital for the first time this year. It was launched in Pulau Pinang on the 20 August, 1988 by the Honorable Chief Minister of Pulau Pinang and attended by the Honorable Minister of Science, Technology and Environment, Ministers and State Executive Councillors in charge of environmental matters. The theme of this year celebrations was "Sustainable Development - When You Put Environment First, Development Will Last" with the slogan being "You And Environment".

An exhibition on the theme Sustainable Development was held in KOMTAR, Pulau Pinang. The various State Governments and local authorities put up posters on their respective efforts related to sustainable development, or development without destroying the environment, environmental and the like.

In conjunction with the celebrations, a National Conference On Sustainable Development also was held in Pulau Pinang. Eighty participants from among senior governmental officials, including representatives from 12 State Governments; officials from the private sector; politicians; and university lecturers attended the Conference.

School children from around Georgetown area took part in an art competition while members of the public participated in an Envirowalk.

Other activities included a Nature Camp to expose members of the press to the coastal environment at Muka Head, Pulau Pinang on 17 and 18 September 1988. Another camp entitled Envirocamp was held on 21-23 October 1988 at Port Dickson for 30 children between the age of 8 to 12.

Environmental Song Contest

On 23 May 1988, The Malayan Nature Society and the Department organised a National Environmental Song Contest. The winning song was sung in Bangkok on 5 June 1988, in conjunction with the launching of international World Environment Day celebrations.

Seminar For Workers

A one - day seminar entitled Environmental Pollution and the Role of the Workers in Controlling and Reducing Pollution was conducted for some workers of an air-conditioner manufacturing factory on 2 November 1988.

Environmental Films/Videos

Two script-writers had been identified to prepare 4 scripts on the following titles for production next year :

(i) You and the Environment
(ii) Air Pollution
(iii) Water Pollution
(iv) Department of Environment

Talks to Student and Other Target Groups

Officers from the Headquarters and the Regional Offices delivered talks to 11,742 students from 85 secondary schools (Table 8.1) and 375 adults from the various institutes and agencies (Table 8.2).

Exhibitions

Besides the exhibition on Sustainable Development which was organised by the Department, the Department also received some invitations to participate in the exhibitions organised by other institutes and agencies (Table 8.3).

Information

Dissemination of Environmental Publication

In 1988, environmental publications such as Environmental Quality Annual Report, SEKITAR magazine, pamphlets and posters are continued to be distributed to various target groups. To date, the department's mailing list has grown to about 300 addressess which comprise of decison-makers, educational institutions, libraries, overseas, non-governmental organisation and others.

The publication of SEKITAR magazine, pamphlets and posters are also made available to the general public during exhibitions and World Environment Day Celebrations.

Query-Response Services

A total of 525 queries for environmental information was received in 1988. Table 8.4, Firuge 8.1 shows the major channels of the queries. A high percentage of queries came through library users followed by requests through letters and INFOTERRA services. The majority

users of the library are students, while most letters came from government officers and foreign agencies are the major users of the INFOTERRA services as shown in Figure 8.2.

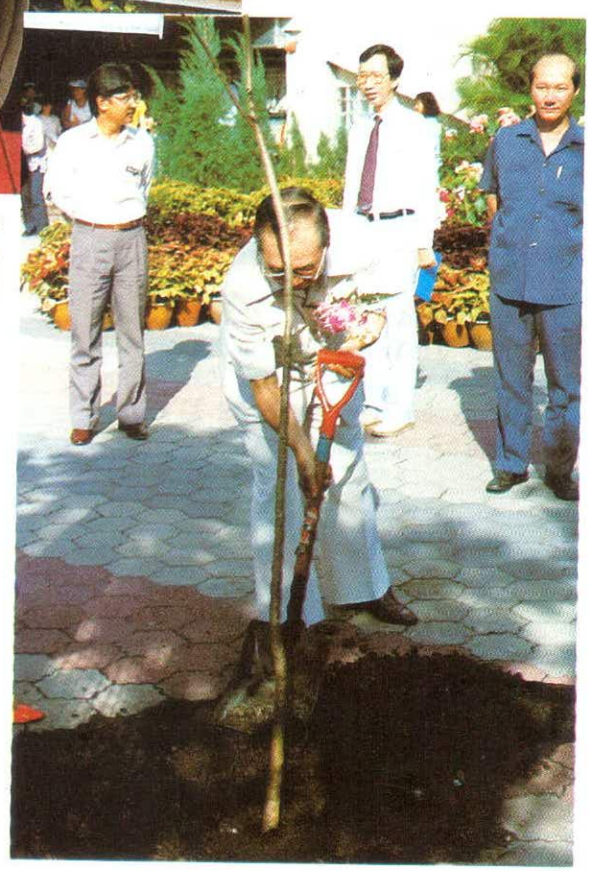
The main subject areas of enquiry have been on general environmental information, water, department's publications and EIA. A small percentage of enquiry were on chemical/ toxic, marine and noise. A comprehensive evaluation of subject distribution of query is shown in Figure 8.3.

Library Services

In 1988, a total of M$30,000 was spent on the purchase of library equipment and books. To date, information sources available within the library itself comprise more than 11,700 books, reports, papers; 432 titles magazine, journal, and brouchures; 42 titles of newspaper cuttings; 22 titles of video films and a modest collection of slides. In conjuction of year of the reader, the library has co-organised three book exhibitions for the department's staff and library user. Meanwhile, in order to facilitate the widest possible access and availibility of publication in the country, the department has participated in the National Availibility Publication System which was co-ordinated by the National Library of Malaysia. This system replacesthe former inter-library loan system. The Memorandum of Understanding between the National Library and the Department of Environment was held on 12 September 1988.

PROMOTING ENVIRONMENTAL AWARENESS

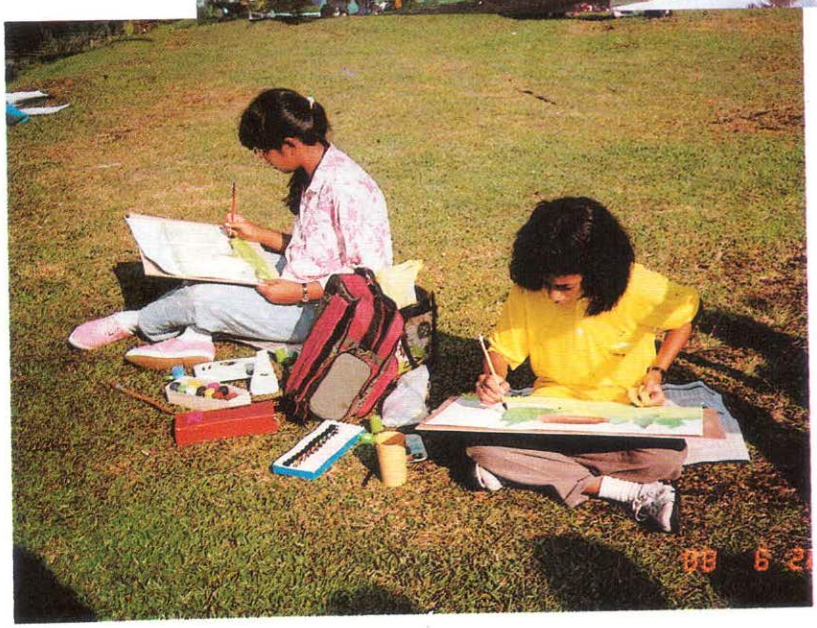
Launching of the World Environment Day Celebration, 20 august 1988 in Pulau Pinang



The Minister marking the World Environment Day Celebration

The Prime Minister's wife, Dato' Seri Dr. Siti Hasmah honouring the night of the Environmental Song Contest, 23, May 1988

Participating in exhibition



Organising art competition for school children

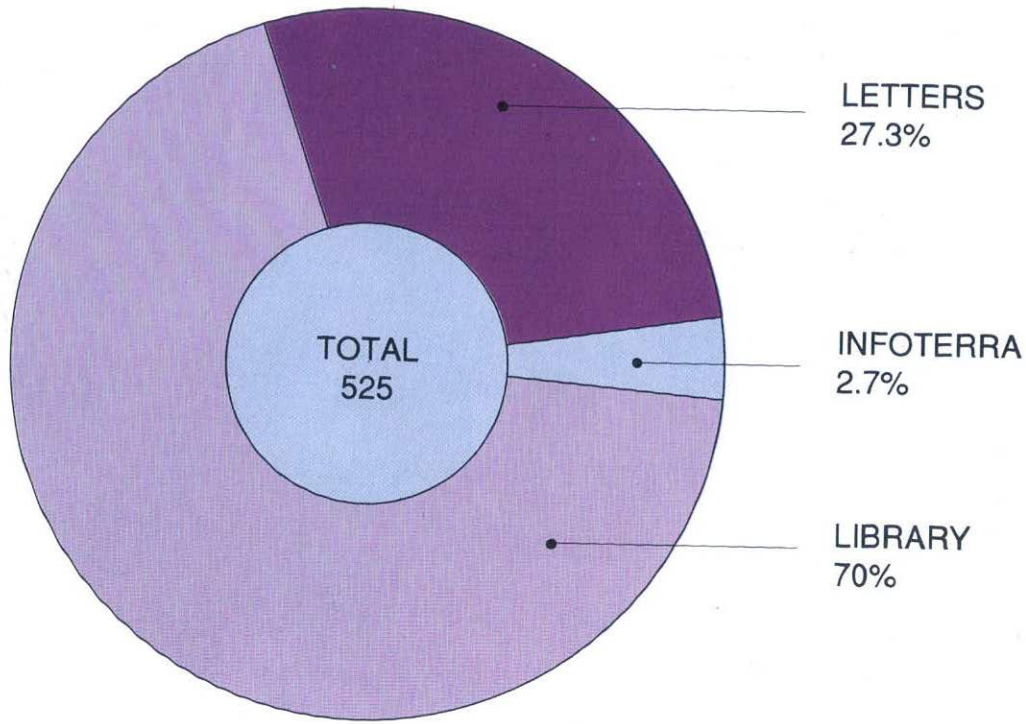


Figure 8.1. Department of Environment: Channels of Information Queries, 1988

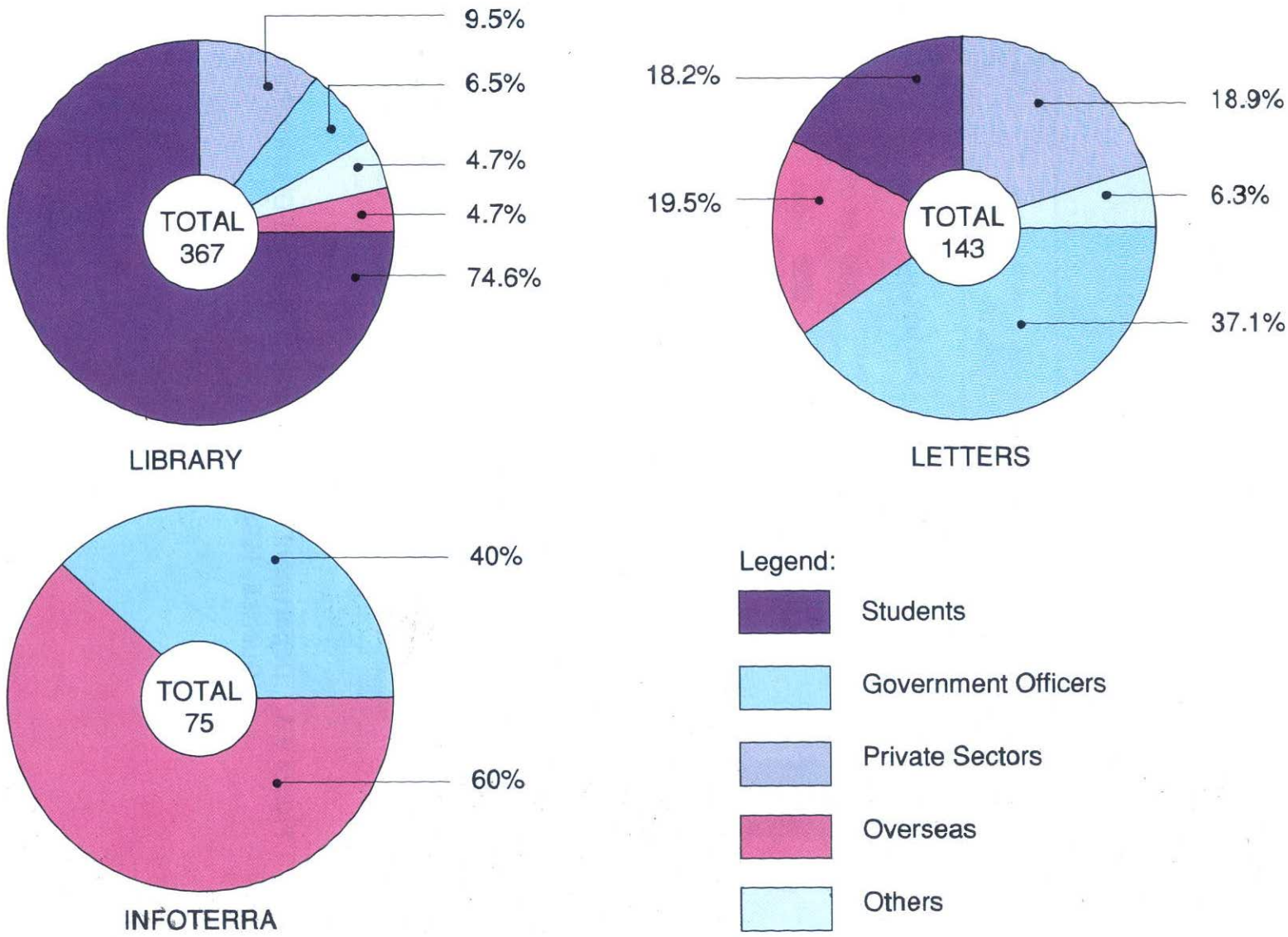


Figure 8.2 Department of Environment: Category of Information Users, 1988

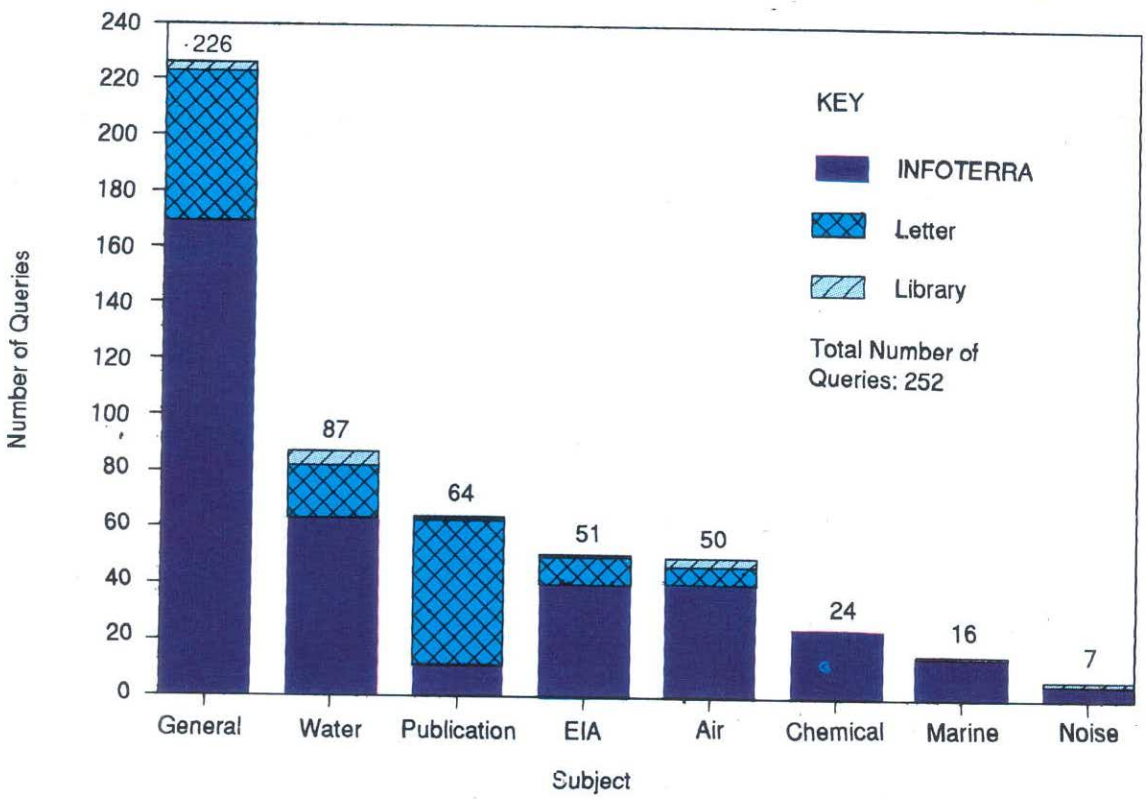


Figure 8.3. Department of Environment: Subject Distribution of Queries, 1988

Table 8.1

Environmental Talks to Secondary Schools Under the International Hydrological Programme (IHP), 1988

Region	State	Number of School	Number of Student
Central	Melaka	4	500
	Negeri Sembilan	No Request	
	Selangor	13	1,187
	Federal Territory Kuala Lumpur	11	690
Johor	Johor	6	900
North-East	Kelantan	1	200
	Terengganu	6	1,150
Northern	Kedah	12	1,390
	Perlis	1	150
	Pulau Pinang	7	870
Pahang	Pahang	1	80
Perak	Perak	13	2,690
Sabah	Sabah	7	1,015
Sarawak	Sarawak	3	920
	Total	85	11,742

Table 8.2

Environmental Talks to Other Target Groups, 1988

Date	Institute/Agency	Target Group	Number of
12 January	Institut Kesihatan Umum, Bangsar	Health Officers	30
5 February	Universiti Malaya, Public Health	Doctors	21
24 February	Universiti Malaya, Biology Dept.	Third Year Undergraduates	20
30 March	Institut Teknologi MARA, Mass Communication	Consumer and Environmental Class Students	12
14 April	Institut Kesihatan Umum, Bangsar	Trainee Nurses	26
23 June	Institut Kesihatan Umum, Bangsar	Health Officers	21
21 July	Majlis Perbandaran Petaling Jaya, Urban Service Dept.	Staff	30
5 & 12 August	Universiti Pertanian Environmental Science Dept.	Third Year Undergraduates	10
10 August	RISDA, Jalan Ampang	Staff	40
11 August	Institut Kesihatan Umum, Bangsar	Health Officers	30
27 September	Universiti Pertanian Home Science Dept.	Third Year Undergraduates	50
7 October	Institut Kesihatan Umum, Bangsar	General Health Nurses	40
14 October	Institut Kesihatan Umum, Bangsar	Health Inspectors, Senior Nurses	30
2 November	Nippondenso Sdn. Bhd.	Factory Workers	15
		TOTAL	375

Table 8.3

Department of Environment: Participation in Exhibitions Organised by Other Institute/Agency, 1988

Date	Venue	Occasion
16-17 January	Sekolah Menengah Dato' Jaafar, Johor Baharu	Silver Jublee Celebration
18-21 January	Universiti Kebangsaan Malaysia, Bangi	"Workshop on Tropical Urban Ecosystem"
6-8 February	Universiti Kebangsaan Malaysia, Bangi	Geographical Expo '88
8-10 April	Bukit Bintang Plaza	World Environment Day
10-11 April	Kuantan, Pahang	Agriculture Day Kuantan District Level
20-27 August	KOMTAR, Pulau Pinang	World Environment Day
27 September	Bukit Bintang	Malaysia Fest 1988
15-22 October	Universiti Teknologi Malaysia	Faculty of Civil Engineering

Table 8.4

Department of Environment : Users of Environmental Information, 1988

User	Number of User
Students	301
Government Officers	83
Private Sectors	61
Overseas Visitors/ Consultant	53
Others	27
Total	525

CHAPTER 9
HUMAN RESOURCE DEVELOPMENT

HUMAN RESOURCE DEVELOPMENT

Introduction

As in the past years and in line with the Department's policy of upgrading the skills of its staff, training programmes in various fields of environmental management were continued in 1988. The training was divided into long-term (more than three months duration) and short-term programmes (less than three months duration).

Long-Term Training

Long-term training courses offered to the Department were mainly those ranging from three months to two years. These included courses abroad and local. Courses included those for Masters and Bachelor degrees, diplomas including post-graduate, advanced and basic diploma, fellowship programmes and several attachment programmes in collaboration with agencies like UNESCO, UNDP, UNEP, JICA, CSC, CDG. Most courses were subject specific aimed at improving the skills and expertise of officers.

Course Attendance

In 1988,6 officers began attending their long-term courses abroad in United States, Netherlands, Japan and Thailand,3 officers for Masters of Science degrees,one officer for post-graduate diploma courses and two officers for certificate courses,while 5 other officers continued to pursue their studies which began in 1987. The courses covered various aspects of environmental management including resources, industrial pollution and engineering. The list of officers attending long-term training in 1988 is shown in Appendix 9.1

Short-Term Training

The Department organised in-house training which included courses and lectures as well as colloquium sessions apart from sending officers to seminars, workshops and conferences both within the country and abroad. A list of these are given in Appendix 9.2, 9.3, 9.4 and 9.5. Attendance at short-term training programmes abroad was made possible mainly through foreign sponsorship. The United Nations Environment Programme (UNEP) turned out to be the main sponsoring agency expending an estimated M$31,598.00 to sponsor officers of the Department of Environment to attend overseas training programmes. This is followed by The Japan International Co-operation Agency (JICA) together with other Japanese Agencies, spending an estimated expenditure of M$8,754.00 for several programmes. The other contributing agencies are The French Government, International Atomic Energy Agency (IAEA), UNESCO, United States Environmental Protection Agency (USEPA), ASEAN-USAID, ASEAN-CANADA, IMO, ESCAP, UNIDO, etc.

Training Courses

The Department in 1988 was represented at several local training courses organised by both government, semi-goverment and private agencies. During the year, 41 officers attended 24 short term training courses within the country in various fields of environmental management including personnel management (Table 9.1). The Department also took advantage of the training programmes organised and sponsored by agencies under the aegis of the United Nations Organization and other International Bodies. In 1988, 17 officers of the Department attended 13 short-term training courses overseas (Table 9.2).

Workshops

The Department in 1988 was represented in 14 workshops organised locally and 5 workshops overseas. A total of 31 officers were involved in this programme where 26 officers attended workshops organised locally and 5 officers attended workshops organised overseas (Tables 9.1 and 9.2).

Conferences and Seminars

In order to upgrade knowledge and to expose officers especially to new issues related to environmental management, the Department took advantage of the several invitations received to send officers to participate in the conferences and seminars both locally and abroad. In 1988, 63 officers attended 24 local conferences and seminars and 21 officers attended 20 conferences and seminars overseas (Tables 9.1 and 9.2). Figures 9.1 and 9.2 show the distribution of major environment-related topics of training programmes attended both locally and overseas. It can be seen that in 1988, the overseas programmes mainly focussed on water pollution, science and technology, management and the environment in general. Locally, they also formed the main subjects of training programmes with the addition of personnel management.

In-House Training

In 1988 there was an increase in the number of in-house

training programmes organised solely by the Department or in conjunction with other agencies. Details of those training programmes which were attended by a total of 370 officers are shown in Tables 9.3 and 9.4.

Guest Lecturers

In addition to the training programmes the Department has also invited especially guest lecturers to give lectures in their field of expertise that were connected with environmental management. In 1988 lectures presented were as listed in Table 9.5.

Weekly Colloquium

Apart from talks and lectures, the Technical Training Unit also organised a total of 43 colloquium sessions presented by officers who had attended training courses, workshops, seminars and conferences outside the Department. Th areas covered during the year were as follows:

- Marine Pollution
- Science and Technology
- Water Pollution
- Management
- Personnel Development
- Environmental Law
- Health
- Air Pollution
- Waste Disposal
- Socio Economy
- Ecosystem
- Information

The colloquium sessions were made open to other agencie and interested parties including universities and the privat sector.

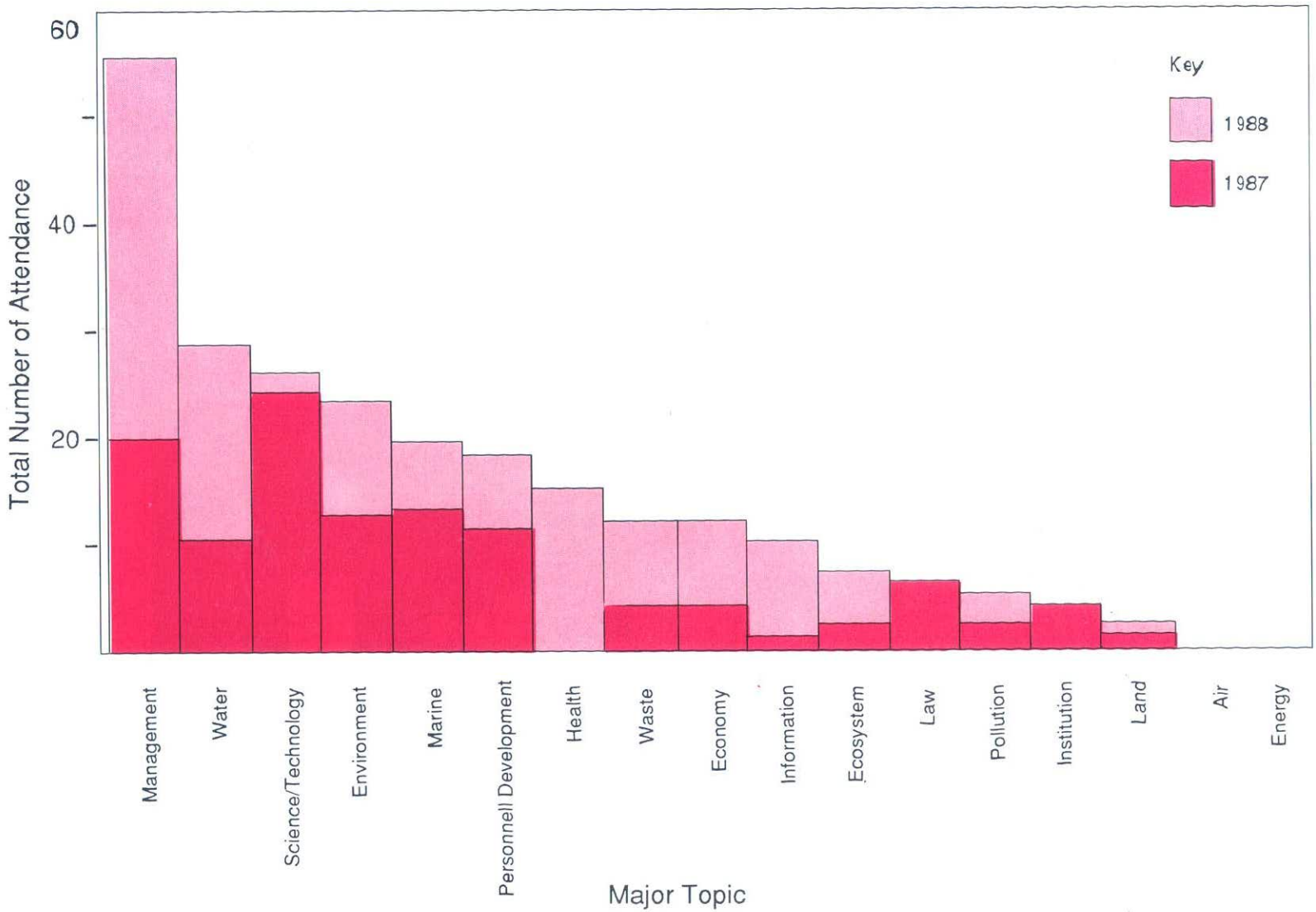


Figure 9.1. Malaysia: The Number of Attendance by The Department of Environment Staff at Training Programmes organised by Local Agencies by Major Topic, 1988

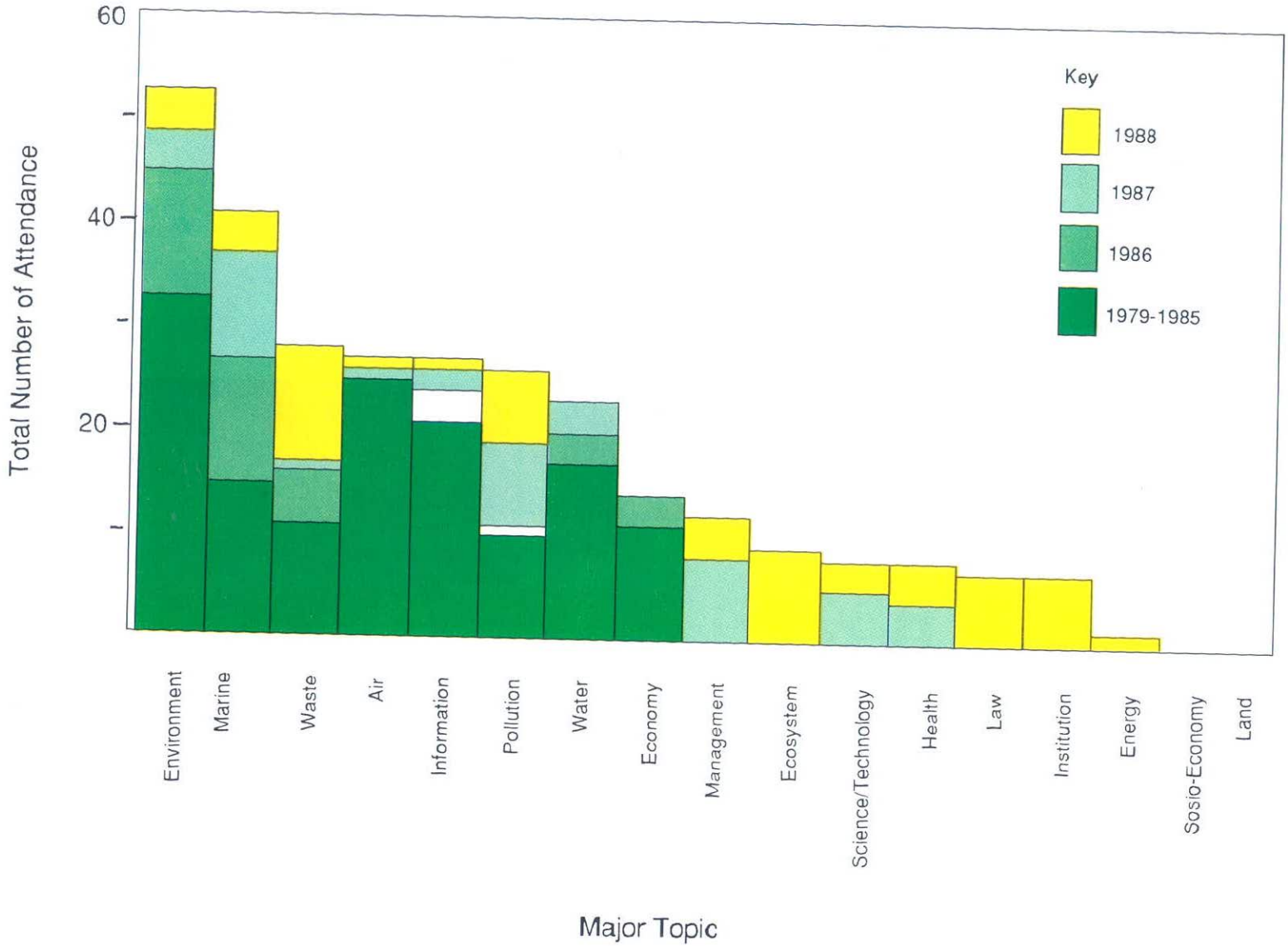


Figure 9.2. Malaysia: The Number of Attendance by The Department of Environment Staff at Training Programmes Overseas by Major Topic, 1979-1988

Table 9.1

Malaysia: Local Training Programmes Attended by Officers of the Department of Environment, Number by Type, 1988.

Type	Number of Programmes	Number of Participants
In- Service Technical Training	17	370
ShortTerm Courses	24	41
Degree/Diploma Courses	-	-
Workshop	14	26
Conference/Seminar	24	63
Total	79	500

Table 9.2

Malaysia: Overseas Training Programmes Attended by Officers of the Department of Environment, Number by Type, 1988.

Type	Number of Programmes	Number of Participants
ShortTerm Courses	13	17
Degree/Diploma Courses	6	6
Workshop	5	5
Conference/Seminar/ Convention/symposium/ Congress	20	21
Total	44	49

Table 9.3

Malaysia: In House Training Programmes Organised by the Department of Environment, 1988.

Title	Major Topic	Date/Place
1. Course on Environmental Impact Assessment	Environment	22 23 March 1988 Dept. of Environment, Kuala Lumpur.
2. Workshop on Principles of Noise Control in Planning.	Pollution	13 15 April 1988 Dept. of Environment, Kuala Lumpur.
3. Workshop on Techniques of Water and Marine Monitoring	Water	14 16 June 1988 Dept. of Environment, Kuala Lumpur.
4. Introductory Course on Toxic and Hazardous Waste Management.	Waste	31 October 2 Nov. 1988 Dept. of Environment, Kuala Lumpur.
5. Workshop on Air Quality Monitoring	Air	9 10 November 1988 Dept. of Environment, Kuala Lumpur.
6. Workshop on Maintenance of Instruments	Management	11 17 November 1988 Dept. of Environment, Kuala Lumpur.
7. Course on Marine Enforcement Procedures	Marine	5 6 Disember 1988 Dept. of Environment, Kuala Lumpur.
8. Workshop on Water Quality Criteria and Standard Projects	Water	13 14 Disember 1988 Dept. of Environment, Kuala Lumpur.

Table 9.4

Malaysia : Training Programmes Jointly Organised by The Department of Environment, 1988

Title	Major Topic	Counterpart Agency	Date/Place
1. Course on Environmental Planning and Management	Environment	INTAN	25-30 January INTAN, K. Lumpur
2. Course on Environmental Impact Assessment	Environment	INTAN	25-27 February INTAN, K. Lumpur
3. Course on Air Quality Management	Air	JICA	7-11 March 1988 Dept. of Environ ment, K. Lumpur.
4. Course on Hazardous Materials Incident Response	Waste	CIDA	14-18 March 1988. Dept. of Environment, K.L
5. Course on Bahasa Malaysia Baku	Information	DBP	28-30 June 1988 Dept. of Environ ment, K. Lumpur.
6. Course on Toxic and Hazardous Waste Landfill, Siting, Design, Construct ion and Operation	Waste	CDG/FRG/ UNEP	6-11 June 1988 Grand Continental Hotel, K. Lumpur
7. Course on Pollution Control for Small and Medium Industries	Pollution	CDG/PDPN	22-26 August 88 Hilton Hotel, P. Jaya.
8. Workshop on Economics cum Environmental Planning	Economy	INTAN/ADB	22-25 August 88 INTAN, K. Lumpur.
9. Second Training Course on Operation and Maintenance of Wastewater Treatment Plants.	Water	UPM	5-10 Disember 88 UPM, Serdang.

Abbreviation

INTAN - National Institute for Public Administration.
JICA Japan International Coperation Agency.
CIDA Canadian International Development Agency.
DBP Dewan Bahasa dan Pustaka
CDG Carl Duisberg Gessellschaft. e.v.
FRG Federal Republic of Germany
UNEP United Nation Environmental Programme
PDPN National Productivity Centre
ADB Asian Development Bank
UPM Malaysian Agricultural University.

Table 9.5

Malaysia : Guest Lectures Organised by The Department of Environment, 1988

Title	Lecturer	Date
1. Demonstration on Micro Computer Based Data Acquisition.	Dr. Assanah , Dr. Wan Ramli and Dr. Kasmiran	6 February 1988
2. Engineering Acoustics Control.	Mr. Joseph Tai .	30 April 1988
3. Dialogue on Noise Control. Dr. D. Fiederer.	Dr. Thomassen and	7 May 1988
4. Presentation on Bio Solve : Emulsifier and Volatile Fuel Encapsulator	Mr. S.K. Chan.	9 July 1988
5. Oil Fields and Separation Technology.	Mr. Rory Carrick	26 October 1988
6. Air Pollution Measurement.	Mr. Robert M. Sasso	23 November 1988
7. Aspects of River Management Related to Water Quality.	Dr. A.L. Downing	25-26 November 1988
8. Open Conduit Flow Meter.	Mr. Ian R. Crow	29 November 1988
9. Creative Writing.	Ms. Sharon Friedman	9 December 1988

" ... ASEAN shall cooperate in promoting the principle of sustainable development and systematically integrating it into all aspects of development and shall focus on the need for policy guidelines to protect ASEAN'S common resources and the environment..."

ASEAN Head of Goverment
MANILA DECLARATION OF 1987

CHAPTER 10
INTERNATIONAL AND REGIONAL AFFAIRS

INTERNATIONAL AND REGIONAL AFFAIRS

INTERNATIONAL

United Nations Environment Programmes (UNEP)

As the focal point of UNEP, the Department of Environment was involved in the following Programme:-

(i) UNEP/CDG Training Workshop on Selection, Design, Construction and Operation of Landfill sites for Hazardous Waste Management, 7-11 June, 1988, Kuala Lumpur.

(ii) Project on 'Socio-Economic Impacts and Policy Responses Resulting' from climate change: A Regional Study - South East Asia.

(iii) The following meetings organised by UNEP were also participated by Department of Environment:-

(a) Second Session of Ad Hoc Working Group of Legal and Technical Experts with mandate to Prepare a Global Convention on the Control of the transboundary Movements of Hazardous Waste, 6-10 June, Caracas, Venuzuela;

(b) Ad Hoc Working Group of Experts on the London Guidelines for the Exchange of Information on Chemicals in Inter-national Trade, 19-23 September, 1988, Dakar, Senegal;

(c) Ad Hoc Working Group of Legal and Technics Experts with mandate to prepare a Global Convention on the Control of the transboundary Movements of Hazardous Waste, 5-7 October 1988, Nairobi, Kenya;

(d) World Congress on Climate Change and Development, 7-11 November 1988, Hamburg, Federal Republic of Germany;

(e) Third Session of the Ad Hoc Working Group of Legal and Technical Experts with mandate to prepare a Global Convention on the control of Transboundary Movements of Hazardous Waste, 7-16 November 1988, Geneva, Switzerland; and

(f) UNEP's Governing Council Meeting on IRPTC - A review on State of Implementation and Funding of IRPTC, 21-24 November 1988, Geneva, Switzerland.

INFOTERRA

Through the services of INFOTERRA, the national focal point has provided information to queries from India, Colombo, Sudan, Poland, Republic of Korea and INFOTERRA PAC in Nairobi. For domestic queries, the user came largely from the department staff and a small number came from other government departments and institutions.

To publicise the services of INFOTERRA, brochure was widely circulated to agencies, universities, institutions, libraries, schools and non-governmental organisations.

Responses received from INFOTERRA have contributed to some major formulation of environmental programmes and legislation in Malaysia. Some recent developments are listed as follows:-

i. reviewing of environmental impact assessment reports on Titanium Dioxide Plant;

ii. Air quality criteria and standard, and assurance programme;

iii. Groundwater Monitoring; and

iv. Regulations for toxic and hazardous waste management.

International Register of Potentially Toxic Chemical (IRPTC)

The Department of Environment continued to be the National correspondent for the International Register of Potentially Toxic Chemicals, an information system under the United Nations Environment Programme which is specifically concerned with the dessimination of information of chemicals.

The National Correspondent operates a query-response

service and provides on request information of chemicals. In 1988, 21 request for information on chemicals were received and processed. Information gathering on the 49 priority chemicals for the National Register of Potentially Toxic Chemicals were continued.

Due to financial constraints and the expanded responsibilities of IRPTC, an Expert Consultation on the International Register of Potentially Toxic Chemicals was convened in Geneve on 21-24 November, 1988. The Consultation reviewed and assessed the current activities of IRPTC with particular reference to its expanded responsibilities and examined its long-term and short-term financial position including the need for, and possibility of obtaining extra-budgetarry funding, in order to secure a stable financial basis for the present and future activities of IRPTC.

The Department continues to be the National Authority for the implementation of the London Guidelines for the Exchange of Information on Chemical in International Trade. The Guidelines were a means to exchange information on national control actions to ban or severely restrict the handling and use of chemicals as well as information regarding trade.

In 1988 the Department received notification of control action from 9 countries on about 41 chemicals mainly pesticides and industrial chemicals. Appendix 10.1 detailed the notification of control actions received from other national authorities in 1988. Twelve notification of import chemicals restricted in the country of origin were also received by the Department.

IRPTC had recently introduced the Prior-Informed Consent (PIC) principle into the London Guidelines, so that prior to the shipment of chemicals, recipient countries would be fully aware of what they are receiving before they agree to their import. An Ad Hoc Working Group of Experts on Prior Informed Consent and Other Modalities to Supplement the London Guidelines was convened in Senegal, from 19-23 September 1988.

International Programme for Chemical Safety (IPCS)

IPCS was established in May 1977 following the resolution of the WHO at its 30th World Health Assembly entitled, 'Evaluation of the Effects of Chemicals on Health' is a collaborative activity between UNDP, ILO and WHO. One principal objective of IPCS is directed towards the study of the impacts to human health of chemicals and their safe use.

The Department of Environment was designated the Malaysian IPCS Focal Point in late 1986. References to IPCS publications can be made through the Department.

REGIONAL CO-OPERATION

ASEAN Experts Group on Environment (AEGE)

An Experts Group on Environment, consisting of representative from the ASEAN countries, was established under the ASEAN Committee on Science Technology as a forum for dealing with the environmental matters of the region.

The Department of Environment as the focal point of AEGE was involved in the following activities:-

(i) The Eleventh Meeting of AEGE, 20-22 July 1988, Yogyakarta, Indonesia;

(ii) Project on 'Anti-Pollution Technology'. Malaysia has a project on 'Development on an Anti-Pollution Woodwaste Burner';

(iii) Project on 'Training of Environmental Education Project for Science Teachers and Supervisors';and

(iv) Contributing articles for ASEAN Environment Newsletter, produced by Philippines, the present Interim Coordinator of AEGE.

Coordinating Body on the Seas of East Asia (COBSEA)

The Coordinating Body on the Seas of East Asia (COBSEA), established at the Intergovernmental Meeting on the East Asian Seas Action Plan, held in Bangkok, 1981 is essentially an extension of the ASEAN Experts Group on the Environment

(AEGE). The Body Comprising of the ASEAN member countries has its general objectives an assessment of the state of marine environment and the protection, management and use of marine resources, in the ASEAN region. In 1982, COBSEA drew up the East Asian Seas Action Plan which is a scientific programme involving research, prevention and control of marine pollution and monitoring in the regional seas surrounding the ASEAN region.

Malaysia participated practically in all the projects that are currently being implemented under this programme. Table 10.1 lists the status of the on-going projects and their respective lead countries. The Project on EAS 12: Co-operative Research on Oil and Oil Dispersant Toxicity in the East Asian Seas Region in which Malaysia had took the lead in its implementation had been completed and report of its technical findings had been submitted for evaluation.

Malaysia had also taken the lead in the Implementation of Project EAS 19: Development of Management Plans for Endangered Coastal and Marine Living Resources.

The Seventh COBSEA Meeting held in Yogyakarta, Indonesia, 17-19 July, 1989 besides reviewing the progress of on-going projects also considered continuing the activity on Oil Pollution Control in the East Asian Region consisting of the following components: Oceanographic features, survey and monitoring of oil pollution and Oil Spill Contingency Planning in the East Asian Seas Region.

During the year, Malaysia had also represented in the following activities:-

(i) Workshop on Methodology for Oceanographic Measurement and Analysis for Impact Assessment Studies in Coastal Areas (Project EAS 14), Pattaya, Thailand, 24-28 February, 1988;

(ii) Training Course on the Methodologies of Assessment of Pollution from Land-Based Sources, Singapore, 3-13 May, 1988; and

(iii) Assessment Meeting on Project EAS 16.

The Department of Environment, being the focal point of this Program Monitor, co-ordinate and review all the Projects under the Action Plan.

As far as Malaysia is concerned participation in the COBSEA programme has brought some changes either directly or indirectly in various policies, programmes, plans, and legislation relating to the marine environment such as:

- the incorporation of marine dimension in the national environmental policy objectives in the Fifth Malaysia Plan, 1986-1990;

- the incorporation of provision relating to the protection and preservation of the marine environment in the Exclusive Economic Zone Act of 1905;

- the harmonization of all marine environment related laws, particularly for the control of pollution from ships, offshore exploration and exploitation, land-based sources, and other activities on the continental shelf;

- the strenghtening of marine pollution research and monitoring committees under the National Council for Scientific Research and Development; and

- increased inter-agency co-ordination in matters relating to the marine environment.

ASEAN Co-operative Programmes on Marine Science

The ASEAN Working Group on Marine Science (AWGMS) was established in 1978 under the Supervision of the Committee on Science and Technology. The objectives of this regional co-operation amongst others are to establish, a co-operative, collaborative and co-ordinative research efforts in the utilization and management of marine and coastal environment. Since then the AWGMS has developed three major co-operative programmes with its dialogue partners namely:

Australia, Canada and the United States of America. The three co-operative programmes with its respective lead country and lead agency in Malaysia are as follows:-

Programme	Lead Country	Lead Agency
1. ASEAN-Australia (1984-1989)	Singapore	Royal Malaysian Navy
i) Tides and Tidal Phenomena		
ii) Coastal Living Resources	Thailand	Department of Environment
2. ASEAN-Canada (1985-1988)	Malaysia	Department of Environment
3. ASEAN-USAID (1985-1989)	Philippines	Department of Fisheries

In 1988, the Department of Environment continued being the Secretariat of the National Working Group on Marine Science which is responsible for co-ordination and implementation of the programmes in Malaysia.

ASEAN-Australia

(i) Project I - Tides and Tidal Phenomena: the main objective of this project is to observe and study the tides and its phenomena in the region. A network of 23 tides gauges has been installed in five participating member countries of ASEAN. In Malaysia five stations were set-up namely: Pulau Lakei (Sarawak), Sandakan, Labuan and Terumbu Layang-Layang (Sabah) and Tapis Alpha (off Terengganu). Tides data were also collected at 12 existing stations located around Peninsular Malaysia.

(ii) Project II : Coastal Living Resources : The objective of this study is to develop scientific and technical expertise within the ASEAN region particularly in coastal ecosystems so as to ensure the development of effective and long term coastal zone management policies.

The project consisting of three components namely: Mangrove, Coral Reef and Benthic Communities Study were conducted by the following institutions in the country:

1.	Mangrove Survey	: UM and USM
2.	Coral Reef	: UPM and UKM
3.	Benthic Communities	: UKM

ASEAN-Canada

The project has its general objective in optimising the management and development of living resources within the jurisdiction of ASEAN countries including the Exclusive Economic Zone (EEZ) as well as to strengthen the ASEAN capabilities through regional cooperation in manpower development, exchange of expertise and dissimination of information.

Five major activities were indentified in this project namely: postgraduate training, ASEAN study tour to Canada, regional workshop and practical attachment: The last component the practical attachment program had been sucessfully completed during the year. The Department of Environment as the Asean Coordinator for the project had also published two issues of its newsletter: 'The Common Frontier'.

ASEAN-US AID

The project aims in assisting the ASEAN member countries in strengthening their capabilities to utilize their renewable resources on a sustainable basis, comprise of two major components:

(i) Component I : Resource Assessment and Planning
(ii) Component II : Training and Information Dissimination

In Malaysia the Resource Assessment and Planning Component of the Project is being conducted in the coastal areas of South Johore. Detailed study on various aspects of coastal elements including coastal forest, water quality management, erosion sosio-economic and institutional framework have been identified with the aim of developing an integrated coastal resource planning and management.

Throughout the year of 1988 Malaysia had participated in several activities under the Co-operative Programme on Marine Science as follows:

(i) The Third Project Steering Committee Meeting of ASEAN-Canada and ASEAN-US Co-operative Programme on Marine Sciences, 2-4 February, Kuala Lumpur;

(ii) ASEAN-Australia Project on Coastal Living Resources: Workshop on MicroBrian, February, UPM, Serdang, Selangor;

(iii) ASEAN-US Training Course in 'Principles of Coastal Resources Management', 3-16 April, Jakarta, Indonesia;

(iv) In Country Workshop of ASEAN-US Coastal Resources Management Project, 26-28 July, Desaru, Johor;

(v) 5th. Project Management Communities Meeting and Workshop of ASEAN Australia Project on Tides and Tidal Phenomena, 1-5 August, Manila, the Philippines;

(vi) International Symposium on Coral Reef, 7-11 August, Townsville, Australia;

(vii) 5th. Project Management Committee Meeting of ASEAN-Australia Project a Coastal Living Resources, 15-19 August, Townsville, Australia;

(viii) ASEAN-US Policy Workshop on Coastal Area Management, 25-27 October, Johor Bahru, Johor;

(ix) ASEAN-US Technical Workshop on Coastal Resource Management Project, 28-31 October, Singapore; and

(x) Training Course in Geographical Information System, 1-12 November, Singapore.

As far as Malaysia is concerned, Malaysia have benefitted directly and indirectly from these co-operative programmes inter area:

- enhanced development of human resources, particularly in the marine related science largely through training at various levels from the conduct of training workshops, seminars, study tour to post-graduated studies, including regular and rapid exchange of information through publications, seminars and workshops; and

- increased technical assistance through the provisions of advisory and consultancy services.

The Straits of Malacca and Singapore Revolving Fund

The Straits of Malacca and Singapore Revolving Fund Committee was set up in February 1981. It is constituted of one representative from each littoral state of Indonesia,

Malaysia and Singapore. The Fund is to be administered on a potational basis in the alphabetical order for a period of 5 years each.

In carrying out of its functions and responsibilities, the Revolving Fund Committee has had two meetings held in Malaysia as follows:-

(i) The Ninth Annual Meeting of the RFC held in Subang Selangor Darulehsan on 13-14 July 1988. This meeting discussed on the annual administrative and operational budget 1988/89. Other matters were also discussed and this include the proposal for the joint oil spill exercise.

(ii) The Third Technical Meeting of the Revolving Fund Committee held in Subang, Selangor Darulehsan on 19-20th. December, 1988. The Technical Committee which consists of representative from Indonesia, Singapore and Malaysia discussed on the Draft proposal of the Joint Oil Spill Combating Exercise in the Straits of Malacca and Singapore to test the Standard Operating Procedure. The Committee agreed that the exercise be carried out however it is subjected to the approval of the Malacca Strait Council.

BILATERAL CO-OPERATION AND ASSISTANCE

The Department of Environment recieved technical assistance from foreign countries under the various bilateral co-operation and assistance programmes. The technical assistance includes consultant services, study tours, sponsorship to attend workshop/seminar or courses as follows:-

1. Japan (JICA)
   (i) Training Course on Air Pollution Monitoring.
   (ii) Marine Environment Protection Course - 20 August - 29 October 1988, Okinawa, Japan; and
   (iii) Seminar on Motor Vehicle Emission Standards and Inspection System - Japan.

2. France
   (i) Dispatch of experts Mr. Frederick Semete, for project on 'Tracking and Monitoring of Schedule Waste' - September 1987 - December 1988.
   (ii) Study Visit to France - 22-31 October 1988.
   (iii) Study Visit to France.

3. Federal Republic of Germany
   (i) Dispatch of 2 consultants, Dr. Thomassen and Dr. Fiedeser foe 'Study on the state of noise control and future Development of Noise abatement in Malaysia' - February-May 1988.
   (ii) CDG Training Course on Pollution Control for Small and Medium Size Industries - 20-25 August 1988, Kuala Lumpur.

4. Sweden
   (i) Study Visit to Sweden - 28 November - 12 December 1988.

5. Canada (CIDA)
   (i) Training Course on the CHEMIS Software -July 1988.

Official opening of the training course for DOE staff sponsored by JICA

Participants at the Course on Hazardous Materials Incident Response sponsored by CIDA, 14-18 March, 1988

Officiating a project under the ASEAN-US Cooperative Programme

Table 10.1

Malaysia: Status of Activities Implemented Under the Coordinating Body on the Seas of East Asian Programmes - 1988

Activity	Status	Malaysia's Responsibility
1. EAS 14: Study of The maritime Meteorological Phenomena and Oceanographic Features of the East Asian Seas Region	on going and expected on complete in December, 1989	Participating Country. Implementing Agency: (1) Meteorological Services Department (2) UPM (3) University Teknologi Malaysia (UTM)
2. EAS 16: Assessment of Concentration Levels and Trends of Non-Oil Pollutants and Their Effects of the Marine Environment in the East Asian Region.	on going and expected on complete in December, 1989.	Participating Country. Implementing Agency: (1) Fisheries Research Institute Penang (2) Chemistry Department
3. EAS 19: Development of Management Plans for Endangered Coastal and Marine Living Resources - Training Phase.	on going and expected to terminate in December, 1989.	Lead Country Implementing Agency: (1) Fisheries Department
4. EAS 21: Assessment of land-based, urban, industrial and agricultural sources of pollution, their environmental impact and development of recommendations for possible control measures.	on going and expected to terminate in April, 1989.	Participating Country. Implementing Agency: (1) Department of Environment
5. EAS 20: Establishment and management of Marine Database and Information	continuing until December, 1989.	Participating Country. Implementing Agency: (1) Department of Environment

APPENDIX

APPENDIX 9.1

LIST OF OFFICERS ATTENDING LONG-TERM COURSES FOR MANPOWER DEVELOPMENT, 1988

NAME	TITLE OF COURSES	VENUE	DATE	SPONSORS/ORGANIZERS
Hasmah Harun	Masters of Science (Environmental Resources)	U.K.	1.10.1988 1.9.1989	PSD (ASEAN-JAPAN)
Lee Heng Keng	Masters of Science (Environmental Engineering)	THAILAND	1.9.1988 1.8.1990	PSD (ASEAN-USAID)
Abdul Aziz Abd. Rasul	Masters of Science (Environmental Engineering)	THAILAND	1.9.1988 1.8.1990	PSD (ASEAN-USAID)
Pauziah Hanum Abdul Ghani	Post-Graduate diploma Course (Environmental Science and Technology)	NETHERLAND	1.10.1988 1.9.1989	NETHERLAND GOVERNMENT
Rahmah Mohd Tahir	Remote Sensing Training Course for Environmental Resources Development and Management	THAILAND	5.9.1988 16.12.1988	CDG/AIT/ADB
Jamaludin Sulaiman	Industrial Pollution Control Course	JAPAN	21.11.1988 20.3.1989	COLOMBO PLAN/JICA

APPENDIX 9.2

LIST OF OVERSEAS SEMINARS, WORKSHOPS AND CONFERENCES ATTENDED BY THE DEPARTMENT OF ENVIRONMENT OFFICERS, 1988

NAME	TITLE OF SEMINAR/WORKSHOP/CONFERENCE	SPONSOR/ VENUE	DATE	ORGANISER
HALIMAH HASSAN	AD HOC WORKING GROUP OF EXPERTS ON THE LONDON GUIDELINES FOR THE EXCHANGE OF INFORMATION ON CHEMICALS IN INT. TRADE	SENEGAL	19/9-23/9/88	UNEP
HASHIM DAUD	INFORMATION SESSION ON URBAN AND INDUSTRIAL WASTE COLLECTION AND TREATMENT	FRANCE	15/2-4/3/88	ACTIM/F
ABU BAKAR JAAFAR,DR	WORKSHOP ON SUBSTITUTES OF CHLORO-FLUORO CARBONS	WASHINGTON D.C	13-15/1/88	USEPA
ABU BAKAR JAAFAR,DR.	WORKSHOP ON DEVELOPING COUNTRY ENERGY STRATEGIES: IMPLICATIONS FOR THE GREENHOUSE PROBLEM	WASHINGTON	27-29/4/88	EPA/WRI
AJIS HAMJAH	WORKSHOP ON CLASSIFICATION SYSTEMS FOR CHEMICALS BASED ON TOXICITY AND HAZARD	LENINGRAD	29/2-4/3/88	IRPTC
HASSAN MAT	INTERNATIONAL WORKSHOP ON ENVIRONMENTAL IMPACT ASSESSMENT OF PORT DEVELOPMENT	BALTIMORE,USA	14-17/11/88	IMO
OMAR MD.ZAIN	REGIONAL WORKSHOP ON MANAGEMENT OF THE ENVIRONMENTAL IMPACT OF WATER RESOURCES DEVELOPMENT PROJECTS	USSR	22-30/6/88	ESCAP/UNEP
GOH KIAM SENG	WORLD CONGRESS OF CLIMATE AND DEVELOPMENT	HAMBURG	7-10/11/88	UNEP
ABU BAKAR JAAFAR,DR.	POLICY-MAKERS FORUM FOR THE NATURAL RESOURCES PROGRAMME	BANGKOK	2-3/6/88	INDP/MP
AZIZ KASSIM	STUDY VISIT TO SWEDEN	SWEDEN	28/11-12/12/88	NBF,SWEDEN
PETER HO	STUDY VISIT TO CANADIAN CENTRE FOR INLAND WATERS (CCIW) AND ATTENDING STATISTICAL MTDS FOR ASSESSMENT OF POINT SOURCE POLLUTION.	BURLINGTON	9-16/9/88	IDRC
PETER HO	STUDY VISIT TO IDRC AND DISCUSSION WITH FEDERAL ENVIRONMENTAL ASSESSMENT REVIEW OFFICERS	OTTAWA	17-21/9/88	IDRC

APPENDIX 9.2 (continuation)

NAME	TITLE OF SEMINAR/WORKSHOP/CONFERENCE	VENUE	DATE	SPONSOR/ ORGANISER
SOO AH KAN	STUDY VISIT TO FRANCE	FRANCE	22-31/10/88	FRENCH GOVT.
TAN MENG LENG	DELEGATE TO MINISTER OF SCIENCE TECHNOLOGY AND ENVIRONMENT OFFICIAL VISIT TO WASHINGTON.	WASHINGTON	JUN,1988	K'JAAN M'SIA
AB.RAHMAN AWANG	PACIFIC BASIN CONFERENCE ON HAZARDOUS WASTE	HONULULU	1-5/2/88	EWC
ABU BAKAR JAAFAR, DR.	INTERNATIONAL ASSOCIATION FOR IMPACT ASSESSMENT (IAIA) CONFERENCE	BRISBANE	28/6-9/7/88	IAIA
GHAZALI MOHD.NOOR	7TH OFFSHORE SOUTH EAST ASIA CONFERENCE AND EXHIBITION	SINGAPORE	2-5/2/88	TARC
RUSLI CHE HUSIN	7TH OFFSHORE SOUTH EAST ASIA CONFERENCE AND EXHIBITION	SINGAPORE	2-5/2/88	TARC
TAN MENG LENG	GLOBAL CONVENTION ON THE CONTROL OF THE TRANSBOUNDARY MOVEMENTS OF HAZARDOUS WASTE	NAIROBI	5-7/10/88	UNEP
TAN MENG LENG	GLOBAL CONVENTION ON THE CONTROL OF THE TRANSBOUNDARY MOVEMENTS OF HAZARDOUS WASTES	GENEVA	1-5/2/88	UNEP
TAN MENG LENG	GLOBAL CONVENTION ON THE CONTROL OF THE TRANSBOUNDARY MOVEMENTS OF HAZARDOUS WASTE	CARACAS	6-10/6/88	UNEP
AMINUDDIN ISHAK	SEMINAR ON MOTOR VEHICLE EMISSION STANDARDS AND INSPECTION SYSTEM	JAPAN	7-22/3/88	MOT,JAPAN
MEXLIEN ANAK GOMBEK	REGIONAL SEMINAR ON THE APPLICATION OF ENVIRONMENTAL IMPACT ANALYSIS IN THE APPRAISAL OF DEVELOPMENT PROJECT PLANNING	BANDUNG	30/5-11/6/88	UNEP/INT
ROSMAH YUSOF	THIRD TRAINING SEMINAR ON CONTROL OF CHEMICAL HAZARDS	MOSCOW	20/9-4/10/88	UNEP
RUSLI CHE HUSIN	REGIONAL SEMINAR ON MARPOL 73/78	SINGAPURA	3-7/10/88	UNDP
SAYUTI SAPEAI	REGIONAL SEMINAR ON THE APPLICATION OF ENVIRONMENTAL IMPACT ANALYSIS IN THE APPRAISAL OF DEVELOPMENT PROJECT PLANNING	BANDUNG	30/5-11/6/88	UNEP/INT

APPENDIX 9.3

LIST OF OVERSEAS TRAINING COURSES ATTENDED BY THE DEPARTMENT OF ENVIRONMENT OFFICERS, 1988

NAME	TITLE OF TRAINING COURSES	VENUE	DATE	ORGANISER
AMER OTHMAN	TOXIC AND HAZARDOUS WASTE MANAGEMENT FOR DEVELOPING COUNTRIES COURSE	BANGKOK	12/97/10/88	ASEAN-USAID
CHE ANI HASHIM	TOXIC AND HAZARDOUS WASTE MANAGEMENT FOR DEVELOPING COUNTRIES COURSE	BANGKOK	12/9-7/10/88	ASEAN-USAID
HASSAN MAT	TRAINING ON HP-SQL/HP-UX	SINGAPORE	28/11-2/12/88	HP
ISMAIL ITHNIN	REGIONAL TRAINING COURSE ON ASSESSMENT OF LAND-BASED URBAN, INDUSTRIAL AND AGRICULTURAL SOURCES OF POLLUTION	SINGAPORE	3-13/5/88	UNEP
JALALUDDIN ISMAIL	COURSE ON ENVIRONMENTAL IMPACT ASSESSMENT	UNITED KINGDOM	3/7-23/9/88	U.K.COL.PLAN
JIMAT BOLHASSAN	TRAINING ON HP-SQL/HP-UX	SINGAPORE	28/11-2/12/88	HP
KALSOM ABD.GHANI	INTERNATIONAL ASSOCIATION FOR IMPACT ASSESSMENT (IAIA) CONFERENCE AND TRAINING COURSE ON EIA	BRISBANE	28/6-9/7/88	IAIA
KHADIJAH ALI	TOXIC AND HAZARDOUS WASTE MANAGEMENT FOR DEVELOPING COUNTRIES COURSE	BANGKOK	12/9-7/10/88	ASEAN-USAID
MOHD.HASHIM MALEK	REGIONAL TRAINING COURSE ON HANDLING AND DISPOSAL OF NUCLEAR WASTE	BEIJING	2-24/5/88	IAEA
MUSLINA SULAIMAN	MARINE ENVIRONMENT PROTECTION COURSE	JEPUN	20/8-29/10/88	JICA
PATRICK TAN	NATIONAL TRAINING COURSE ON INDUSTRIAL POLLUTION CONTROL FOR SMALL AND MEDIUM INDUSTRIES	BANGKOK & P.JAYA	15-27/8/88	DOE/CDG/PDPN
PETER HO	INTERNATIONAL ASSOCIATION FOR IMPACT ASSESSMENT (IAIA) CONFERENCE AND TRAINING COURSE ON EIA	BRISBANE	28/6-9/7/88	IAI
SITI RUGAYAH DUGEL	REGIONAL TRAINING COURSE ON ASSESSMENT OF LAND-BASED URBAN, INDUSTRIAL AND AGRICULTURAL SOURCES OF POLLUTION	SINGAPORE	3-13/5/88	UNEP

APPENDIX 9.3 (continuation)

NAME	TITLE OF TRAINING COURSES	VENUE	DATE	ORGANISER
ZAINAL ABDULLAH	PRACTICAL ATTACHMENT UNDER ASEAN-CANADA PROGRAMME ON MARINE SCIENCE	CANADA	30/5-8/7/88	ASEAN-CANADA
ZAINAL ABDULLAH	TRAINING COURSE ON THE CEHEMIS SOFTWARE	CANADA	JULY, 1988	BENNET ENV.
ZAMRUDAH YEOP	TRAINING COURSE ON MICRO-COMPUTER METHODS FOR ENVIRONMENTAL STUDIES	SURABAYA	1-7/2/88	UNESCO
ZULKIFLI ABD. RAHMAN	REGIONAL TRAINING COURSE ON ASSESSMENT OF LAND-BASED URBAN, INDUSTRIAL AND AGRICULTURAL SOURCES OF POLLUTION	SINGAPORE	3-13/5/88	UNEP

APPENDIX 9.4

LIST OF LOCAL SEMINARS, WORKSHOPS AND CONFERENCES ATTENDED BY THE DEPARTMENT OF ENVIRONMENT OFFICERS, 1988

NAME	TITLE OF SEMINAR/WORKSHOP/CONFERENCE	VENUE	DATE	SPONSOR/ ORGANISER
AB.RAHMAN AWANG	SEMINAR ON POLYCHLORINATED BIPHENYLS (PCB).	P.JAYA	3/3/88	WEST.IND.LTD.
AHMAD IBRAHIM	SEMINAR ON FLOOD MITIGATION.	K.LUMPUR	14-17/11/88	JPT/JICA
AMINUDDIN ISHAK	SYMPOSIUM ON TRANSPORTATION PLANNING AND POLICY FORMULATION IN KLANG VALLEY	SHAH ALAM	15-16/9/88	UPLK/JPM
AZHAR ZAINAL ABIDIN	SEMINAR ON URBAN ENVIRONMENTAL HEALTH	K.LUMPUR	9-10/2/88	AREEA
CHARANPAL SINGH	SEMINAR ON POLLUTION OF WATER RESOURCES	SHAH ALAM	17-18/11/88	JKR
CHE MOHD.AZHAR CHE MOHD NOOR	SEMINAR ON URBAN ENVIRONMENTAL HEALTH	K.LUMPUR	9-10/2/88	AREEA
GOH KIAM SENG	SEMINAR ON PROGRAMME IMPROVEMENT AGAINST CORRUPTION IN PUBLIC SERVICES.	INTAN	17-18/10/88	INTAN
HALIMAH HASSAN	SEMINAR ON STRATEGIC R&D PLANNING	K.LUMPUR	8-12/8/88	MPKSN/MARDI
HALIZA ABD. AZIZ	SEMINAR ON POLLUTION OF WATER RESOURCES.	SHAH ALAM	17-18/11/88	JKR
HJH.ROSNANI IBARAHIM	SEMINAR ON GEOGRAPHICAL INFORMATION SYSTEM FROM ESRI	K.LUMPUR	15/11/88	KS(M) SDN.BHD.
HJH.ROSNANI IBARAHIM	SEMINAR ON A SCIENTIFIC UPDATE ON ASBESTOS AND HEALTH	K.LUMPUR	19/7/88	PER.ASB.PAC.SEL
ISMAIL ITHNIN	SEMINAR ON A SCIENTIFIC UPDATE ON ASBESTOS AND HEALTH	K.LUMPUR	19/7/88	PER.ASB.PAS.SEL
JAMALUDDIN MAHMUD ABU BAKAR	SEMINAR ON HEWLETT PACKARD'S COMPUTING SOLUTION	K.LUMPUR	30/6/88	HEWLETT PACKARD
JAMALUDDIN MAHMUD ABU BAKAR	SEMINAR ON COMPUTER SCIENCE II - COMPUTER INNOVATION IN MALAYSIA.	UKM	6-7/4/88	UKM

APPENDIX 9.4 (continuation)

NAME	TITLE OF SEMINAR/WORKSHOP/CONFERENCE	VENUE	DATE	SPONSOR/ ORGANISER
JIMAT BOLHASSAN	SEMINAR ON EARTH RESOURCES: DATA SYSTEMS AND APPLICATIONS	K.LUMPUR	12-14/7/88	TERRA CONTROL
KAMALAKARAN NADESON	SEMINAR ON STRATEGIC R&D PLANNING	K.LUMPUR	8-12/8/88	MPKSN/MARDI
KAMARUDDIN ISMAIL	SEMINAR ON URBAN ENVIRONMENTAL HEALTH	K.LUMPUR	9-10/2/88	AREEA
KARIMAH YUNUS	SEMINAR ON WASTEWATER DESLUDGING BY DECANTER	P.JAYA	16/3/88	ENSEARCH
LEE HENG KENG	SEMINAR ON THE MARINE ENVIRONMENT CHALLENGES AND OPPORTUNITIES	K.LUMPUR	31/3-2/4/88	ENS/ESSO/P'NAS
MAKETAB MOHAMED	SEMINAR ON POLLUTION OF WATER RESOURCES.	SHAH ALAM	17-18/11/88	JKR
MOHAMAD SHUKRI AHMAD MARZUKI	SEMINAR ON OIL SPILL CONTROL.	K.LUMPUR	21/1/88	PATI BUMI S.BHD
MOHD. HASHIM MALEK	NATIONAL SEMINAR ON RADIATION PROTECTION.	BANGI	28-29/11/88	UTN
MOHD. ZAILANI KORDI	SEMINAR ON MANAGEMENT AND MAINTENANCE OF SCIENTIFIC EQUIPTMENT.	BANGI	23-24/11/88	UTN
MOHD.HASHIM MALEK	SEMINAR ON POLYCHLORINATED BIPHENYLS (PCB)	P.JAYA	3/3/88	WEST.IND.LTD.
MOHD.IZZUDDIN GHANI	SYMPOSIUM ON TRANSPORTATION PLANNING AND POLICY FORMULATION IN KLANG VALLEY.	SHAH ALAM	15-16/9/88	UPLK/JPM
NOOR ALSHURDIN	SEMINAR ON STRATEGIC R&D PLANNING	K.LUMPUR	8-12/8/88	MPKSN/MARDI
NORAZIAN ABD.HAMID	SEMINAR ON WASTEWATER DESLUDGING BY DECANTER	P.JAYA	16/3/88	ENSEARCH
NORHAYATI ABU MANSOR	SEMINAR ON URBAN ENVIRONMENTAL HEALTH	K.LUMPUR	9-10/2/88	AREEA
NORIZAN ABU BAKAR	SEMINAR ON POLLUTION OF WATER RESOURCES.	SHAH ALAM	17-18/11/88/	JKR
NORLIN JAAFAR	SEMINAR ON A SCIENTIFIC UPDATE ON ASBESTOS AND HEALTH	K.LUMPUR	19/7/88	P.A.P.S

APPENDIX 9.4 (continuation)

NAME	TITLE OF SEMINAR/WORKSHOP/CONFERENCE	VENUE	DATE	SPONSOR/ ORGANISER
NORMADIAH HUSIEN	SEMINAR ON WASTEWATER DESLUDGING BY DECANTER	P.JAYA	16/3/88	ENSEARCH
OMAR MD.ZAIN	SEMINAR ON RESIDENT MOBILITY AND URBANISATION.	PORT DICKSON	28-30/4/88	LPPKN
RADZUAN YUNUS	SEMINAR ON OIL SPILL CONTROL.	K.LUMPUR	21/1/88	PATI BUMI S.BHD
RAHMAH MD.TAHIR	SEMINAR ON EARTH RESOURCES: DATA SYSTEMS AND APPLICATIONS	K.LUMPUR	12-14/7/88	TERRA CONTROL
RJ.AMINAH RJ.BAKAR	SEMINAR ON WASTEWATER DESLUDGING BY DECANTER	P.JAYA	16/3/88	ENSEARCH
ROSLINA ABD. RAHIM	SEMINAR ON WASTEWATER DESLUDGING BY DECANTER	P.JAYA	16/3/88	ENSEARCH
SAMSUDIN CHE ABAS	SEMINAR ON URBAN ENVIRONMENTAL HEALTH	K.LUMPUR	9-10/2/88	AREEA
SANUSI SULAIMAN	RAS/86/162: SEMINAR ON TRANSPORT, HANDLING AND STORAGE OF DANGEROUS AND HARMFUL SUBSTANCES AT SEA IN PORT AREAS	P.PINANG	16-20/8/88	KEM.PENGANGKUT
SANUSI SULAIMAN	SEMINAR ON THE MARINE ENVIRONMENT CHALLENGES ADN OPPORTUNITIES	K.LUMPUR	31/3-2/4/88	ENS/ESSO/P'NAS
SAYUTI SAPEAI	SEMINAR ON THE MARINE ENVIRONMENT CHALLENGES AND OPPORTUNITIES	K.LUMPUR	31/3-2/4/88	ENS/ESSO/P'NAS
SITI RUGAYAH DUGEL	SEMINAR ON GEOGRAPHICAL INFORMATION SYSTEM FROM ESRI	K.LUMPUR	15/11/88	KS(M) SDN.BHD.
SITI ZALEHA IBRAHIM	SEMINAR ON POLYCHLORINATED BIPHENYLS (PCB)	P.JAYA	3/3/88	WEST.IND.LTD.
SOO AH KAN	SEMINAR ON POLYCHLORINATED BIPHENYLS	P.JAYA	3/3/88	WEST.IND.BHD.
T.ARUMUGAM	SEMINAR ON URBAN ENVIRONMENTAL HEALTH	K.LUMPUR	9-10/2/88	AREEA
TG.BAKRY SHAH	SEMINAR ON GEOGRAPHICAL INFORMATION SYSTEM FROM ESRI	K.LUMPUR	15/11/88	KS(M) SDN.BHD.
WAN MOHD. YUNUS	SEMINAR ON MANAGEMENT AND MAINTENANCE OF SCIENTIFIC EQUIPMENT.	BANGI	23-24/11/88	PUSPATI

APPENDIX 9.4 (continuation)

NAME	TITLE OF SEMINAR/WORKSHOP/CONFERENCE	VENUE	DATE	SPONSOR/ ORGANISER
WAN MOHD. YUNUS	SEMINAR ON OIL SPILL CONTROL.	K.LUMPUR	21/1/88	PATI BUMI S.BHD
WAN RAMLAH WAN IBRAHIM	SEMINAR ON POLYCHLORINATED BIPHHENYLS (PCB)	P.JAYA	3/3/88	WEST.IND.LTD.
WONG FONG MENG	SEMINAR ON FLOOD MITIGATION.	K.LUMPUR	14-17/12/88	JPT/JICA
Y.M TG.BAKRY SHAH	SEMINAR ON HEWLETT PACKARD'S COMPUTING SOLUTION	K.LUMPUR	30/6/88	HEWLETT PACKARD
Y.M.TG.BAKRY SHAH	INTERNATIONAL SEMINAR AND EXHIBITION ON COMPUTERISATION FOR DEVELOPMENT -THE RESEARCH CHALLENGE	K.LUMPUR	16-18/8/88	UPM/MAMPU/INTAN
ZAINAL ABDULLAH	SEMINAR ON OIL SPILL CONTROL.	K.LUMPUR	21/1/88	PATI BUMI S.BHD
ZULKIFLI ABD. RAHMAN	SEMINAR ON POLLUTION OF WATER RESOURCES.	SHAH ALAM	17-18/11/88	JKR
ABU HASAN MOHD.ISA	NATIONAL SEMINAR/WORKSHOP ON MONITORING STRATEGY IN ENVIRONMENTAL MANAGEMENT AND ASSESSMENT.	K.LUMPUR	28/11-1/12/88	UKM
AMER OTHMAN	WORKSHOP ON INDUSTRIAL AND LABORATORY SAFETY	K.LUMPUR	23-25/3/88	INS.KIMIA M'SIA
CHARANPAL SINGH	SECOND WORKSHOP ON PIG FARMING IN MALAYSIA	PORT DICKSON	20-22/1/88	UNDP/JAB:HAIWAN
HANILI GHAZALI	NATIONAL SEMINAR/WORKSHOP ON MONITORING STRATEGY IN ENVIRONMENTAL MANAGEMENT AND ASSESSMENT.	K.LUMPUR	28/11-1/12/88	UKM
HASHIM DAUD	ECONOMIC CUM ENVIRONMENTAL PLANNING WORKSHOP	INTAN	22-25/8/88	INTAN/ADB/DOE
HJH.ROSNANI IBARAHIM	NATIONAL SEMINAR/WORKSHOP ON MONITORING STRATEGY IN ENVIRONMENTAL MANAGEMENT AND ASSESSMENT.	K.LUMPUR	28/11-1/12/88	UKM
IBRAHIM MAJID	WORKSHOP ON SANITARY LANDFILL.	BUTTERWORTH	4/8/88	MPSP/JICA/KPKT
JAMALUDDIN SULAIMAN	WORKSHOP ON MICROCOMPUTER USES IN CIVIL ENGINEERING : LOTUS 1-2-3	UTM	20/7/88	UTM
JOHARI BAKAR	WORKSHOP ON PROGRAMME IMPLEMENTATION OF ISLAMIC VALUES IN ADMINISTRATION.	K.LUMPUR	18-19/10/88	JPMC

APPENDIX 9.4 (continuation)

NAME	TITLE OF SEMINAR/WORKSHOP/CONFERENCE	VENUE	DATE	SPONSOR/ ORGANISER
KALSOM ABD. GHANI	WORKSHOP ON ENVIRONMENTAL MONITORING STRATEGIES.	K.KINABALU	22-24/11/88	KPPAS/UNEP/UKM
KAMALAKARAN	SECOND WORKSHOP ON PIG FARMING IN MALAYSIA	PORT DICKSON	20-22/1/88	UNDP/JAB.HAIWAN
LEE CHOONG MIN	WORKSHOP ON MALAYSIAN TROPICAL FOREST IMPLEMENTATION PLAN.	UPM	11-12/7/88	KEM.PER.UTAMA
LILY HOR	YMCA NEWSLETTER AND COMMUNICATION WORKSHOP	K.LUMPUR	18-19/6/88	YMCA
LILY HOR	INTERNATIONAL WORKSHOP ON INNOVATIVE, INTERSECTORAL LEADERSHIP FOR CHILD SURVIVAL AND HEALTH FOR ALL	UM	21-22/1/88	UM
MEXLIEN ANAK GOMBEK	SECOND WORKSHOP ON PIG FARMING IN MALAYSIA	PORT DICKSON	20-22/1/88	UNDP/JAB.HAIWAN
MOHD.SHARIFF MUSTAFA	SECOND WORKSHOP ON PIG FARMING IN MALAYSIA	PORT DICKSON	20-22/1/88	UNDP/JAB.HAIWAN
NORAZIAN ABD.HAMID	WORKSHOP ON COMPUTER USES IN CIVIL ENGINEERING (LOTUS 1-2-3 MAKRO)	K.LUMPUR	14-15/12/88	UTM
NORAZIAN ABD.HAMID	WORKSHOP ON MICROCOMPUTER USES IN CIVIL ENGINEERING : LOTUS 1-2-3.	UTM	20/7/88	UTM
NORHAYATI MUSTAPHA	ECONOMIC CUM ENVIRONMENTAL PLANNING WORKSHOP	INTAN	22-25/8/88	ITAN/ADB/DOE
OMAR MD.ZAIN	REGIONAL WORKSHOP ON TROPICAL URBAN ECOSYSTEM STUDY.	UKM,BANGI	18-21/1/88	UKM
PETER HO	WORKSHOP ON CONSERVATION STRATEGY OF NATURAL RESOURCES IN SELANGOR.	FRASER'S HILL	8-10/4/88	SUK SELANGOR
RAHMAH TAHIR	REGIONAL WORKSHOP ON TROPICAL URBAN ECOSYSTEM STUDY.	UKM,BANGI	18-21/1/88	UKM
SHAMSUDIN LATIF	ECONOMIC CUM ENVIRONMENTAL PLANNING WORKSHOP	INTAN	22-25/8/88	INTAN/ADB/DOE
SOO AH KAN	WORKSHOP ON CONSERVATION STRATEGY OF NATURAL RESOURCES IN SELANGOR.	FRASER'S HILL	8-10/4/88	SUK SELANGOR

APPENDIX 9.4 (continuation)

NAME	TITLE OF SEMINAR/WORKSHOP/CONFERENCE	VENUE	DATE	SPONSOR/ ORGANISER
SOO AH KAN	ECONOMIC CUM ENVIRONMENTAL PLANNING WORKSHOP	INTAN	2-25/8/88	INTAN/ADB/DOE
SOO AH KAN	REGIONAL WORKSHOP ON TROPICAL URBAN ECOSYSTEM STUDY.	UKM,BANGI	18-21/1/88	UKM
SUHAIMI HANAFI	WORKSHOP ON PRODUCTION OF SLIDE/TAPE FOR TRAINING.	INTAN	10-29/10/88	INTAN
WONG FOON MENG	ECONOMIC CUM ENVIRONMENTAL PLANNING WORKSHOP	INTAN	22-25/8/88	INTAN/ADB/DOE
NORLIN JAAFAR	DIALOG :'STRENGTHS AND WEAKNESSESS IN THE HEALTH MANAGEMENT OF THE URBAN POOR': AN ANALYSIS OF HEALTH SYSTEMS	U.M.	17/11/88	U.M.
TAN MENG LENG	TALK ON MAJOR HAZARDS	K.LUMPUR	29/11/88	KEM.BURUH
AB.RAHMAN AWANG	MALAYSIA-JAPAN CONFERENCE ON MANAGEMENT OF MUNICIPAL AND INDUSTRIAL WASTE.	K.LUMPUR	26-27/10/88	JAS/JICWELS/KPT
HJH.ROSNANI IBARAHIM	MALAYSIA-JAPAN CONFERENCE ON MANAGEMENT OF MUNICIPAL AND INDUSTRIAL WASTE.	K.LUMPUR	26-27/10/88	JAS/JICWELS/KPT
HJH.ROSNANI IBRAHIM	CONFERENCE ON TRANSPORTATION, HANDLING, AND STORAGE OF HAZARDOUS MATERIALS	K.LUMPUR	24-25/3/88	INST.OF INT.RES
PATRICK TAN	CONFERENCE ON TRANSPORTATION, HANDLING AND STORAGE OF HAZARDOUS MATERIALS	K.LUMPUR	24-25/3/88	INST.OF INT.RES
RAHANI HUSSIN	MALAYSIA-JAPAN CONFERENCE ON MANAGEMENT OF MUNICIPAL AND INDUSTRIAL WASTE.	K.LUMPUR	26-27/10/88	JAS/JICWELS/KPT
SOO AH KAN	CONFERENCE ON TRANSPORTATION, HANDLING AND STORAGE OF HAZARDOUS MATERIALS	K.LUMPUR	24-25/3/88	INST.OF INT.RES

APPENDIX 9.5

LIST OF LOCAL TRAINING COURSES ATTENDED BY THE DEPARTMENT OF ENVIRONMENT OFFICERS, 1988

NAME	TITLE OF TRAINING COURSES	VENUE	DATE	SPONSOT/ ORGANISER
DALILAH DALI	NATIONAL TRAINING COURSE ON INDUSTRIAL POLLUTION FOR SMALL AND MEDIUM INDUSTRIES	P.JAYA	22-27/8/88	DOE/CDG/PDPN
FADHILLAH KASSIM	COURSE ON DOS 3.3 AND GALLERY COLLECTION	K.LUMPUR	26-27/9/88	HEWLETT PACKARD
ABD.RAHMAN SHUKOR	COURSE ON ANALYSIS OF MICRO AND MACRO ECONOMY.	INTAN	22/2-9/3/88	INTAN
AHMAD IBRAHIM	COURSE ON INFRASTRUCTURE DEVELOPMENT ADMINISTRATION.	INTAN	29/2-2/4/88	INTAN
AHMAD IBRAHIM MOHAMAD	SHORT COURSE ON OPERATION AND MAINTENANCE OF DAMS	K.LUMPUR	10-12/10/88	IEM
AHMAD KAMARUL NAJUIB.	EIGTH COURSE ON HOUSING MANAGEMENT AND PLANNING. (INTERNATIONAL)	INTAN	20/6-23/7/88	INTAN
AINON ZAKIAH	NATIONAL TRAINING COURSE ON INDUSTRIAL POLLUTION COURSE FOR SMALL AND MEDIUM INDUSTRIES	P.JAYA	22-27/8/88	DOE/CDG/PDPN
AZIZAH ABU BAKAR	COURSE ON SKILL IMPROVEMENT FOR ASSISSTANT LIBRARY.	DAMANSARA	28/9-5/10/88	PNM
FUZIAH ABD.RAHIM	ENGLISH INTENSIVE COURSE - 1988.	INTAN	20/6-3/9/88	INTAN
HUNAIZAH CHE MAT	ADMINISTRATION COURSE.	INTAN	5-17/12/88	INTAN
INDON MOHD.RASHID	COURSE ON MANAGEMENT OF PUBLIC PURCHASES.	INTAN	22/2-5/3/88	INTAN
JALALUDDIN ISMAIL	MAJOR HAZARDS ASSESSMENT AND CONTROL	K.LUMPUR	10-14/10/88	JKJ
JIMAT BOLHASSAN	COURSE ON MS DOS 3.3 AND GALLERY COLLECTION	K.LUMPUR	26-27/9/88	HEWLETT PACKARD
MAIMON JUMAAT	COURSE ON CLEANLINESS STUDIES FOR WATER SUPPLY SYSTEM.	KAJANG	5-17/9/88	JKR
MAKETAB MOHAMAD	PART-TIME LANGUAGE COURSE - CHINESE.	INTAN	7/3-5/12/88	INTAN
MOHD.NAHAR OTHMAN	COURSE ON CLEANLINESS STUDIES FOR WATER SUPPLY SYSTEM.	KAJANG	5-17/9/88	JKR

APPENDIX 9.5 (continuation)

NAME	TITLE OF TRAINING COURSES	VENUE	DATE	SPONSOT/ ORGANISER
MOHD.SAYUTI SAFEAI	COURSE ON ANALYSIS OF MICRO AND MACRO ECONOMY.	INTAN	22/2-9/3/88	INTAN
MOHD.SHARIFF MUSTAFA	SAFETY COURSE FOR SEMI-PROFESSIONAL OFFICERS.	JPM	26-28/1/88	JPM
MOKHTAR ABD.MAJID	INTRODUCTORY COURSE TO ANALYSIS ON GOVERNMENT POLICIES.	INTAN	14-26/3/88	INTAN
NOOR ALSHURDIN SALLEH	INTRODUCTORY COURSE TO UNDERSTANDING OF GOVERNMENT MAIN POLICIES.	INTAN	7-12/3/88	INTAN
NORAZIAN ABD.HAMID	COURSE ON MS DOS 3.3 AND GALLERY COLLECTION.	K.LUMPUR	26-27/9/88	HEWLETT PACKARD
NORAZIAN ABD.HAMID	ADVANCE ENGLISH LANGUAGE COURSE 1988.	INTAN	23/5-4/6/88	INTAN
NORIZAN NAZIR	ENGLISH LANGUAGE COURSE 1988.	INTAN	20/6-3/9/88	INTAN
PAUZIAH HANUM	COURSE ON WATER RESOURCES EVALUATION. (KAPSA)	K.LUMPUR	13-18/6/88	IHP/UTM
RAZIF SAHLAN	COURSE ON MS DOS 3.3 AND GALLERY COLLECTION.	K.LUMPUR	26-27/9/88	HEWLETT PACKARD
ROKIAH BAKRUN	COURSE ON DEPARTMENTAL RECORD FILLING CLERK.	K.LUMPUR	3-8/10/88	ARKIB NEGARA
SAARI CHE LAH	COURSE ON MONITORING AND ASSESSMENT OF AGRICULTURAL PROJECT.	INTAN	20/6-1/7/88	INTAN
SABERI ABD.HAMID	INTRODUCTORY COURSE TO UNDERSTANDING OF GOVERNMENT MAIN POLICIES.	INTAN	6-11/6/88	INTAN
SAERAH ABD.RAHMAN	COURSE ON CLEANLINESS STUDIES FOR WATER SUPPLY SYSTEM.	KAJANG	5-17/9/88	JKR
SITI RUGAYAH DUGEL	COURSE ON MS DOS 3.3 AND GALLERY COLLECTION.	K.LUMPUR	26-27/9/99	HEWLETT PACKARD
SUHAIMI HANAFI	COURSE ON MS DOS 3.3 AND GALLERY COLLECTION.	K.LUMPUR	26-27/9/88	HEWLETT PACKARD
WAN ABDULLAH WAN SALLEH	ENGLISH INTENSIVE COURSE 1988.	INTAN	26/9-10/12/88	INTAN
WAN RAMLAH WAN IBRAHIM	NATIONAL TRAINING COURSE ON INDUSTRIAL POLLUTION CONTROL FOR SMALL AND MEDIUM INDUSTRIES	P.JAYA	22-27/8/88	DOE/CDG/PDPN

APPENDIX 9.5 (continuation)

NAME	TITLE OF TRAINING COURSES	VENUE	DATE	SPONSOR/ ORGANISER
WAN RAMLAH WAN IBRAHIM	PART-TIME LANGUAGE COURSE - ARABIC.	INTAN	7/3-5/12/88	INTAN.
Y.M.TG.BAKRY SHAH	OPERATION RESEARCH COURSE	INTAN	18-23/7/88	INTAN
YAHYA OTHMAN	COURSE ON CLEANLINESS STUDIES FOR WATER SUPPLY SYSTEM.	KAJANG	5-17/9/88	JKR
ZAINAL ABDULLAH	TRAINING PROGRAMME ON MARINE AFFAIRS FOR INDIAN OCEAN COUNTRIES.	INTAN	10/10-16/12/88	INTAN.
ZAINORA NORDIN	INTRODUCTORY COURSE ON CHEMISTRY, PROPERTIES AND USES OF PALM OIL AND PALM KERNEL OIL.	K.LUMPUR	4-5/4/88	PORAM
ZAINULDIN YAAKOB	INTRODUCTORY COURSE ON CHEMISTRY, PROPERTIES AND USES OF PALM OIL AND PALM KERNEL OIL	K.LUMPUR	4-5/4/88	PORAM
ZAMRI JUSOH	ENGLISH INTENSIVE COURSE 1988.	INTAN	26/9-10/12/88	INTAN
ZAMRUDAH YEOP	COURSE ON MS DOS 3.3 AND GALLERY COLLECTION.	K.LUMPUR	26-27/9/88	HEWLETT PACKARD

Appendix 10.1

NOTIFICATION OF CONTROL ACTION ON CHEMICALS RECEIVED BY THE DEPARTMENT OF ENVIRONMENT, 1988

Name of Chemical	Country	Type of Control Action
AGRICULTURE		
1. 2,3,4,5 Tetrachlorophenol	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and product which contain the substance.
2. 2,3,4,6 Tetrachlorophenol	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and product which contain the substance.
3. 2,3,5,6 Tetrachlorophenol	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and product which contain the substance.
4. 2,4,5 - T	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and product which contain the substance.
5. Alachlor	1. The Netherland	Prohibited to sell, or use all pesticides containing alachlor as active ingredient.
6. Aldrin	1. United Kingdom	All remaining approval for sale, supply and advertisement in the above areas to be revoked prior to the control action used.
Name of Chemical	Country	Type of Control Action
		All approval for use and storage in food storage practice, agriculture, holticultures to be revoked.

Name of Chemical	Country	Type of Control Action
	2. Switzerland	Prohibited the manufacture, supply, import and used of the substance and of product which contain the substance.
	3. The Netherland	Prohibited to sell, exports, store or use all pesticides containing aldrin as active ingredient.
7. Arsenic	1. Switzerland	Plant treatment product shall not be supplied if they contain arsenic compound.
8. Binapacryl	1. Cyprus	Banned for use in pesticide.
	2. United Kingdom	All approved agricultural and nolticultural uses of binapacryl to be revoked.
9. Chlordane	1. United Kingdom	Approval in food storage practice, home kitchen, larder and garden use, agri - cultural, nolticultural, to br revoked, except for garden earthworm killer.
	2. Switzerland	Prohibited the manufacture, supply, import and use of the substance and the products which contain the substance.
10. Cyhexatin	1. Cyprus	Banned for use as pesticide.
	2. Sweden	Banned all use of cyhexatin as pesticides.
11. DDD	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and of the products which contain the substance.

Name of Chemical	Country	Type of Control Action
12. DDE	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and of the products which contain the substance.
13. DDT	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and of the products which contain the substance.
14. Dieldrin	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and of the products which contain the substance.
	2. The Netherland	Prohibited to sell, stock, store or use all pesticides containing Dieldrin as active ingredients.
15. Dinoseb	1. Colombia	The importation and manufacture of agriculture pesticides containing the active ingredients Dinoseb is banned.
	2. United Kingdom	All approved agricultural and nolticultural uses of Dinoseb to be revoked.
	3. Cyprus	Banned for use in pesticides.
16. Dinoseb Acetate	1. United Kingdom	All approved agricultural and nolticultural uses of Dinoseb Acetate be revoked.
	2. Cyprus	Banned for use in pesticides.
17. Dinoseb Amine	1. Cyprus	All approved agricultural and nolticultural uses of Dinoseb Amine to be revoked.

Name of Chemical	Country	Type of Control Action
18. Dinoterb	1. Cyprus	All approved agricultural and nolticultural uses of Dinoterb to be revoked.
19. Diquat	1. The Netherland	Prohibited to sell all pesticides containing Diquat as active ingredient.
20. Endrin	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and of products which contain the substance.
21. Fenoprop	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and of products which contain the substance.
22. HCH, Hexachlorohexane	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and of products which contain the substance.
23. Heptachlor	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and of products which contain the substance.
24. Heptachlor Epoxide	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and of products which contain the substance.
25. Letophos	1. Cyprus	Banned for uses in pesticides.
26. Lindane	1. Findland	Total ban.
	2. Cyprus	Banned for use in agriculture, approved for use in paint.

Name of Chemical	Country	Type of Control Action
27. Mercury	1. Switzerland	Prohibited the supply, import and use of product and articles containing mercury.
28. Methoxychlor	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and products which contain the substance.
29. Paraquat	1. The Netherland	Prohibited to sell, stock, store or use all pesticides containing paraquat as active ingredient.
30. Pentachloro Pehnol	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and products which contain the substance.
31. Perthane	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and products which contain the substance.
32. Telodrin	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and products which contain the substance.
33. Toxaphene	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and products which contain the substance.
INDUSTRIAL		
1. Halogenated	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and products which contain the substance.

Name of Chemical	Country	Type of Control Action
2. Halogenated Naphthalene	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and products which contain the substance.
3. Halogenated Terphenyls	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and products which contain the substance.
4. PCB	1. Algeria	Banned for repairing/ checking new or old electrical fitting which are in operation, stocked or rejected and disposal in nature.
5. Strobane	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and products which contain the substance.
CONSUMER PRODUCT		
1. Hexachlorophene	1. USSR	Hexachlorophene and products (antimic robial and cosmetics preparation, household goods, pharmaceutical) for use and production.
2. Octylphenol ethoxylate	1. Switzerland	Prohibited the manufacture, supply, import and use of the substances and products which contain the substance.
3. Nonylphenol ethoxylate	1. Switzerland	Prohibited the manufacture, supply, import and use of the substance and products which contain the substance.

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