

## 2-1-2 Environmental Administration Tasks

### (1) Organizations in charge of environmental administration and their functions

Indonesia's natural resources and environmental management is controlled by 16 ministries and agencies in accordance with the classification of environment-related administration.

No ministries have general control over environmental administration. The Minister of State for Population and Environment (KLH) was established in 1983 as the agency formulating and proposing policies, coordinating diversified activities of the ministries concerned, and supervising the execution of various measures.

The Environment Impact Management Agency (BAPEDAL) was established on June 5, 1990, in accordance with Presidential Decree No. 23, as an organization directly controlled by the President. The Agency is intended for the development of human resources in charge of environmental conservation and improvement in environmental conservation technologies for executing new measures for environmental conservation.

On a provincial basis, there are Provincial Government Offices for Environment and Population (BKLH) established as environment-related organizations and pollution monitoring and control (TKP2) groups for environmental pollution control, as well as environmental studies centers (PSL) established within national universities.

#### 1) Functions of KLH

Four Assistant Ministers, under the control of the Minister of State for Population and Environment, are respectively responsible for (1) population, (2) natural resources, (3) environmental pollution control, and (4) coordination, citizens' participation, and publicity. The Assistant Ministers have their own staff. KLH's major responsibilities include enacting basic laws in connection with environmental policy making, establishing an environmental assessment system, establishing environmental standards regarding rivers, and establishing standards for industrial waste water. Also, it is responsible for coordinating

Fig. 2-1-2. Organization Chart of Ministry of State for Population and Environment

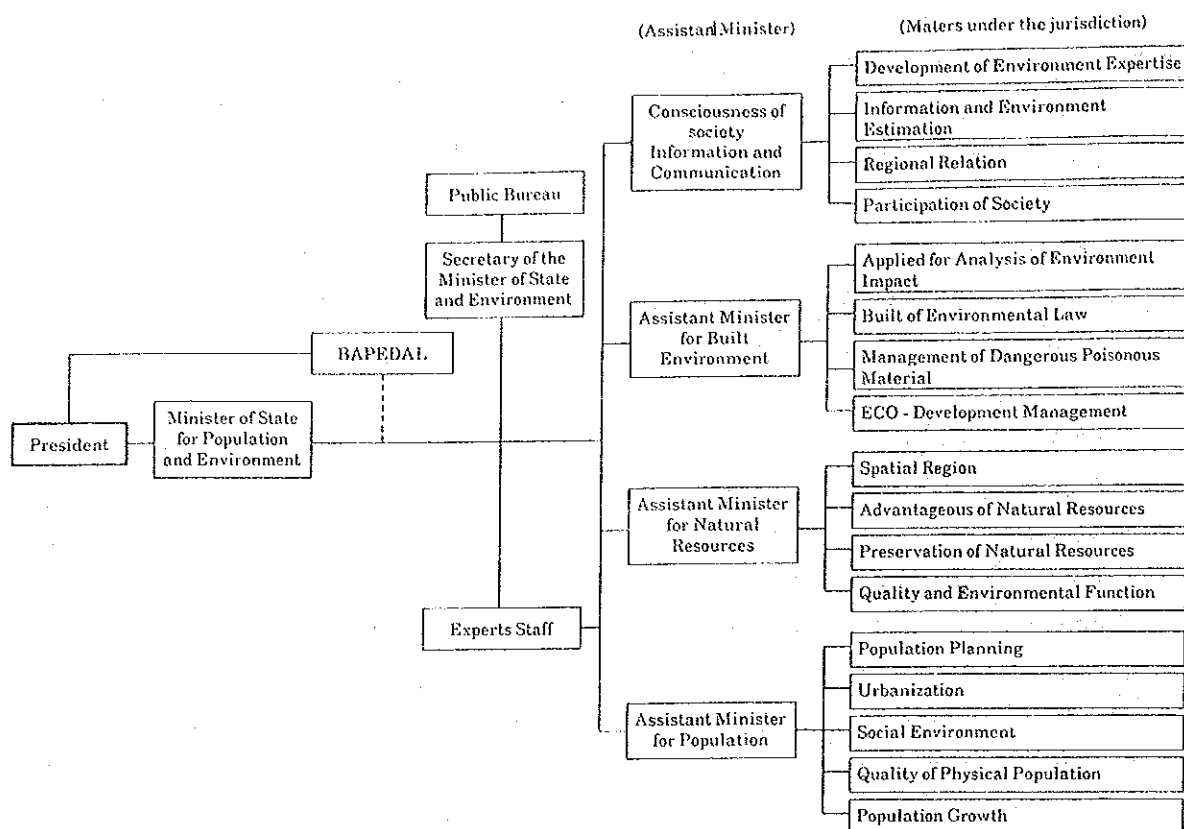


Table 2-1-5. Development Budget and Routine Budget of State Ministry for Population and Environmental Office

Development Budget (In Rupiah)

Year	1987/1988	1988/1989	1989/1990	1990/1991	1991/1992	Total
1. Honorarium	138,320,000	131,160,000	183,451,000	312,304,000	929,257,000	1,694,492,000
2. Office Supplies	102,401,000	85,072,000	82,345,000	99,180,000	438,187,000	807,185,000
3. Equipments/ Machines	86,749,000	25,325,000	38,800,000	177,209,000	358,223,000	686,306,000
4. Survey and Monitoring	327,397,000	326,988,000	539,645,000	981,186,000	2,668,438,000	4,843,654,000
5. Construction	1,031,123,000	993,627,000	1,116,783,000	2,096,233,000	6,539,554,000	11,777,320,000
6. Others	595,726,000	643,089,000	722,025,000	1,167,832,000	3,849,892,000	6,978,564,000
Total	2,281,716,000	2,205,261,000	2,683,049,000	4,833,944,000	14,783,551,000	26,787,521,000

Routine Budget

Year	1987/1988	1988/1989	1989/1990	1990/1991	1991/1992	Total
1. Stationary	36,424,000	89,728,000	97,357,000	117,608,000	115,280,000	456,397,000
2. Fixed Capital	2,950,000	8,945,000	14,760,000	15,600,000	27,214,000	69,369,000
3. Services and Maintenance	0	0	6,300,000	9,000,000	9,000,000	24,300,000
4. Others	416,726,000	408,815,000	421,637,000	532,716,000	568,865,000	2,348,759,000
5. Vehicle Maintenance	2,880,000	0	0	9,000,000	0	11,880,000
6. Survey and Monitoring	378,468,000	423,980,000	427,414,000	500,000,000	680,000,000	2,409,862,000
Total	837,448,000	931,468,000	967,468,000	1,183,824,000	1,400,359,000	5,320,567,000

relevant activities among the Ministry of Industry, the Ministry of Public Works, and the Ministry of Health, ministries empowered to enforce systems, and the Ministry of Internal Affairs, which controls the provincial governments.

KLH is empowered to

- (a) coordinate government policies on population and the environment,
- (b) prepare regulations for the execution of environment-related policies of the national and provincial governments,
- (c) give technical advice and assistance,
- (d) monitor the progress of environmental programs of government agencies, and
- (e) stimulate the people's participation in and awareness of environmental conservation.

KLH, however, is not empowered to enforce policies on natural environment conservation. It only gives advice, and policies are enforced by the provincial agencies of the ministry in charge.

● KLH's coordination activities

The following are the environmental conservation activities carried out by engineers, experts, and officials of the ministries concerned, provincial governments, and environment-related institutions including universities, under the coordination of KLH.

Surveys on environmental pollutants, groundwater source preservation, natural resources protection, and coastal environment preservation are carried out by the Ministry of Public Works, the Ministry of Communications, the Ministry of Industry, the Ministry of Mines and Energy, the Ministry of Agriculture, Bogor Agricultural University, Provincial Government Offices for Environment and Population (BKLH), Provincial Development Planning Board (BAPPEDA), provincial governments, the Science and Technology Application Agency, the National Science and Technology Agency, the Capital City Special Region (DKI), and national universities.

Other activities are in progress with cooperation between KLH and the Ministry of Forestry, the Ministry of the Internal Affairs, and the

**Table 2-1-6. Assigned Work of Environment-Related Organizations**

Organization involved in activities relating to environmental science and their assigned work are given below.

Organization	Outline of Work
<p><u>Public Research Organizations</u></p> <ul style="list-style-type: none"> <li>◦ P4L</li> <li>◦ BKLH, BAPEDA</li> <li>◦ BMG</li> <li>◦ SUCOFINDO Laboratory</li> </ul>	<ul style="list-style-type: none"> <li>- Water quality analysis, air, and noise monitoring, waste composition and toxic substance analysis</li> <li>- Inspection of waste from common drainage facilities in industrial estates</li> <li>- Climate monitoring</li> <li>- Sampling Analysis of waste, water, air and noise</li> </ul>
<p><u>Universities</u></p> <ul style="list-style-type: none"> <li>◦ Human ecology, economic and social aspects of the environment University of Indonesia (UI), Jakarta, Java</li> <li>◦ Watershed management, coastal zone management, natural resources management Bogor Agricultural University (ITB), West Java</li> <li>◦ Human settlements, industrial ecology Bandung Institute of Technology (ITB), Bandung, West Java</li> <li>◦ Ecological toxicology, environmental law, Padjadjaran University (UNPAD), Bandung, west Java</li> <li>◦ Geographical ecology Gadjah Mada University (UGM), Yogyakarta Central Java</li> </ul>	<ul style="list-style-type: none"> <li>- Improved Hygiene for urban and rural areas, environmental Hygiene, Industrial Hygiene, water pollution control, training of pollution specialist</li> <li>- Domestic water, waste water treatment, training of pollution specialist, environmental study</li> <li>- technical development to serve for development plans and environmental conservation, provision of relevant data and information</li> <li>- Domestic water, waste water treatment, training of pollution specialist, toxicity control, air pollution control environmental research</li> <li>- Common environmental problem in Indonesia, especially relating to domestic water, waste water treatment and solid waste</li> </ul>
<p><u>Private Research Institute</u></p>	<ul style="list-style-type: none"> <li>- Water pollution control, wast water and solid waste treatment</li> </ul>

Ministry of Transmigration, regarding natural resources preservation and coastal environment preservation. Coastal environment preservation activities are also in progress with cooperation between KLH and the National Marine Resources Society and Pertamina. Provincial Government Offices for Development Planning Board and Provincial Government Offices for Environment and Population are conducting activities in cooperation with KLH, by utilizing national universities' environmental study centers. These activities include the following.

Researches, advice in environmental policy making, technology development, information development, surveys on resources distribution, issue of publications, provision of materials for presentation meetings on environmental protection, etc.

● Budget of KLH

The Government of Indonesia has planned to triple KLH's development budget for fiscal 1990/1991 through 1991/1992, based on its policy to simultaneously promote development and environmental conservation activities in accordance with REPELITA V. The government intends thereby to promote the expansion of environmental monitoring activities and environmental conservation activities with which more than one administrative department are concerned on a provincial administration basis.

2) Functions of environment-related organizations of provincial governments

Provincial governments have organizations, as mentioned below, which constitute KLH's environmental management system.

**BKLH :** An organization established in 1980 by the Ministry of the Internal Affairs, BKLH is located in the provincial capitals and controlled by the provincial governors. BKLH is in charge of (1) data collection and analysis, (2) coordination for program formulation and guidelines preparation, and (3) monitoring, but it has not made much of a contribution to

environmental assessment and monitoring activities because of its limited capability, power, and budget.

TKP2 : A team for environmental pollution control, TKP2 is in charge of surveys on environmental pollution and environmental monitoring on a provincial basis, as its extraordinary function. As a standing function, the Center for Urban and Environmental Research and Development (P4L) has been established in the Capital City Special Region (DKI). The Center, corresponding to TKP2 in function, is equipped with monitoring and research facilities related to water quality, air, noise and vibration, toxic substances, etc., and is in charge of environmental regulation activities such as the examination of amounts of waste water from businesses in Jakarta.

Under the Project, ten to 15 EMC researchers are planned to receive training in P4L.

### 3) Functions of environment-related organizations of national universities

PSL : Among the national universities of the country, 57 universities have environmental studies centers (PSL) connected with KLH. These centers belong to the Ministry of Education and Culture. In some of these centers, training is provided for government officials and employees of private corporations, and environmental monitoring/ management activities are conducted on a state basis.

For the Project, it is considered that some instructors are expected to be sent from PSL for technical and administrative training planned in the EMC.

### 4) Functions of other private organizations

NGOs: NGOs are active in drawing the citizens' attention to local problems including soil and water pollution by hazardous waste resulting from development, marine pollution resulting from marine resources

development and fishing, deforestation caused by excessive cutting for the purpose of agricultural and forestry development, and environmental pollution. But the lack of adequate technologies and experience prevents them from giving full play to their functions.

There are some NGOs in major cities of Indonesia, and their activities are described below.

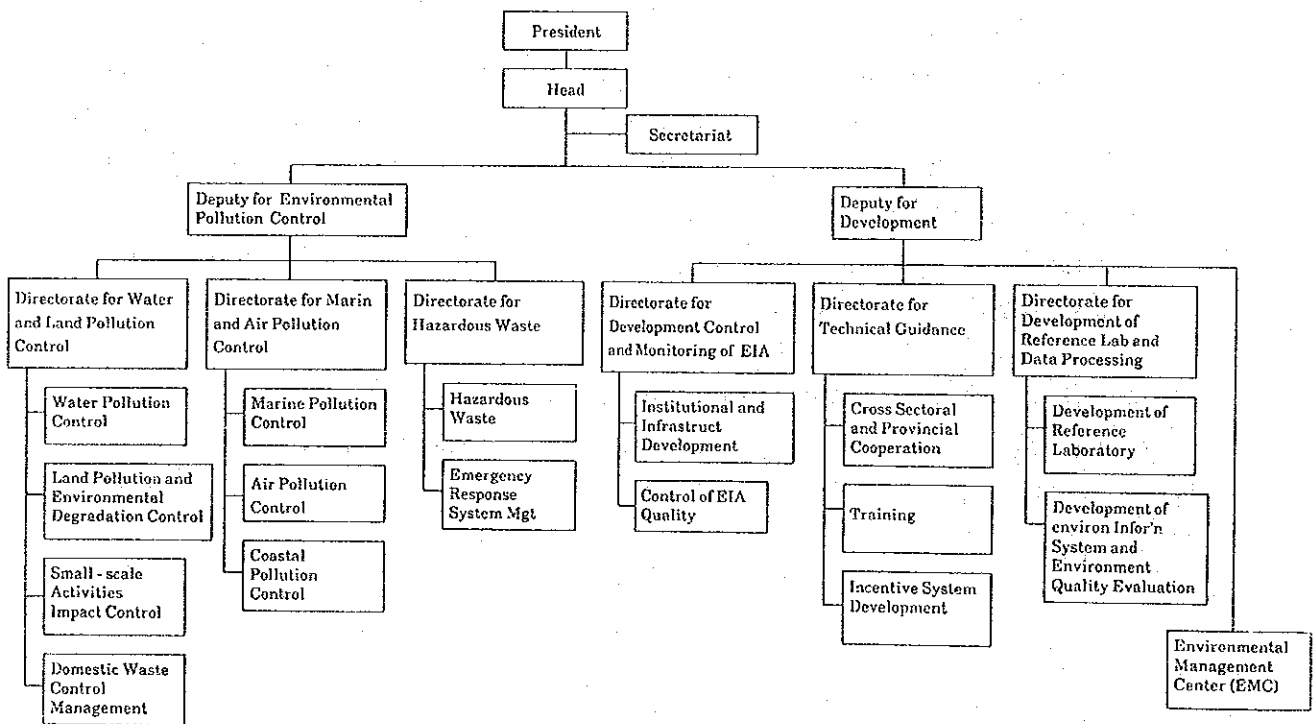
NGOs' major activities Community development and training, medical and health guidance, instruction in optimum technologies for small businesses, agricultural chemicals handling and organic agriculture, land utilization and environmental protection, green zone development, nature inspections, family planning, agricultural extension, coastal and marine environment preservation, forest preservation, information on air and water pollution control, natural resources protection, etc. NGOs play the role of supplementing public environment management.

Indonesia's consultant firms related to environmental protection carry out environmental impact researches (AMDAL/EIA) in accordance with Act No. 4/1982 on the Basic Provisions of Environmental Management, upon request from business managers. The Act obliges those enterprises that have the possibility of greatly affecting the environment to be subjected to assessment.

Consultants' activities primarily concern the examination, analysis, and testing of products of private companies. Some consultant firms are capable of environmental impact assessment and have practical experiences.

Other public corporations and private companies concerned with coastal and marine development : Pertamina, for example, has its own analysis and research institution for environmental protection and carries out environmental impact researches. In private companies, however, spending is small on installing facilities for environmental pollution control.

Fig. 2-1-3. Organization Chart of BAPEDAL





5) Functions of the Environmental Impact Management Agency (BAPEDAL)

BAPEDAL, an executing agency, assists the President in environmental pollution control.

Though closely connected with the Ministry of State for Population and Environment (KLH), BAPEDAL is a separate organization under the direct control of the President. The Hon. Emil Salim, Minister of State for Population and Environment, currently acts as the Head of BAPEDAL.

While KLH is primarily in charge of policy-making and coordination of policies, BAPEDAL takes charge of enforcing environmental measures such as environmental regulations, monitoring, and assessment, as the executing agency for environmental pollution control.

The personnel of BAPEDAL were assigned in November 1990. (As of July 1991, two of the 53 officials were formally assigned and the other officials were informally assigned. But they are planned to be gradually formally assigned.) The final number of personnel is planned to be 182, of which 63 are officials of the EMC. All officials are planned to be transferred from other ministries and agencies including KLH and from new graduation, and the number of candidates has reached 401.

The order to organize BAPEDAL is going to be issued at the end of 1991.

In order to enforce measures for environmental pollution control, BAPEDAL is empowered to

- a) assist the President in making policies for enforcing measures for environmental pollution control,
- b) conduct toxic and hazardous waste management,
- c) supervise and manage activities greatly affecting the environment,
- d) establish a reference laboratory for processing data and information on environmental pollution,
- e) develop human resources to be engaged in environmental pollution control, and
- f) execute tasks designated by the President.

Fig. 2-1-4. Feasible Structure for BAPEDALDA 1 Organizations

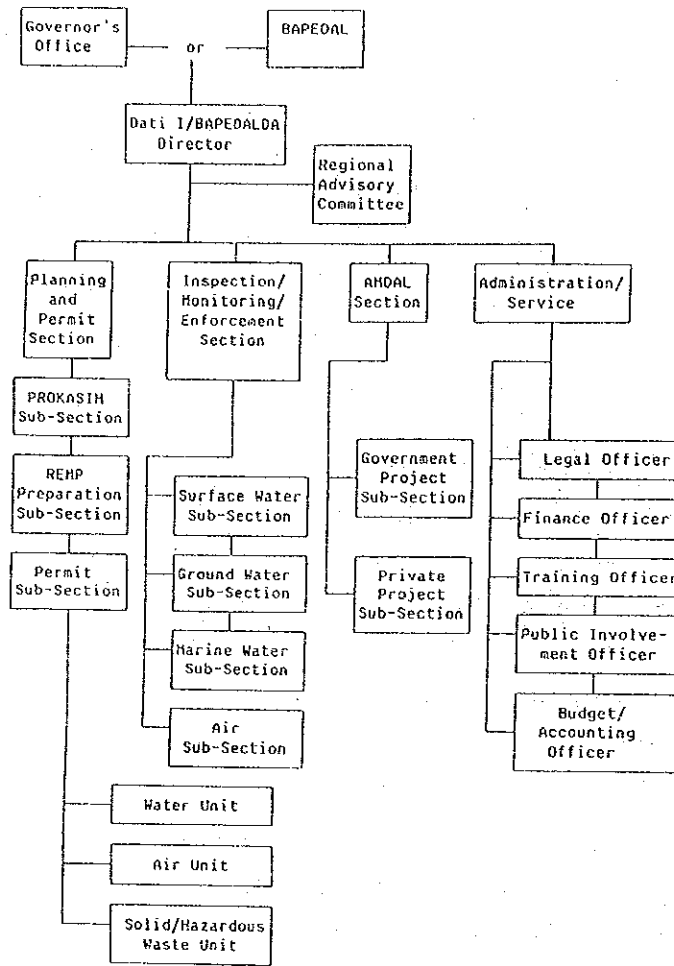
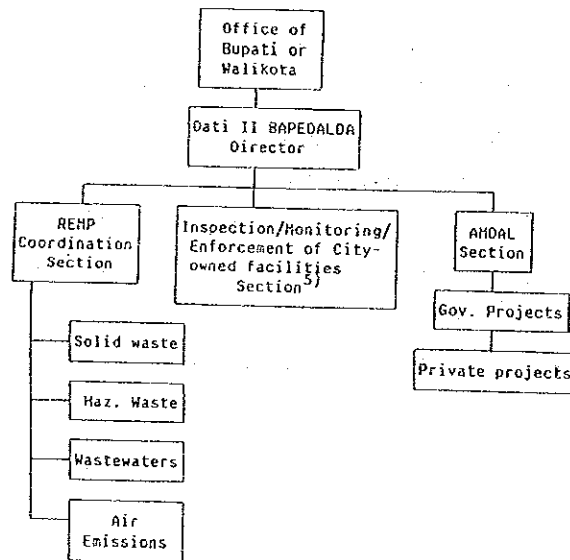


FIG. 2-1-5. Feasible Structure for BAPEDALDA 2 Organizations



Provincial-level environmental impact assessment agency (BAPEDALDA) plan

BAPEDALDA-1 is planned to be established under a five-year plan as BAPEDAL's provincial-level agency and BAPEDALDA-2 is planned to be established as BAPEDAL's city-level agency.

At BAPEDALDA established in 14 provinces, monitoring activities will be conducted at the regional monitoring points concerning waste water, air, soil, toxic substances, and solid waste matter, in accordance with the environmental management policies formulated in BAPEDAL. BAPEDALDA will also be in charge of permission and approval as well as examinations concerning environmental pollution control.

(Feasible structure for BAPEDALDA organizations are refer to Fig. 2-1-4, Fig. 2-1-5, BAPEDALDA location plan is refer to Table 2-1-7.)

BAPEDALDA will be empowered to

- 1) manage the Clean River Program (PROKASIH), in which three points will be added annually between 1992 and 1996 to the current 20 rivers in eight provinces, based on the guidelines prepared in BAPEDAL,
- 2) give permission and approval to industries in the areas subjected to PROKASIH,
- 3) conduct monitoring activities, under extended PROKASIH, at 36 designated regions regarding surface water, groundwater, seawater, and air, in accordance with BAPEDAL's guidelines (on monitoring systems, monitoring points, frequency, parameters, and methods), and
- 4) give warnings to those who disrupt or pollute the environment, and issue permission and approval.

## (2) Environmental administration tasks

For the realization of environmental policies, KLH formulates and coordinates policies and BAPEDAL enforces measures for environmental pollution control. And measures for environmental protection are executed by 15 other ministries and agencies responsible in respective areas. Environmental measures are thus separately taken.

**Table 2-1-7. BAPEDALDA Location Plan (BAPEDALDA-1 and BAPEDALDA-2)**

- |   |  |
|---|--|
| <p>1. ACEH</p> <p>(1) Aceh Utara</p> <p>(2) Aceh Besar</p>  | <p>8. JAWA TENGAH</p> <p>(1) Kodya Semarang</p> <p>(2) Kab. Semarang</p> <p>(3) Surakarta</p>  |
| <p>2. SUMATERA UTARA</p> <p>(1) Kodya Medan</p> <p>(2) Deli Serdang</p>   | <p>9. JAWA TIMUR</p> <p>(1) Surabaya</p> <p>(2) Sidoardjo</p> <p>(3) Gresik</p> <p>(4) Kodya Malang</p> <p>(5) Kab. Malang</p> <p>(6) Pasuruan</p> |
| <p>3. RIAU</p> <p>(1) Kep. Riau</p> <p>(2) Kab. Kampar</p>  | <p>10. KALIMANTAN BARAT</p> <p>(1) Kodya Pontianak</p>   |
| <p>4. SUMATERA SELATAN</p> <p>(1) Kodya Palembang</p> <p>(2) Musi Banyuasin</p>   | <p>11. KALIMANTAN TIMUR</p> <p>(1) Kodya Samarinda</p>   |
| <p>5. LAMPUNG</p> <p>(1) Lampung Tengah</p> <p>(2) Lampung Selatan</p>  | <p>12. SULAWESI SELATAN</p> <p>(1) Kab. Goa</p>  |
| <p>6. DKI JAKARTA</p> <p>(1) Jakarta Timur</p> <p>(2) Jakarta Selatan</p> <p>(3) Jakarta Barat</p> <p>(4) Jakarta Utara</p>                     | <p>13. BALI</p> <p>(1) Kab. Badung</p> <p>(2) Kab. Buleleng</p> <p>(3) Kab. Klungkung</p>  |
| <p>7. JAWA BARAT</p> <p>(1) Bekasi</p> <p>(2) Bogor</p> <p>(3) Tangerang</p> <p>(4) Kodya Bandung</p> <p>(5) Kab. Bandung</p> <p>(6) Serang</p> | <p>14. NTB</p> <p>(1) Kab. Lombok Barat</p>  |

Though Indonesia has established environmental standards supporting these measures and the Basic Provisions of Environmental Management for environmental assessment, there are few individual regulations on air pollution, water pollution, solid waste management, toxic substances, and noise and vibration. Consequently it is urgently necessary for the country to strengthen its law system to ensure the effectiveness of measures for environmental pollution control.

In Indonesia, environmental administration has just been started. Insufficient administrative and technical experience of the ministries and agencies concerned in central and regional, including KLH, impede satisfactory enforcement of policies for environmental protection and prevent the development of new policies coping with changing environmental conditions. The greatest impediment is the lack of technologies for monitoring the environment and pollution sources. Data collected in monitoring activities are less reliable, as a result, and mistakes in analysis cause confusion that proper techniques could avoid. Regarding pollution sources, only some of them are monitored, and consequently satisfactory data cannot be collected for identifying pollution sources.

Such being the case, it is necessary to strengthen the systems of BAPEDAL, the central government, the provincial governments, and local public organizations, and develop and ensure human resources. For these purposes, personnel in charge of environmental conservation in the institutions concerned, including private companies, need to acquire necessary knowledge, techniques, and accumulate experience, to increase their capability.

**Table 2-1-8. Work Assignments of Organization Involved in Environmental Conservation in Indonesia**

Assignment Organization	Water Pollution	Air Pollution	Noise and Vibration	Solid Waste	Toxic Substance
Ministry of Health	<ul style="list-style-type: none"> <li>- Monitoring and evaluation of water quality impact on health</li> <li>- To set up the concept of water quality criteria in regard of public health, e.g drinking water, swimming, etc.</li> </ul>	<ul style="list-style-type: none"> <li>- Monitoring and evaluation of impact on health</li> </ul>	<ul style="list-style-type: none"> <li>- Monitoring and evaluation of impact on health</li> </ul>	<ul style="list-style-type: none"> <li>- Monitoring of impact on health</li> </ul>	<ul style="list-style-type: none"> <li>- Human health standard</li> <li>- Monitoring</li> <li>- Creating the list of toxic substances</li> </ul>
Ministry of Agriculture	<ul style="list-style-type: none"> <li>- Monitoring and evaluation of water quality impact on agricultural, farming &amp; fishery</li> <li>- To set up the concept of water quality criteria in regard of water for agriculture</li> <li>- Control the use of fertilizer &amp; nesticide</li> </ul>				<ul style="list-style-type: none"> <li>- Safety and Emergency Response</li> </ul>
Ministry of Forestry	<ul style="list-style-type: none"> <li>- Water conservation</li> </ul>				<ul style="list-style-type: none"> <li>- Safety and Emergency Response</li> </ul>
Ministry of Mines and Energy	<ul style="list-style-type: none"> <li>- Management of mining &amp; energy production activities</li> </ul>	<ul style="list-style-type: none"> <li>- Policy and management of exploration and process production activities</li> </ul>	<ul style="list-style-type: none"> <li>- Policy and management of exploration and process production activities</li> </ul>		<ul style="list-style-type: none"> <li>- Safety and Emergency Response</li> </ul>
Ministry of Public Works	<ul style="list-style-type: none"> <li>- Management policy of water</li> <li>- Management and control of river discharge/run off</li> <li>- Coordination of inter provincial water quality standard</li> <li>- Policy and management of domestic waste</li> <li>- Policy and management of water supply for cities (PAM)</li> </ul>			<ul style="list-style-type: none"> <li>- Policy and Management for domestic waste</li> </ul>	
Ministry of Industry	<ul style="list-style-type: none"> <li>- Management of industry activities</li> </ul>	<ul style="list-style-type: none"> <li>- Policy and Guidances</li> <li>- Inspection, Monitoring and evaluation for industrial process</li> </ul>	<ul style="list-style-type: none"> <li>- Policy and Guidances</li> <li>- Inspection, Monitoring evaluation</li> </ul>		<ul style="list-style-type: none"> <li>- Safety and Emergency Response</li> </ul>
Ministry of Communications	<ul style="list-style-type: none"> <li>- Policy and management of waste from transportation especially sea transportation, river transportation and transportation in lake and swamp</li> </ul>	<ul style="list-style-type: none"> <li>- Policy and Guidances</li> <li>- Inspection, Monitoring and evaluation for mobile sources</li> </ul>		<ul style="list-style-type: none"> <li>- Transport of hazardous wastes</li> </ul>	<ul style="list-style-type: none"> <li>- Transport of dangerous goods</li> </ul>

Assignment Organization	Water Pollution	Air Pollution	Noise and Vibration	Solid Waste	Toxic Substance
Ministry of Manpower	- Hygiene and work safety	- Policy and Guidance - Inspection, Monitoring and evaluation for work places	- Policy and Guidances - Inspection, Monitoring and evaluation for work places		- Environmental Standard for Labors - Safety & Fire
Ministry of Transmigration					
Ministry of Trade and Cooperatives					- Inventory & Enforcement of Imported toxic substances that are banned
Ministry of Education and Culture	- Environmental Education				
State Ministry for Research and Technology	- Development and Research for "non waste & low waste technology"			- Evaluation and implementation of Technology	
Ministry of Justice	- Law enforcement			- Law enforcement	- Law enforcement
Ministry of Finance	- Foreign aid administration particularly "Loan" Administration - Budgeting			- Financing - Government - Programme	- Financing - Government - Programme
Ministry of Home Affairs	- Policy and management of Local Government administration			- Policy and management for domestic waste	
State Ministry for Population and Environmental (KLH)	- Policy coordination	- Policy coordination	- Policy coordination	- Coordination of solid waste - National Policy	- Coordinating of National Policy
Local Public Entity	- Monitoring, evaluation and reporting	- Monitoring - Reporting	- Monitoring - Reporting	- Public awareness	- Public awareness
University	- Research and development of Science and technology	- Synthetic Study of anti pollution	- Synthetic Study of anti pollution	- Research and development	- Research and development
Public Enterprise		- Compliance to the regulation - Treatment	- Compliance to the regulation - Treatment	- Compliance to the regulation	- Compliance to the regulation
Private Enterprise	- Consultant and contractor of pollution control facilities - Waste monitoring and reporting - Management of waste	- Compliance to the regulation - Treatment	- Compliance to the regulation - Treatment	- Compliance to the regulation	- Compliance to the regulation
BAPEDAL	- Management of pollution control implementation - Set up guidelines for implementation - Implementation pollution control programmes	- Implementation of pollution control programme	- Implementation of pollution control programme	- Coordinating of cleanest city programme - Management of hazardous waste - Management of Emergency Response	- Environmental standard - Monitoring of the environmental impact

Table 2-1-9. Environmental Conservation Act in Indonesia

	Estalish Year
Fishery	Vischerij Ordonantie, 1916
Coastal Fishery	Kustvischerij Ordonantie, 1927
Disturbance	Hinder Ordonantie, 1926
Wildlife	Dierenbeschermings Ordonantie, 1927
Business	Bedrijfsreglementerings Ordonantie, 1938
Hunt	Jacht Ordonantie, 1940
Nature Protection	Natuurbeschermings Ordonantie, 1941
City Formation	Standsvorming Ordonantie, 1948
Land/Agrarian Affairs	Act No. 5/1960
Health	Act No. 9/1960
Import and Export of Seedlings	Act No. 2/1961
Atomic Energy	Act No. 31/1964
Hygiene	Act No. 2/1966
Forestry	Act No. 5/1967
Veterinary	Act No. 6/1967
Mining	Act No. 11/1967
Transmigration/Inter-Insular Migration	Act No. 3/1972
Continental Shelves	Act No. 1/1973
Pesticides	Government Regulation No. 7/1973
Waters	Act No. 11/1974
Offshore Mining	Government Regulation No. 17/1974
Environmental Management	Act No. 4/1982
Exclusive Zones of Economy	Act No. 5/1983
Industries	Act No. 5/1984



## 2-1-3 Necessity of Environmental Conservation Research and Training

### (1) Necessity of researches in environmental conservation

The Fisheries Act, the Annoyance Act, and the Wildlife Protection Act were first enforced in Indonesia in the 1920s, during which time the country was governed by the Netherlands. The disruption of the natural environment and environmental pollution gradually became apparent in Indonesia from the 1960s well into the 1970s, but no particular measures were taken. In these circumstances, researches necessary for environmental conservation were started in experimental and research institutions attached to the administrative agencies concerned and science-related departments of some universities. (Refer to Table 2-1-9)

Among the environment-related administrative agencies, the Ministry of Public Works, the Ministry of Industry, the Ministry of Education and Culture, and the Ministry of the Internal Affairs have their own research and experiment institutions, though small in scale, which are needed in implementing their administrative policies. The laboratories of P4L, the Ministry of the Internal Affairs environmental research institution established in Jakarta in 1983, is said to be best equipped with personnel and materials. The reality is, however, that solving ever increasing environmental problems requires more laboratories, more staff members, and more equipment. The staff are primarily engaged in routine analysis of water and soil, and there is not sufficient time for them to identify pollution sources and seek measures for environmental conservation. The same is true of other administrative agencies.

Regarding education related to environmental protection, the University of Indonesia, Bogor Agricultural University, Bandung Institute of Technology, Padjajaran University, and Gadjamada University, all of which are national universities, provide courses related to environmental science, namely, environmental management, natural resources preservation, and ecology. In these universities, however, budgets for research are extremely small, and their laboratories are not sufficiently equipped with analysis, experiment, and research facilities, despite there being room for installing them. Since researches in water pollution are currently made in these laboratories only on a small scale, it cannot be expected that universities will play important roles

Table 2-1-10 The Basic Provisions of Environmental Management of Indonesia (enacted in 1982)

<Contents of the Act>

Chapter 1	General (Articles 1 and 2)
Chapter 2	Principles and Purposes (Articles 3 and 4)
Chapter 3	Rights, Duties, and Power (Articles 5 to 10)
Chapter 4	Preservation of Living Environments (Articles 11 to 17)
Chapter 5	Institutions (Articles 18 and 19)
Chapter 6	Compensation and Rehabilitation (Articles 20 and 21)
Chapter 7	Penal Regulations (Article 22)
Chapter 8	Temporary Regulations (Article 23)
Chapter 9	Conclusion (Article 24)

<Details of major regulations>

- Legal definitions regarding living environments
- Principles and purposes of environmental management
- Individual persons' rights and duties, corporations' duty to preserve the environment, the Government of Indonesia's rights and duties to manage the environment on a national basis
- Regulations on the preservation of the environment and natural resources
- Environmental standards
- Regulations on environmental impact assessment
- Prevention or reduction of environmental pollution and damage from it
- National and local institutions
- Regulations on NGOs
- Regulations on compensation for persons suffering from environmental pollution
- Provisions on the Government's duty to rehabilitate damaged environment
- Provisions on the principle of strict responsibility
- Penal regulations

in the very near future in solving the environmental problems now facing Indonesia, through practical and problem-solving researches.

As described thus far, laboratories attached to administrative agencies and environment-related departments of universities do not provide adequate bases of research for solving environmental problems.

Environmental researches deepen a scientific understanding of the environment and provide scientific bases for solving environmental problems. These researches cover a vast range of subjects. Especially in Indonesia, researches in environmental conservation have just been started, and consequently the country has a short history and little experience in this area of research. Accumulated environmental problems require comprehensive and diversified environmental researches for solving them.

Environmental monitoring provides the basis for grasping the conditions of environmental pollution, identifying pollution sources, revising and establishing environmental regulations, and formulating measures for environmental pollution control.

Grasping the present situation of environmental pollution, which is the basis of environmental protection administration, requires reliable monitoring data sufficient to allow mutual comparisons. Making this possible requires the development of techniques for sampling, measurement, and analysis, as well as their spread to the institutions concerned. Grasping the situation of environmental pollution also clears up causes of pollution and reveals mechanisms of pollution that adversely affect the human body, and thereby makes it possible to formulate, revise, and enforce measures for environmental protection.

In Indonesia, it is indispensable to establish systems, especially in administrative agencies, for measuring, analyzing, and processing environmental data, for properly grasping concentrations of pollutants and pollution sources.

BAPEDAL is assigned the urgent task of preparing a system for executing environmental impact control including environmental quality monitoring activities under a new organizational system. The research institutions under the control of the central government need to be equipped with

environmental quality monitoring facilities in the first place and then technologies developed there should be transferred to the provincial government institutions that enforce measures for environmental pollution control.

In order to build these systems, the central government urgently needs to first establish environmental quality monitoring activities. Then the government should standardize analysis and measuring methods, direct and supervise monitoring activities on a national basis, and collect and analyze monitoring data. The government needs to provide training for the officials of the local institutions to increase their capability, and build a nationwide monitoring network for enforcing measures for environmental protection.

(2) Necessity of training pertaining to environmental pollution control

The Government of Indonesia has decided to "promote sustainable development and control environmental pollution simultaneously" in its Fifth Five-Year Development Plan (REPELITA V). The government, laying emphasis on harmony between social development and environmental protection, aims at the most efficient social development by taking optimum measures beforehand regarding environmental protection.

The Government of Indonesia has established BAPEDAL to deal with environmental problems on a full scale. Through BAPEDAL, the government assists the President in policy making for environmental pollution control, manages waste, supervises and controls activities whose impact on the environment is considerable, establishes a standard measuring institution for processing data and information on environmental pollution, and develops human resources for environmental pollution control. Also, systems in local institutions of provincial governments are being strengthened.

The ministries controlling environment-related areas enforce environmental measures. Environmental standards and regulations have been established, but lack of adequate knowledge, experience, and techniques greatly restrict efficient enforcement of policies and prevent the development of new policies to cope with changing conditions in the country. For the purpose of improving measuring and analysis techniques including environmental monitoring and

ensuring reliability of analyzed data, it is necessary to provide training for beginner and intermediate technicians and leading officials in the environment-related administrative agencies, local public organizations, and environment-related institutions of private corporations. These people's increased knowledge and improved techniques are requisites for effective enforcement of measures for environmental protection.

Indonesia's officials in charge of environmental administration do not have a sufficient knowledge of environmental protection nor much know-how on incorporating environmental improvement plans and development plans into environmental policies. Effective administration on environmental protection requires administrative training in environmental management, in addition to training pertaining to monitoring techniques. Established facilities and systems make it possible to provide training opportunities for not only persons working in administrative agencies but also persons of NGOs that are playing an important role in Indonesia's environmental protection.

According to a survey at BAPEDAL, about 20,000 people in the 16 ministries and agencies and local public organizations alone need training pertaining to environmental protection. Not only in the Metropolitan area but also in provincial cities where environmental pollution will probably spread, much is expected from training for acquiring know-how on formulating measures. Since there are no such facilities to provide this kind of training, it is very important, in strengthening Indonesia's basis of environmental protection, that the planned center be constructed for providing training for these people for the purpose of increasing their capability.

## 2-2 Outline of Related Plans and Programs

### 2-2-1 National Plans

#### (1) History and problems of Indonesia's policy on environmental conservation

Indonesia's policies on environmental development and conservation are based on the preamble to the 1945 Constitution of the Republic of Indonesia, which says, "It is the government's duty to preserve natural resources for all the people of Indonesia." This principle obliges the government to effectively manage natural resources for the people, backed by Article 33 of the Constitution: "Land, water, and natural resources shall be managed by the government and so used as to produce the greatest welfare of the people." National policy guidelines and five-year plans have been formulated and realized in accordance with this principle.

As it was necessary to consider the impacts of economic development on the environment, the basic policy of "development in harmony with the environment" was incorporated in the First Five-Year Development Plan (1974 through 1979). In the plan for the "management of natural resources and the environment" in the Third Five-Year Development Plan (1979 through 1984), the necessity of establishing laws on powers of the ministries and agencies was pointed out, regarding human life and the environment, management of natural resources, environmental pollution control, and environmental management.

The laws on environmental conservation established in the 1960s primarily concerned natural resources, in connection with environmental conditions in land utilization, forestry, mining, irrigation, etc. However, complicated environmental problems demanded the strengthening of the country's law systems, in order to systematically grasp environmental conditions. Consequently the Basic Provisions of Environmental Management was enacted in 1982 as the basis of the law system for environmental protection. It is stipulated in the Basic Provisions that the people should have the right to enjoy an environment which is good for their health. The Basic Provisions also specify the principle of polluters' liability to bear expenses for environmental pollution control, the necessity of environmental assessment, preferential treatment under the tax system, environmental pollution

control, permission for installing pollution sources, etc. But since individual regulations on air pollution, water contamination, noise and vibration have yet to be enacted, the government's important task is to ensure the effectiveness of environmental pollution control measures by enacting such regulations. Regarding those development enterprises that are considered to have the possibility of greatly affecting the environment, the Government Regulation on Environmental Impact Assessment was enacted in 1986. Furthermore, as a policy for environmental protection in the Fifth Five-Year Development Plan (REPELITA V) started in 1989, the concept of "promoting sustainable development and controlling environmental pollution simultaneously" was introduced, which provided the basis of the country's major policies. In REPELITA V, it is specified that economic development should be attained by effectively utilizing the abundant natural resources of the country, for stabilizing the people's social life. And the Government of Indonesia aims at maintaining a rather high annual growth rate of more than 5% on the average during the duration of REPELITA V, by shifting the country's economic basis from agriculture to industries where productivity is expected to be improved. Thereby the government intends to absorb workers whose number is estimated to rapidly increase to 86,400,000, an increase of about 11,900,000, during this period. But the development of economic activities at such a high growth rate inevitably affects the natural environment in various ways, and problems caused by these impacts will remain unsolved. The most important task of Indonesia regarding environmental conservation is to plan "development in harmony with the environment."

The goals of the basic environmental policy in REPELITA V are as follows.

- 1) Development of effective living environment management systems
- 2) Development of technology for efficient use of natural resources
- 3) Development of technologies for waste utilization and resources recycling
- 4) Promotion of the use of energy resources without hazards and in a highly economic manner
- 5) Promotion of preferential use of renewable resources in development enterprises
- 6) Maintenance and improvement of living environments
- 7) Early rehabilitation of damaged natural environments and living environments

- 8) Establishment of social organizations and systems for promoting the people's participation in environmental protection

The basic environmental policies based on the above-mentioned goals are as follows.

- 1) Promotion of harmony between population and living environments
- 2) Management of natural resources and living environments
- 3) Strengthening of the environment-related executing agencies and systems, development of science and technology
- 4) Continuing development of management systems

The following programs are planned during REPELITA V.

- 1) Survey and evaluation of natural resources and environment
- 2) Preservation of forests, land, and water quality
- 3) Management of natural resources and environment
- 4) Development of meteorology and geophysics
- 5) Development of coastal regions
- 6) Environmental pollution control planning
- 7) Rehabilitation of forests and land

(2) Environmental conservation policies in REPELITA V

REPELITA V includes the following development policies.

- |            |   |
|------------|---|
| Chapter 1  | Population and Family Planning                          |
| Chapter 2  | Settlement  |
| Chapter 3  | Human Resources and Employment                          |
| Chapter 4  | Food and Nutrition                                      |
| Chapter 5  | Health  |
| Chapter 6  | Education   |
| Chapter 7  | Housing Environment                                     |
| Chapter 8  | Management of Natural Resources and Living Environments |
| Chapter 9  | Agriculture and Irrigation                              |
| Chapter 10 | Industries  |
| Chapter 11 | Mining and Energy                                       |
| Chapter 12 | Transportation, Communications, Tourism                 |
| Chapter 13 | Enterprise Development                                  |
| Chapter 14 | Regional Development                                    |



Details of environmental policy planning are mentioned in Chapter 8 "Management of Natural Resources and Living Environments". The goals and stages of the plan are described below.

1) Promotion of harmony between population and living environments

For the promotion of harmony, pressure on the environment needs to be reduced. One measure to attain this is the restriction of population increase. Measures for restricting population increase such as family planning, settlement, and improvement in living environments have to be so enforced as to contribute to environmental preservation. These measures are being intensively carried out in the provinces of Java, Bali, North Sumatera, West Sumatera, Lampung, South Kalimantan, South Sulawesi, West Nusa Tenggara, and East Nusa Tenggara. In urban areas, measures are taken for improving medical care for the residents, environmental pollution control, environmental sanitation, and traffic. It is also necessary to heighten the residents' interest in city beautification, public transportation, and parks. In rural regions, it is necessary to take measures that stimulate the residents' efforts toward self-reliance.

2) Management of natural resources and living environments

① Grasping and evaluating the conditions of natural resources and living environments

Information needs to be collected regarding forms of ecosystems, agricultural ecosystems, soil, water, forests, and energy. Regarding water resources, data and information need to be collected in Java, Madura, Bali, and Lombok, where ever increasing demand for water has caused an insufficient supply due to pollution and deforestation. Regarding forests, too, conditions of resource preservation and utilization need to be understood.

② Development of spatial plans pertaining to environment

Important ecosystems of Indonesia exist in tropical forests, river basins, coastal areas, marshy regions, dry regions, and mountain

regions. Development requires careful consideration of ecosystem preservation. For the purpose of keeping harmony in the utilization of land, water, and other natural resources, spatial plans need to be developed, with the view of ensuring the protection of reserved forests and reservations. Spatial plans are necessary for improvement in land productivity, too.

③ Preservation of natural resources and living environments

Forest preservation requires the heightening of forestry productivity, maintaining harmony with the production capacity of productive forests. The reserved forests are carefully protected for maintaining living environments, tourism, and science. In the preserved forests, lumber and land should be provided under productivity management systems. Genetic resources play an important role in the development of industries including food, clothes, housing, and pharmaceuticals. Adequate preservation of the protected regions requires that measures be taken in their peripheries. The protection of marine resources is also important. Indonesia has a catch of 6.6 million tons annually, of which catches in the archipelago reach 4.5 million tons, while those in the exclusive economic zone account for 2.1 million tons. Water resources are maintained through preserving the watershed forests and rainwater permeating areas. For this purpose, regional plans need to be developed. Those lands whose incline is 15% or more are managed with optimum technology, for the purpose of preventing soil erosion. Those lands whose incline is more than 40% are designated as protected areas. Green parks should be constructed in urban areas, with the view of preventing environmental pollution, floods, and temperature rise.

3) Strengthening of environment-related executing agencies and organizations, scientific and technological development

① Strengthening of systems

The preservation of living environments requires the establishment of laws and regulations, procedures, and a system for coordinating

the activities of relevant agencies. In 1986 the environmental assessment system was established in accordance with the Basic Provisions of Environmental Management, and it is necessary to establish further environmental standards, regulation standards, economic incentive systems, and self-reliance systems for the people. Priorities are given to spatial plans, enacting and strengthening environmental standards and regulation standards, and ocean utilization systems.

② Education and technology

For promoting environmental management, know-how and technologies suitable to the conditions in Indonesia are indispensable. Environmental research activities need to be intensified in environmental study centers of universities and other research institutions. It is urgently necessary to develop human resources in such areas as agriculture, forestry, industries, mining, transportation, urban development, and tourism. There is increasing demand for socio-environmental researches at environmental study centers. Regarding environmental management technologies, international cooperation with advanced nations needs to be strengthened in various fields. The involvement of the commercial world and industrial world should be encouraged.

4) Development of management systems

① Development management systems, with environment taken into consideration

Development management systems are strengthened in the following areas.

- a) Development technology for improving efficiency of natural resources utilization
- b) Technology for waste recycling for improving living environments and urban land utilization
- c) Coast management

d) Collection, management, and analysis of environmental information and systems for managing physical and social environments

② Development of systems pertaining to living environments

Sustainable development is a process of technical innovation and mental innovation, and requires actions based on new values and principles. Traditional wisdom regarding harmony between living environments and nature should be reconsidered in this situation. From this viewpoint, the ministries and agencies need to strengthen their activities pertaining to the country's social systems.

③ Promotion of broad-based participation of the people

In sustainable development, it is necessary for all the people to behave with awareness of the importance of environmental conservation. It is expected that social systems such as religion and customs will play important roles in this respect. Also much is expected from the business managers in mining, industries, transportation, communications, agriculture, and forestry, for the improvement of living environments. Especially large businesses and state-owned businesses should provide models of environmental conservation.

④ Rehabilitation of forests and devastated land

Technical development such as the application of natural fertilizers and the restriction of the use of chemicals will be promoted, with the view of recovering soil productivity. Technical cooperation with the farmers needs to be strengthened. Devastated land needs to be rehabilitated through greenery promotion. Measures including loan guarantees should be taken to encourage the people to participate. Since most of the productive forests are subjected to the License for Forest Development (HPH), maintenance, management and rehabilitation of forests should be conducted by those who have a license to do so. The diminution of forests has shortened the shifting

cycle of people engaged in slash-and-burn agriculture. Measures are also needed in this area.

⑤ Management of the ocean and coastal regions

Indonesia is one of the world largest maritime nations. The ocean contributes to its development through mining, marine transportation, and fishery. However, oceanic management is insufficient, and human resources development and the establishment of organizations and systems are urgently needed. It is important to develop oceanic technologies and accumulate oceanic information. Oceanic pollution control requires the cooperation of such sectors as mining, marine transportation, and national defense. Regarding oil pollution in particular, close cooperation needs to be maintained with private business managers running oil-related companies, shipping agents, and harbor authorities. Desirable utilization of the ocean and coastal regions should be specified.

⑥ Environmental pollution control and improvement of living environments

With the advance of development, pollution has been caused in rivers, lakes, marshes, seas, air, and soil, by waste matter originating in industrial waste water, exhaust gas, and solid waste, as well as household waste water and garbage, exhaust gas from automobiles, agriculture, and tourism. The first step is to reduce waste itself through increased production efficiency and recycling. It is necessary that "downstream" industries utilize waste from "upstream" industries. Another important measure is to expand and enforce standards preventing waste matter from exceeding allowable limits from the viewpoint of environmental protection. Enforcing recycling and standards requires the establishment of economic incentive systems and law systems. At the same time, facilities need to be constructed for collecting and treating waste. Regarding agricultural waste, it is necessary to develop industries that can utilize it. In urban areas, environmental pollution has been caused by household and industrial waste, exhaust gas from automobiles, which fact demands more effective measures. In cases of air

pollution, it is most important to facilitate traffic flow through optimum arrangement of roads. It is also important to heighten the efficiency of public transportation and restrict the use of private cars. The development of clean energy and the construction of buffer green zones are necessary. Energy, which is indispensable in development, causes pollution of air, soil, water, and living environments. Consequently attention needs to be paid to the development of clean energy such as geothermal heat, natural gas, and solar heat.

The Environmental Conservation Program planned in REPELITA V in accordance with the above-mentioned goals includes the following seven plans.

1. Survey and evaluation of natural resources and environment
2. Preservation of forests, land, and water resources
3. Management of natural resources and living environments
4. Development of meteorology and geophysics
5. Development of coastal regions
6. Environmental pollution control planning
7. Rehabilitation of forests and land

The plans are outlined below.

(1) Survey and evaluation of natural resources and environment

Purpose: The following activities are planned for collecting more information and accurately grasping present conditions, with the view of improving future programs pertaining to natural resources utilization and living environments.

Planned activities:

- 1) Understanding conditions pertaining to land, sea, geology, and hydrology, drawing maps of them, and making maps of agricultural ecology, vegetation, forests, and soil
- 2) Understanding conditions of natural resources and ecosystems and making maps of them
- 3) Education, training, technical research and development
- 4) Forms of utilizing natural resources including forests, land, and water
- 5) Development of environmental information systems

6) Economic development and environmental assessment

(2) Preservation of forests, land, and water resources

Purpose : Optimum management of the reserved forests and ecosystems, construction of natural parks, protection of valuable plants, management and protection of natural resources and living environments through these activities

Planned activities :

- 1) Improvement and environmental rehabilitation will be carried out for 39 rivers, which have large cities downstream or where large amounts of investment have been made for constructing irrigation systems.  
Major big rivers: Citanduy, Cimanuk, Brantas, Solo, Jratunseluna  
The River Basin Management Plan is implemented for 12 rivers to protect about 500 thousand hectares of farmland from floods: Citarum, Cimanuk, Citanduy, Billa, Walanac, Ciliwung-Cisadane-Cibeet, Jratunseluna, Solo, Ceravuluk Ulo, Brantas, Asahan, Saddang
- 2) Construction and development of 12 national parks: Leuser Mountain, South Bukit Barisan, Ujung Kulon, Baluran, Meru Betiri, Gede-Pangrongo Mountains, West Bali, Komodo, Seribu Islands, Dumoga-Bone, Kutai, Bromo Tengger Semeru. Since eight of these national parks are included in tourism routes and located in important river basins, sufficient consideration needs to be given to this point in developing them.
- 3) Protection of 30 million hectares of reserved forests and 18.7 million hectares of protected regions :  
Marshland ecosystems in Baduy and Mentawai and the traditional housing areas will remain protected. Genetic resources inside and outside forests will be protected.

### (3) Management of natural resources and living environments

Purpose : Expansion of governmental and private activities necessary for managing natural resources and living environments through systematic activities, education, training, surveys, etc., conducted by the central and provincial governments

#### Planned activities :

Systems will be developed for social environment management, education, training, research and development, and environmental management by citizens. Measures will be taken for smooth execution of environmental assessment.

- 1) Strengthening the environmental study centers of the following universities :  
Medan, Padang, Pekanbaru, Palembang, Bandar Lampung, Jakarta, Bogor, Bandung, Semarang, Yogyakarta, Surabaya, Malang, Banjarbaru, Pontianak, Samarinda, Ujung Pandang, Denpasar, Kupang, Ambon, Jayapura.
- 2) Establishing graduate schools: Jakarta, Bogor, Bandung, Yogyakarta, Surabaya, Medan, Palembang, Ujung Pandang.
- 3) Environmental education, training in environmental assessment, and provision of environmental information will be improved for the people who are going to play important roles in various areas. School education pertaining to environment will be improved.
- 4) Environmental standards and discharge regulations will be established for the regions mentioned below, which are undergoing intensive development. North Sumatera, East Aceh, West Sumatera, Riau, South Sumatera, Lampung, Java, Bali, South Kalimantan, East Kalimantan, South Sulawesi, North Sulawesi.
- 5) Optimum land utilization will be promoted in the steel industry, petrochemical industry, agriculture and other



industries, oil industry, gas industry, mining, pharmaceuticals, and urban areas. The necessity of giving environmental consideration through environmental assessment in early stages of development will be made known.

(4) Development of meteorology and geophysics

Purpose: Expanded provision of information in the areas of land, marine, and air transportation. Increased information for air and marine pollution control and natural disaster management. Increased information on the warming of the earth.

Planned activities:

Global environmental information, such as the warming of the earth and marine pollution, will be collected and provided. Observation facilities will be constructed and modern technologies will be introduced for collecting, analyzing and displaying information. Information will be intensively collected in the sea areas near the border: Malacca Strait, South China Sea, Java Sea, Sulawesi Strait, and the exclusive economic zone. Those coasts affected by erosion -- north coast of Java, Bali, coasts of Lombok, south coast of Sulawesi -- will be rehabilitated. Waste oil pollution will be monitored in the Malacca Strait, South China Sea, Java Sea and Makassar Strait.

(5) Development of coastal regions

Purposes: Expansion of roles of "marine and coastal resources" in national development

- Development of techniques and capability of the coastal residents for the utilization and protection of marine and coastal ecosystems
- Development of human resources and techniques for marine and coastal management
- Management of marine environmental pollution control and protection of the functions of marine and coastal ecosystems

**Table 2-2-1. The Budget in the Sector of Natural Resources and Living Environment in REPELITA V**

unit : billion rupiah

Development Programme	1989/90	During REPELITA V
① Forest, Land and Water Safeguarding Programme	128.8	919.7
② Natural Resources and Living Environment Management Programme	18.7	132.5
③ Meteorological and Geophysical Development Programme	12.2	81.8
④ Natural Resources and Living Environment Inventory and Evaluation Programme	31.2	184.5
⑤ Forest and Critical Land Rehabilitation Programme	48.3	352.5
⑥ Living Environment Pollution Control Programme	4.7	34.1
⑦ Coastal Areas Promotion Programme	4.9	36.4
<b>Total</b>	<b>248.8</b>	<b>1,741.5</b>

Source : Indonesia's Fifth Five-Year Development Plan

**Planned activities :**

- 1) Survey on conditions of marine resources and evaluation of them
- 2) Establishment of marine and coastal management systems
- 3) Land utilization planning for coastal regions
- 4) Formulating marine resources utilization plans
- 5) Preservation of marine and coastal environments
- 6) Improved standard of living for the coastal residents
- 7) Education, training and survey for marine and coastal environmental protection

(6) Environmental pollution control planning

Purpose : Minimizing pollution of living environments, especially of air and water, resulting from human activities.

Planned activities :

For the purpose of preventing damage caused by environmental pollution, discharge standards will be enforced, waste treatment facilities will be constructed, and production technologies causing less environmental pollution will be developed through use of alternative raw materials. Specifically, recycling, citizens' participation, and the enforcement of discharge regulations will be promoted. Environmental pollution control devices will be developed and environmental quality monitoring facilities will be constructed. Laws and regulations will be enforced and the rehabilitation of damaged environments and the development of environmental information systems will be conducted.

Regarding hazardous industrial waste, measures will be taken, with the cooperation of the industrial sector, in Jakarta, Bogor, Tangerang, Bekasi, Surabaya, East Kalimantan, Lhok Seumawe, Medan, Palembang, Bandung, Semarang, Batam Island, and Merak-Cilegon. Improvement of waste and industrial waste treatment facilities is necessary. Environmental information systems will be established for the smooth promotion of environmental pollution control.

(7) Rehabilitation of forests and land

Purpose : Rehabilitation of forests and land for production and environmental protection

Planned activities :

The rehabilitation of productive forests will be conducted with the cooperation of those who have been granted licenses for lumbering, and the reserved forests will be rehabilitated, with the cooperation of the residents living near them. For plantations whose inclination is 40 degrees or more, measures for land protection will

Table 2-2-2. Sectoral Growth Rates and Structural Change in REPELITA V  
(%)

Sector	Estimated Share in GDP 1989	Projected Share in GDP 1993	Average Annual Growth Rate, REEPELITA V
Agriculture	23.2	21.6	3.6
Mining and Quarrying	15.9	12.6	0.4
Manufacturing	14.4	16.9	8.5
Construction	5.6	5.8	6.0
Trade	15.9	16.7	6.0
Transportation and Communication	15.7	6.0	6.4
Others	19.3	20.4	6.1
Gross Domestic Product (GDP)	100.0	100.0	*5.0

\* GDP Growth Rate

Source : Indonesia's Fifth Five-Year Development Plan

Table 2-2-3. Major Social Target in REPELITA V

	1988	1993
Total Population in Indonesia	175.59 millions	192.94 millions (Growth Rate 1.9%)
Jawa	105.8 millions	114.1 millions (Growth Rate 1.5%)
Other Island	69.8 millions	78.8 millions (Growth Rate 2.5%)
Crude Birth Rate (per 1,000)	28.7	25.4
Labor Force	74.5 millionns	86.36 millions

Source : Indonesia's Fifth Five-Year Development Plan

be taken. In REPELITA V, 1.9 million hectares of forests and 4.9 million hectares of devastated land will undergo rehabilitation. Those who have been granted licenses for lumbering are expected to rehabilitate 4 million hectares of low-productivity forests. These activities will be conducted at 101 tributary basins of 39 important river basins designated in 26 provinces. In executing these activities, information and necessary materials and equipment will be provided for obtaining the cooperation of the local residents. For the purpose of promoting the settlement of 500 thousand households of migrating farming people, model settlement agricultural units will be constructed, in coordination with programs for community amalgamation, settlement, forestation, and lumbering.

#### **2-2-2 National Policies and Implementation Measures for Environmental Development**

Details of environmental policies and plans are described in Chapter 8 Management of Natural Resources and Living Environments of REPELITA V started in fiscal 1989, as mentioned earlier. The concept of "sustainable development" underlies the government's major policies specified in REPELITA V. All programs of REPELITA V pertaining to the environment, including the Project for Establishment of EMC, are aimed at sustainable development in Indonesia.

Among the seven environmental preservation plans of REPELITA V, three plans concern activities in the EMC. Especially in connection with the plan mentioned in (6) above, the establishment of the EMC has great significance toward the realization of these policies.

- (1) Survey and evaluation of environment
- (3) Management of natural resources and living environments
- (6) Management of environmental pollution control

### 2-2-3 Assistance Projects by Other Countries

Assistance agencies of various countries have been active in environmental protection in Indonesia. They cover such comprehensive areas as agriculture, forestry, water resources, living resources, mineral resources, energy, solid waste management, and natural environment, with the Clean River Program (PROKASIH) at the core.

Details of assistance from these agencies are described below.

#### (1) Strengthening of the BAPEDAL organization by a World Bank's EMTAG

The Ministry of State for Population and Environment (KLH) has been examining the BAPEDAL Development Plan (BDP) in activities, budget, etc., of BAPEDAL, whose strengthening is planned with a fund of 400 thousand US dollars disbursed by the Japan Trust Fund of the World Bank as a World Bank EMTAG (Environmental Management Technical Assistance Grant). The Ministry is also examining activities assisted by an EMTAL (Environmental Management Technical Assistance Loan).

These examinations are based on the request from the Government of Indonesia for grant aid cooperation and project-type technical cooperation of the Government of Japan and the request for an EMTAL loan from the World Bank, with the view of appropriating it for activities planned in the EMC.

The following are activities covered by EMTAL loan which has been requested by the Indonesian government.

- 1) Sending of experts in environmental policy making, establishing and enforcing regulation systems
- 2) Provision of monitoring equipment for PROKASIH
- 3) Technical cooperation for the Provincial Development Planning Bureau (BAPPEDA) of East Java Province and one province in Sumatera
- 4) Technical cooperation in making land utilization plans aimed at natural resources protection

Training for the staff of the environment-related agencies and researches in the area of environmental pollution (water pollution, air pollution, noise and vibration) is also included in cooperation for development activities in the EMC, under the BAPEDAL Development Plan (BDP) now under examination.

(2) EMDI Plan by CIDA

The Government of Canada is implementing its EMDI Plan (Environmental Management Development in Indonesia) aimed at assisting KLH in establishing environmental management systems.

Under EMDI, which was started five years ago, some environmental standards and discharge standards have been enforced and an environmental assessment system has been established.

EMDI is implemented simultaneously with REPELITA V -- from fiscal 1989 through 1994 -- and 3.5 million Canadian dollars has been appropriated for the plan. EMDI is outlined as follows.

1) Technical cooperation

- Spatial planning and management of local environments
- Management of environmental impact caused by development (EIA)  
Environmental assessment / Establishment of environmental standards / Management of toxic substances
- Management of marine and coastal environments
- Assisting systems for the management of marine and coastal environments  
Environmental information systems / Environment Act / Study abroad system for environmental management / Assistance for macro-policies / Publication programs

2) Technical cooperation

- Assistance for NGOs and cooperation between the two countries
- Assistance for the private sector and cooperation between the two countries

- Cooperation between universities (Gadjamada University, University of Indonesia, Bandung Institute of Technology/Waterloo University, York University)
- Cooperation with the Ministry of Public Works (dispatch of environmental assessment experts)
- Training programs provided by Dalhousie University

(3) UNDP

The UNDP has been assisting in (1) surveys and evaluation of environmental conditions and (2) activities in the environmental study centers of universities, through its projects implemented in cooperation with KLH. Regarding surveys and evaluation of environmental conditions in Indonesia, the situation of environmental protection measures was evaluated and the orientation of future environmental measures was examined in 1983 and 1988. Because of limitations in the UNDP's budget, it will be difficult for future projects to be implemented without funds provided by the World Bank, etc.

(4) USAID

No projects are being implemented, but projects for natural resources management (proposed) are being formulated. These projects are aimed at natural resources management with the cooperation of the National Development Planning Board (BAPPENAS), the Ministry of Forestry, and other relevant ministries and agencies. The recognition that optimum utilization of natural resources requires establishment of new systems underlies these projects.

Major projects are mentioned below. Implementation of projects 1 and 2 is probable.

- 1) Sustainable forestry with managed natural resources
- 2) Management of living resources and protection of species
- 3) Other projects
  - a) Sustainable agriculture with managed natural resources
  - b) Management of coastal regions and marine resources
  - c) Distribution and management of water resources in Java



- d) Management of industrial environmental pollution and hazardous waste
- e) Management of energy and mineral resources
- f) Measures for disaster prevention and response

(5) Germany (GTZ)

- 1) Environmental impact surveys (sending of experts and provision of equipment such as computers)  
Establishment of permission systems for factory and business place construction  
These plans are intended for two rivers of the 20 rivers subject to PROKASIH
- 2) Dispatch of experts for training in environmental management provided in four Kalimantan provinces (East Kalimantan, West Kalimantan, South Kalimantan, and Central Kalimantan).  
The GTZ has given assistance in holding seminars on hazardous waste management and making films for the city beautification campaign.

(6) Australia (AIDAB)

- 1) Water pollution control
  - a) Dispatch of two technicians for waste water treatment facility designing
  - b) Eight experts giving instructions in environmental administration in eight provinces
  - c) Training for 20 officials in charge of on-the-spot inspections
  - d) Monitoring of 15 rivers among the 20 rivers subject to PROKASIH
  - e) Environmental impact assessment in the basins of the rivers subject to PROKASIH
- 2) Air pollution control
  - a) Measurement of exhaust from automobiles
  - b) Utilization of measurements such as publication of the measurement results

- c) Monitoring in the Cibinong and Pulo Gadong districts
- 3) Establishment of environmental protection systems in mining and quarrying
- 4) Toxic waste management
  - a) Detailed designing of treatment facilities
  - b) Management of information on the treatment facilities
  - c) Environmental protection measures for small businesses

(7) Asian Development Bank (ADB)

KLH is examining its planned request for assistance in waste minimization (a measure for minimizing pollutants discharged from factories through efficient use of raw materials). Assistance is planned for BAPEDAL in implementing the Clean River Program, and the 1993 loan is planned to be used for establishing local networks.

2-2-4 Status of the EMC Project

The EMC Project is aimed at enforcing national environmental policies in accordance with programs in national plans. The Project is expected to contribute to Indonesia's development in harmony with environmental pollution control and environmental protection, by supporting and promoting environmental administration through monitoring and research activities and training for those who are in charge of environmental protection in various institutions.

Research, monitoring and training activities planned in the EMC Project are closely connected with the guidelines for attaining the goals of national environmental policies. They are outlined as follows.

- (1) Functions as a reference laboratory
  - 1) Development of national standardized measuring methods for environmental quality analysis

- 2) Sampling, selection of sample canisters, development of analyzers' techniques and guidance for them. Assistance for local officials through instruction in monitoring planning
- 3) Realization of proper handling of hazardous and toxic chemicals on a provincial basis
- 4) Realization of regular analysis on a provincial basis
- 5) Technical training for provincial officials and officials of other ministries and agencies, and development of guidelines
- 6) Cooperation in identifying causes and effects of environmental disruption and seeking possible solutions through establishing scientific organizations
- 7) Giving evidence from technical viewpoints in environmental lawsuits

(2) Functions as an environmental information system

- 1) Preparation of environmental data on a national basis (water quality soil, air, toxic substances, environmental pollution assessment, geographic data)
- 2) Data base management, global information system for environmental statistics, establishment of data processing software including simulation models of water pollution and air pollution
- 3) Playing a role as part of an international organization networks such as the UNEP and WHO
- 4) Playing a role in the management of national resources and living environment assessment

(3) Functions as an environmental training institution

- 1) Training for officials in charge of sampling, analysis, and data processing in central, provincial, local government institutions and private sectors.
- 2) Training for officials dealing with environmental problems in central, provincial, and local government institutions
- 3) Training for officials in charge of prosecution for settling environmental lawsuits
- 4) Training for teachers in charge of environmental education
- 5) Training for NGOs aimed at the people's participation

## 2-3 Outline of the Request

### (1) Background of the request

Environmental problems facing the Republic of Indonesia are characterized, similar to other developing countries, by urbanization due to a rapid increase in population and environmental disruption due to water pollution, air pollution, pollution by hazardous chemical substances, noise and vibration, which are nuisances resulting from industrialization. Indonesia's environmental problems are also characterized by its natural resources being on the verge of destruction and the addition of general environmental sanitation problems, which have already been solved in developed countries. This fact complicates environmental problems of Indonesia.

Consequently it is important to seek solutions suitable to the country for its environmental problems which are so different from those in developed countries. In environmental administration, the Government of Indonesia promulgated the Basic Provisions of Environmental Management in 1982 and established the Ministry of State for Population and Environment (KLH) in 1983. The Ministry, however, is currently in charge of only making laws and regulations on environmental administration and the coordination of activities of the ministries dealing with environmental problems. The government needs to develop human resources with high technological levels, in order to improve its capability of solving environmental problems, and as a specific measure for this, established the Environmental Impact Management Agency (BAPEDAL) in June 1990, in accordance with a Presidential Decree. Indonesia's environmental administration and execution of environmental pollution control measures have thus just been started, with BAPEDAL being the nucleus. And the reality is that environmental problems are not sufficiently dealt with because of financial and technical restrictions such as insufficient techniques for measuring and analyzing pollution sources, techniques that constitute the basis of measures for environmental pollution control, insufficient numbers of environmental administrative officials, engineers, and researchers, and insufficient research facilities and equipment.

Under these circumstances, the Government of Indonesia, having specified its basic policy of "promoting sustainable development and simultaneously

preventing environmental pollution" in REPELITA V, formulated the "Project for Establishment of Environmental Management Center (EMC)." The government intends the EMC to be the central institution for further promoting researches pertaining to environmental administration, development of environmental management technologies, analysis of data and information, training for administrative officials and technicians in private institutions and establishing future environmental administration. The government requested grant aid and technical of the Government of Japan for the Project's implementation. In response to this request, the Government of Japan dispatched the Preliminary Study Team in February 1991 and the Project-type Technical Cooperation Preliminary Study Team in May 1991, to confirm the contents of the request.

(2) Details of the request

1) Implementing agency

Ministry of State for Population and Environment, Environmental Impact Management Agency (BAPEDAL) of the Republic of Indonesia

2) Major activities

① Environmental Quality monitoring

a) Development of Reference Laboratory

Standardization of analysis methods, accuracy management, research and development, and analysis and provision of data in the areas of water pollution, air pollution, toxic substances, and noise and vibration, etc.

b) Conducting Environmental Monitoring Program

Management of national environmental monitoring programs, guidance in the establishment of monitoring networks which is an urgent task of the government, and implementation of environmental monitoring programs such as identifying causes and effects of environmental pollution.

- c) Development of Environmental Information Systems  
Plans to collect environmental data from the provincial governments and international agencies, arrange and analyze them, and utilize them in policy- and decision-making.  
Establishment of environmental data bases, establishment of system software, communications and global contribution in environmental protection.

② Human Resources Development

- a) - Environmental Technical Training
  - Environmental monitoring technology
  - Environmental planning
  - Environmental data processing Environmental pollution control technologies
- b) - Environmental Administrative Training
  - Environmental impact assessment (AMDAL)
  - Environmental administration (1) for junior officials
  - Environmental administration (2) for senior officials
  - Self-development and participation of the public

3) Project site

Serpong, West Java  
National Center for Research, Science and Technology (PUSPIPTEK)

4) Details of the facilities Proposed total floor area : about 12,000 m<sup>2</sup>

- ① Research facility
  - ... Water analysis laboratory
  - Air analysis laboratory
  - Toxic substances analysis laboratory
  - Information system room ... Environmental data base room
  - Information apparatus room
  - Meeting room etc.
- ② Training facility
  - Lecture rooms, practice rooms, audiovisual room, meeting room, etc.

- ③ Management facility
  - Director's office, Deputy Director's office, office, library, auditorium, conference room
- ④ Lodging facility
- ⑤ Other
  - Workshop, storage, toilet, entrance hall, etc.

5) Requested equipment

- ① Common analytical equipment (gas chromatograph, spectrophotometer, other analysis equipment)
- ② Water analysis equipment (pH meter, COD meter)
- ③ Air analysis equipment (automatic measuring equipment for SO<sub>2</sub>, NO<sub>x</sub> and O<sub>3</sub>)
- ④ Noise and vibration measuring equipment (noise meter, vibration level meter)
- ⑤ Waste analysis equipment (stirrer, balance)
- ⑥ General analysis equipment (chemical balance, centrifuge)
- ⑦ Library equipment (bookstacks, books)
- ⑧ Information equipment (central processing unit, personal computers)
- ⑨ Audiovisual equipment (slide projector, OHP, VTR)
- 10 Office equipment, furniture for lodgings, vehicles

6) Project-type technical cooperation

(Dispatch of long-term experts)

- Environmental science (team leader)
- Environmental analysis
  - air pollution
  - water pollution
  - toxic substances
- Environmental information
- Impact on health
- Administrative field

(Dispatch of short-term experts)

- Environmental analysis
  - noise & vibration
- Environmental information

- Environmental impact assessment
- Ecology/biology
- Environmental engineering
- Training, education



## **CHAPTER 3 OUTLINE OF THE PROJECT**



## **CHAPTER 3    OUTLINE OF THE PROJECT**

### **3-1    Overall Objective**

The Government of Indonesia is going to strengthen its capability of environmental pollution control through the Environmental Impact Management Agency (BAPEDAL), the executing agency. The government intends to cause the Agency to cope with environmental pollution resulting from urbanization and industrialization, in cooperation with the Ministry of State for Population and Environment (KLH), which has been in charge of formulating and coordinating environmental policies. The government expects more effective measures will be taken in coordination with the other ministries and agencies concerned. However, insufficient techniques and experience in environmental pollution control prevent these ministries and agencies from taking appropriate measures. Under these circumstances, the Government of Indonesia has formulated the Project for Establishment of Environmental Management Center (EMC) in order to advance science and technology that constitute the basis of formulating and executing measures for controlling various types of environmental pollution caused in Indonesia. The objective of the Project is the procurement of facilities and equipment necessary in the EMC.

### **3-2    Examination of the Request**

#### **3-2-1    Suitability of and Necessity the EMC**

Planned activities in the EMC based on the objective mentioned above include the following activities.

- (1) Environmental quality monitoring activities
- (2) Human resources development activities for environmental pollution control

The appropriateness and necessity of these activities are described below.

#### **(1) Environmental quality monitoring activities**

Environmental monitoring constitutes the basis of understanding the conditions of environmental pollution, identifying pollution sources,

establishing and revising environmental standards, and formulating measures for environmental pollution control. In Indonesia, environmental monitoring is carried out at agencies institutions on a provincial basis and at environmental studies centers (PSL) of national universities. However, even in P4L in the Capital City Special Region (DKI), which is considered to be comparatively well equipped with facilities and equipment, staff members and instruments are insufficient in number, and their hands are full with analysis of water and soil, a routine activity controlled and executed by P4L. Consequently little environmental research is done because the staff members have little time to spare in doing research for the development of standardized measuring methods indispensable for environmental monitoring. This is also true of other administrative agencies. Universities are provided with extremely small amounts of funds appropriated for research activities and insufficiently equipped with facilities and equipment, and consequently little research is done concerning water pollution. It cannot be expected that universities will play important roles in the very near future in solving the environmental problems now facing Indonesia, through practical and problem-solving research.

It is urgently necessary for the Government of Indonesia to cause unified practical research to be done, and consequently it is reasonable that the EMC be designed as Indonesia's central institution where this research can be carried out.

Environmental monitoring activities in the EMC are classified into three functions as mentioned below.

- 1) Functions of a reference laboratory (standard measuring institution)
- 2) Leading role in environmental monitoring planning
- 3) Establishment of environmental information systems

The above-mentioned functions, including the establishment of standardized measuring methods, guidance in monitoring planning, and provision of relevant environmental information, are necessary and indispensable as well as appropriate in implementing environmental quality monitoring plans. The appropriateness and necessity of these functions are described below.

- 1) Functions of a reference laboratory (standard measuring institution)

Formulating environmental standards requires the understanding of current environmental conditions by collecting highly reliable data which can be mutually compared. The reality is, however, that different analysis methods are applied in BKLH, TKP2, and PSL, and institutions conducting environmental quality monitoring, and consequently it is almost impossible to make comparisons between data collected in these institutions.

Collecting highly reliable monitoring data which can be mutually compared can be accomplished by practical research such as the development of standardized measuring methods. It is appropriate therefore that the Project be aimed at the standardization of analysis methods, accuracy management, standardized measurement, and analysis and provision of data.

An urgent task of the Government of Indonesia is to determine current conditions of environmental pollution through monitoring water quality, air, and toxic substances. Objects of research planned in the Project cover mainly water quality, air, and toxic substances, which fact shows the appropriateness of the Project.

## 2) Leading role in environmental quality monitoring planning

Environmental quality monitoring activities are conducted in TKP2, concerning water and air quality. BAPEDAL plans to expand its monitoring activities in 1992, which include the following activities.

- Water quality monitoring
  - ① Strengthening of the monitoring systems pertaining to the Clean River Program (PROKASIH)
  - ② Monitoring of groundwater pollution
  - ③ Coastal seawater monitoring in large cities including Jakarta and industrial cities
  
- Air quality monitoring
  - ① Continuous monitoring in Jakarta and the Tangerang industrial zone (three monitoring stations)
  - ② Monitoring of exhaust gas from factories and automobiles regions where air pollution by automobiles is considerable

- Local industrial cities
  - Assistance in monitoring for EIA (AMDAL)
- Hazardous waste monitoring
    - ① Issue the Government regulation concerning hazardous waste
    - ② Detail design for centralized hazardous waste treatment

However, monitoring activities conducted in Indonesia are insufficient for understanding conditions of environmental pollution all over the country, even if monitoring activities planned in BAPEDAL are put into practice. In view of environmental pollution ever spreading over the country, it is urgently necessary for the Government of Indonesia to construct a nationwide environmental monitoring network and establish BAPEDALDA, in addition to a sharp increase in monitoring points and supplementary monitoring in mobile measuring cars. Through the EMC, which is planned to become the center of Indonesia's environmental monitoring activities, a nation wide monitoring network will be constructed and the monitoring systems of provincial governments will be managed. Also, monitoring activities will be conducted for identifying environmental pollution sources and evaluating environmental policies. The EMC thus has important roles.

### 3) Establishment of environmental information systems

In order to promote environmental monitoring all over Indonesia, the Government of Indonesia needs to provide environmental information regarding standardized measuring methods and pollution sources, including geological information, for the monitoring institutions. Statistical analysis of collected monitoring data makes it possible for the government to understand conditions of environmental pollution throughout the country and formulate environmental policies.

Environmental data bases have yet to be established in Indonesia and statistical analysis is not done. Consequently it is considered appropriate that the preparation of environmental data bases as an environmental information system and statistical data analysis be planned in the EMC.

Environmental disruption affects not only one country but also the entire earth. Acid rain, the greenhouse effect, destruction of the ozone layer, and desertification are results of global environmental disruption. Many of the ASEAN nations are faced with the same environmental problems as those confronting Indonesia. Environmental data and know-how possessed by foreign nations would be very useful for Indonesia toward removing difficulties in environmental administration in order to attack environmental problems on a full scale. The planned function of the EMC as a place for the international exchange of environmental information is expected to be very effective.

(2) Human resources development for environmental conservation

BAPEDAL is primarily in charge of managing the execution of environmental measures. The enforcement of regulations for environmental protection is necessary to cooperate with the other government agencies, including provincial governments, that control industries. Consequently it is indispensable to improve the qualifications of the personnel not only of BAPEDAL but also of the relevant agencies, for the smooth execution of measures for environmental protection. But in Indonesia's environment-related institutions, where full-scale environmental protection activities have just been started, insufficient facilities and equipment and lack of technology and experience impede human resources development, though small scale of training is provided at some institutions. The establishment of the EMC will lead to the expansion of human resources for environmental protection, through providing unified training for research, technical, and administrative officials of the environment-related agencies of the central and provincial governments. The establishment of the EMC is thus urgently needed for promoting environmental protection administration, and consequently the Project is regarded as appropriate. Especially for understanding the conditions of environmental pollution, which constitutes the basis of environmental protection administration, a large number of highly reliable and mutually comparable monitoring data need to be collected. Making this possible requires the development of sampling, measuring, and analysis methods at the EMC as well as the spread of them among those who are engaged in research and analysis in the institutions concerned. Training needs to be provided for them, too. Understanding conditions of environmental pollution promotes identification of the causes of

of the causes of pollution and dangers to the human health and allows the formulation, revision, and execution of measures for environmental protection.

Indonesian environmental administrative officials only have an insufficient knowledge about environmental protection and little know-how on how to incorporate environmental improvement planning and development planning into environmental administration. Effective promotion of environmental protection administration in Indonesia will require administrative training pertaining to environmental management, in addition to technical training.

Training to be provided in the EMC is classified into two categories, namely, training pertaining to environmental technology and training pertaining to environmental administration. Training is intended for researchers, engineers, and administrative officials of administrative agencies dealing with environmental problems and for personnel of private corporations. Training will cover the whole range of environmental pollution control. Training pertaining to environmental technology consists of environmental monitoring, environmental planning, environmental data processing, and environmental pollution control technologies. Water and air quality, toxic substances, soil, and noise and vibration are the objects of environmental quality monitoring. Thirteen courses will be given, including courses for environmental pollution control technologies, five years after the commencement of training.

Training pertaining to environmental administration consists of four categories of training, namely, environmental impact assessment (EIA), environmental administration (1) and (2), environmental communication and public participation. Nine courses will be given. As short-term special training, 17 seminars are planned to be held annually, which will receive 50 to 800 participants.

These training courses, being necessary and appropriate for promoting environmental administration, are much larger in scale than those provided thus far by KLH and PSL, and consequently cannot be realized without the transfer of know-how on training through project-type technical cooperation.



It is planned that instructors will be invited from the EMC and external institutions. Eighteen staffs of the EMC Training Department will be in charge of training. In addition to these staffs, staffs of the Reference Laboratory Division and the Environmental Information Division will act as instructors. However, since these instructors alone cannot run 22 training courses and seminars, it is planned that the instructors will be invited from external institutions such as KLH, staff in charge of ministerial environmental laboratories (Ministry of Health, Ministry of Industry, etc.) environmental laboratories of universities, P4L, BAPEDAL, and private consulting firms.

These persons, however, do not have sufficient experience in giving training, and the Project is to include a plan to train instructors for the improvement of their qualifications, through project-type technical cooperation.

### 3-2-2 Examination of Implementing and Operating Plans

BAPEDAL is to take charge of the Project's implementation, and the EMC is to be controlled by the Deputy for director of development in BAPEDAL (Deputy II).

In promoting the Project, BAPEDAL plans to organize a steering committee to carry on negotiations with the government agencies concerned, ensuring appropriations, and implementing employment plans. The Deputy for director of development in BAPEDAL is planned to be nominated chairman of the committee. The committee is planned to consist of BAPEDAL officials and experts dispatched from Japan for project-type technical cooperation.

#### (1) Organizational plan

The EMC will be organized by the Head, who controls four divisions : the Reference Laboratory Division (including the Water and Soil Section, Air and Noise Section, and Toxic Substance Section), the Environmental Information Division (Data Analysis and Evaluation Section, Information and Materials Section, and Data Processing Section), the Training Division (Planning Section, Course Section, and Control Section), and the Management Division. The first two Divisions are controlled by the Deputy Director- I and the

Training Division is controlled by the Deputy Director-II. The EMC thus consists of four divisions and nine sections.

In the preliminary study, it was planned that the Reference Laboratory Division would comprise four sections, but the planned Microorganism Section was excluded in the following technical cooperation preliminary study, for the reason that it was considered too early to organize the Microorganism Section in view of current conditions in Indonesia. In the basic design study, the Government of Indonesia proposed that the Training Division consist of three sections, namely the Planning Section, the Course Section, and the Control Section, rather than the four sections of the Water and Soil Section, the Air and Noise Section, the Hazardous Substances Section, and the Environmental Management Section. After discussions and studies, it was decided that the Training Division comprise three sections, which was considered more appropriate in conducting training activities.

The organization of the EMC is to be established by Head of BAPEDAL, after the Exchange of Notes are concluded for grant aid.

The EMC will have 63 staffs by the end of fiscal 1993. Nineteen staffs will be employed in fiscal 1991, 30 staffs in 1992, 14 staffs in 1993, totaling 63 staffs. This employment plan has already been submitted to the Ministry of State for Administrative Reform, which handles the personnel affairs of government officials. Regarding the selection of the deputy directors and division chief, guidance will be given from the Ministry of State for Administrative Reform in consideration of balance with other agencies, and the employment of personnel has been charged to BAPEDAL. BAPEDAL plans to assign seven of its own staffs, nine staffs from other ministries, and 47 new graduates (15 university graduates, 18 college graduates, and 14 high school graduates). BAPEDAL declares that the assignment of 63 officials will be completed by the end of fiscal 1994.

The assigned technical officials are planned to receive training at P4L and the other institute until the EMC is completed.

(2) Budgetary plan

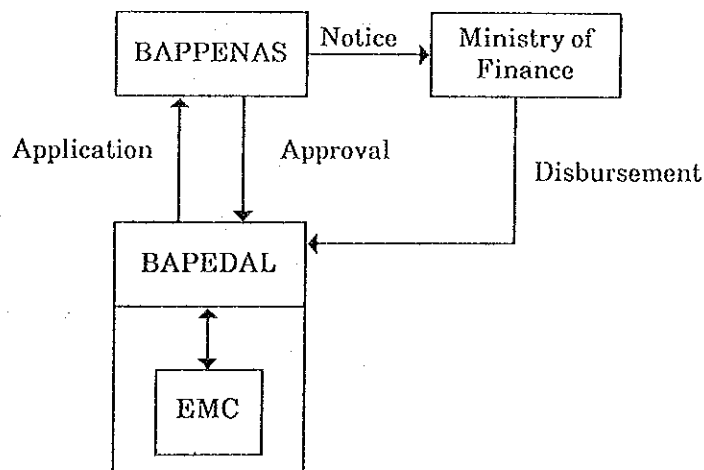
Since the EMC is one of organizations under the BAPEDAL agencies, its budgetary application is submitted to the National Development Planning Board (BAPPENAS) as part of BAPEDAL budgets. The EMC applies for budgets independently of KLH. BAPPENAS has control over the examination and approval of ordinary budgets such as personnel expenses and development budgets such as activity expenses, and the Ministry of Finance, makes disbursement after the approval by BAPPENAS. BAPPENAS's approval is necessary in using any funds, and the Ministry of Finance makes disbursement. The budgetary plan for BAPEDAL and the EMC is as follows.

	1991/1992	1992/1993	1993/1994
Routine budget (Rp)	2,140,980,000	2,460,000,000	2,800,000,000
Development budget (Rp)	1,919,298,000	2,200,000,000	2,500,000,000
EMC budget (Rp)	30,000,000	700,000,000	1,342,000,000

Among the above mentioned budgetary plan of Indonesian side, EMC budget for fiscal 1991/1992 is the budget before commencement of the construction work, 1992/93 is the budget during construction, 1993/1994 is the budget for management and maintenance after completion of the EMC.

The following is a budgetary plan schematic.

Details are refer to 3-4-1. Budget Plan.



### **3-2-3 Examination of Relation and Possible Overlaps with Other Aid Projects**

The Project is intended for the promotion of researches and training laboratory testing and control on a national basis for the purpose of advancing science and technology in environmental impact management which constitute the basis of formulating and executing environmental policies. The Project is the only national plan in the area of laboratory reference test in environmental protection though Assistance has been given by overseas countries in consultancy of specific sectors of environmental protection. Consequently there are no overlapping plans.

As mentioned in 2-2-3 above, assistance in the area of environmental protection has been provided by international agencies including the World Bank, the Canadian International Development Agency (CIDA), the United Nations Development Program (UNDP), and the United States Agency for International Development (USAID). Many projects are under way, but they do not overlap with the Project, whose objectives are research and training in the control of environmental pollution (water pollution, air pollution, noise and vibration, toxic substances) resulting from industrialization.

### **3-2-4 Examination of the Planned Activities**

The Project consists of two elements. One is environmental monitoring activities intended for advancing science and technology which constitute the basis of the formulation and execution of environmental policies. The other is human resources development activities for environmental protection. Environmental quality monitoring activities comprise three functions, namely, the functions of a standard measuring institution, the leading role in environmental quality monitoring activities, and the functions of an environmental information system. Human resources development activities for environmental protection consist of two categories of training, namely, training pertaining to environmental conservation technologies and training pertaining to environmental administration.

These are necessary activities for the advancing of science and technology which constitute the basis of formulating and executing environmental policies. The goals of the Project cannot be attained without an organization relationship among these activities. Lack of any of them will prevent the goals from being attained. The organization relationship among these activities is shown below.

Purposes	Necessary conditions for attaining goals				
	Environmental monitoring activities			Human resources development activities for environmental conservation	
	Functions of a standard measuring institution	Leading roles in environmental monitoring activities	Functions of an environmental information system	Training pertaining to environmental technologies	Training pertaining to environmental administration
Execution of environmental monitoring	Development of standardized measuring methods Development of sampling and analysis methods	Monitoring network	Making data bases	Learning standardized measuring methods Learning sampling and analysis methods Learning data processing	
Analysis and evaluation of data					
Understanding current conditions of environmental pollution	Analysis and provision of data	Designating surveillance areas Instruction in making specific monitoring programs	Making data bases	Learning data processing	
Identifying causes of environmental pollution					
Enforcing environmental standards and regulations	Provision of data	Monitoring network	Statistical analysis of data	Learning environmental preservation planning	Learning environmental assessment techniques Learning environmental administration
Developing methods for environmental pollution control					
Executing measures for environmental conservation		Monitoring network	Providing overseas countries' information on environmental pollution control Encouraging the people to participate in environmental activities conservation	Learning techniques for environmental pollution control Learning environmental conservation planning	Learning environmental assessment techniques Learning environmental administration People's awareness of environmental conservation and Learning the techniques of participation in environmental conservation activities

### 3-2-5 Examination of the Requested Facilities and Equipment

The requested facilities and equipment by the Indonesian government have separately been examined. Details are given below.

#### (1) Facilities

Since the EMC is planned to have 63 staffs by the end of fiscal 1993, details and scales of facilities have been planned for 63 staffs in the basic design. Facilities are so planned as to be expanded when the number of staffs is increased in the future.

Requested facilities are divided into four facilities : research, training, management, and lodging. The research, training, and management facilities are considered appropriate since they are necessary for major activities in the EMC. The lodging facility is intended for participants in training provided in the EMC. There are few lodgings in Serpong, the city where the National Center for Research, Science and Technology (PUSPIPTEK) is located, and in which the EMC is to be constructed. This city is 45 kilometers away from the central part of Jakarta, where an abundance of lodgings are available, and transportation between these cities has yet to be established. For these reasons it is considered difficult for trainees to commute from Jakarta to attend training courses which are planned to start early in the morning. In order for the trainees to attend courses without fail, it is considered necessary to prepare dormitory for them within the premises of PUSPIPTEK. The Government of Indonesia has requested that the lodging facilities accommodate 78 trainee, but it has been agreed that dormitory for 50 trainee are to be constructed for the opening of the EMC. This agreement has been reached through the adjustment of training curricula by the Indonesian government and estimation of the use of the facilities.

Examinations of other major facilities are described below.

- Regarding the Reference Laboratory Division of the research facility, the Microorganism Section is excluded.
- It has been decided that the Training Division will consist of three sections : Planning Section, Course Section, and Control Section.

- It has been decided that the auditorium (having a seating capacity of 700) of the management facility be excluded and that the large lecture room of the Training Division will be used as an auditorium. This lecture room is planned to seat 400. The reason: more than 90 percent of the 42 seminars planned annually receive less than 400 participants, and it is sufficient for the lecture room to seat 400 persons in one seminar.
- A canteen is planned to be constructed in the administrative block. Since dormitory are constructed in the housing zone, in accordance with the regulations on the use of the PUSPIPTEK premises, which are the planned site, an independent canteen needs to be constructed, attached to the EMC main building.
- The laboratories of the research facility and the training facility will be equipped with materials and equipment that can be utilized during project-type technical cooperation. After a series of discussions with the Indonesian officials concerned regarding the requested facilities and details of them, it has been concluded that a total floor area of 8,500 m<sup>2</sup> is necessary, despite the requested total floor area of 12,000 m<sup>2</sup>. (Refer to p. 279) BAPEDAL architects participated in discussions on concept models of the facilities, and several models proposed by the Study Team were examined. Both parties agreed that the basic design be conducted according to the agreed concepts. (Refer to p. 280)

Since the EMC is to become a model facility for environmental protection in Indonesia, facilities for treating waste water and exhaust gas must be so constructed as not to cause environmental pollution around them. Discussions with the Indonesian officials concerned have reached the following plans.

- Treatment of waste water from the laboratories
  - Heavy metals : Heavy metal treatment equipment will be installed at two places, namely, the water quality laboratories of the Research Division and the laboratory of the Training Division. Heavy metals will be treated, bound with concrete, and dumped.

Organic solvents : Since organic solvents are used only in small quantities, they will be sprinkled and evaporated.

Waste water from other laboratories

: It will be neutralized in a neutralizing tank and discharged.

- Organic solid waste : burned in an incinerator
- Sewage : purified in a septic tank and discharged
- Exhaust gas : Inorganic toxic gases will be treated with scrubbers. Organic toxic gases will be discharged only in small quantities, and since the maintenance of a treatment plant is difficult, no treatment equipment will be installed.

## (2) Equipment

The same types and numbers of equipment have been requested by the Government of Indonesia in the basic design study as those requested in the preliminary study -- 227 types and 1,897 units.

These equipment are basically necessary for activities in the Research and Training Divisions and appropriate for the Project. The Study Team, having further examined the necessity of them, has proposed necessary equipment and instruments as follows, with their priorities attached.

- 1) Equipment must be commonly used in the Research Division and the Training Division. They must be of general purpose and high in operating rates.
- 2) Regarding those equipment that are commonly used in the divisions, it is sufficient to install one unit each.
- 3) Equipment must be easy to manage and maintain. Maintenance of them must be possible through simple technical instructions.
- 4) Priority 1 : those equipment that are necessary at the start of the EMC



Priority 2 : those equipment that are necessary over five years from the start of activities in the EMC

Priority 3 : those equipment that are necessary five years after the start of activities in the EMC

Discussions with the Indonesian officials concerned about the plan proposed by the Study Team, has led to an agreement that the proposed basic design consist of those equipment that are urgently necessary over the five years from the start of activities in the EMC (approximately the duration of project-type technical cooperation).

The difference between details of major equipment requested and details proposed in the basic design study is described below.

Equipment	Total Number of Equipment		Difference of Content
	Requested	Team Proposal	
FID/FTD Gas Chromatograph (FID/FTD GC)	6	3	As applied restrictedly to pesticide analysis such as carbamate compounds, Total number was reduced to three (3) sets (Research : 2, Training : 1)
Capillary Gas Chromatograph (Capillary GC)	6	1	As applied to research and specific analysis such as isomer separation analysis of less-volatile compounds and other GC system fully covers to routine analysis of environmental monitoring, Total number was reduced to one (1) set only for research purpose.
UV/RI High Performance Liquid Chromatograph (HPLC)	2	4	As widely used for analysis of Aromatic Hydrocarbons and pesticides, Total Number is increased to four(4) sets in comparison with requested number from Indonesia, UV/RI detector was replaced to UV/FL with higher sensitivity.
Thin Layer Chromatograph	3	0	These instruments are cancelled as application field is the same as HPLC system.
TLC Scanner	3	0	
Polarograph	3	1	AAS system used for heavy metal analysis covers application field of Polarograph, but probability of introduction by local institution exists because system cost is lower than AAS system. Total number is reduced to one (1) set only for training purpose.

Equipment	Total Number of Equipment		Difference of Content
	Requested	Team Proposal	
Single Beam UV/VIS Spectrophotometer	8	3	This system usually is used for routine analysis. Double Beam UV/VIS system is adequate for research purpose, Total number is consequently reduced to three (3) sets only for training purpose of routine analysis.
Flame Type Atomic Absorption Spectrophotometer (AAS)	8	5	As AAS system enables rapid measurement of heavy metals, Training can be successfully made by three(3) AAS system. Total number is adjusted to five sets for research and training purpose.
Gas Chromatograph - Double Focus Mass Spectrometer (GC-Quadruple Pole MS)	1	1	Specification of this system is changed without modification of quantity. GC-Double Focus MS is changed to GC-Quadruple Pole MS with lower maintenance cost and easy operation.
Laboratory Type ph meter	3	6	ph measurement is one of basic measurement items for water quality. this system is frequently used. Total number is consequently increased to six(6) sets.
COD Meter	6	0	Manual titration techniques can fully apply to COD measurement. COD Meter is cancelled from the List.
TOC Meter	3	1	Application of this system is limited to carbon analysis. Users can use in common for research and training purpose because this system is not frequently used. Only one(1) system is introduced to EMC.
Automatic Titrator	3	0	This system is mainly used for the titration without adequate indicators and precisely look for end point of titration procedure. this system is cancelled because almost all manual titration technique has suitable itself.
Process Polarograph	3	0	Used for automatic monitoring of waste water, but this system is cancelled for the difficulties of maintenance techniques.
Automatic Water Quality Analyzers (Water Quality Monitoring System, COD, Suspended Solid, Total Cyanide, Total Chromium, Mercury)	1	0	Used For continuous monitoring for river water quality, this system is substitute with portable water quality analyzer syetem for the difficulties of maintenance and operation techniques.
Portable Water Quality Analyzer System	0	1	
Sound Level Meter, Level Recorder, Tape Recorder, Precision Sound Level Meter Vibration	10	5	These instruments is used in common for research and training of mobile monitoring of noise pollution. These purposes is fully achieved by the introduction of five(5) sets of each instrument.

### 3-2-6 Examination of the Necessity of Technical Cooperation

The Government of Indonesia has requested project-type technical cooperation, simultaneously with grant aid, for the Project's implementation. The Government of Japan, in response to the request, made preliminary studies in February 1991 with respect to grant aid and preliminary studies in May 1991 with respect to project-type technical cooperation. The Government of Japan has confirmed the necessity and details of cooperation.

Procuring facilities and equipment under grant aid is indispensable for the Project's implementation. However, expected goals will not be attained without smooth implementation of research and training programs. The Government of Indonesia has just started strengthening its administrative systems, including the establishment of BAPEDAL, an agency executing the country's environmental protection policies, and currently is not capable of formulating and implementing optimum projects for itself. Such being the case, it is considered necessary that technologies and experience be transferred from developed countries for implementing projects in the EMC. Japan, as a nation that has experienced serious environmental disruption and rehabilitation, is one of the countries that have advanced technology and abundant experience in environmental protection. Japan also has experience in technical cooperation through technology transfer to BAPEDAL, by dispatching experts in environmental protection. Japan's environmental protection technologies have already been transferred to other countries, too. Consequently it is very reasonable for the Government of Japan to provide project-type technical cooperation together with grant aid to Indonesia. Project-type technical cooperation will also support proper and efficient use of facilities and equipment provided under grant aid.

Details of technical cooperation are as follows.

- (1) Supporting the development and formulation of management and maintenance plans
- (2) Supporting the development and formulation of executing and operating plans
- (3) Supporting the development of curricula and teaching materials for training
- (4) Developing training instructors
- (5) Guidance to the officials in charge of executing research and training programs

- (6) Transferring Japan's administrative and technical experience in the area of environmental protection to Indonesia through these activities

### **3-2-7 Basic Policy for Cooperation**

Examinations mentioned thus far have confirmed the effects, feasibility, and Indonesia's capability of implementing the Project and have shown that the Project is in accord with the grant aid system of Japan. Consequently it is considered appropriate that the Project be implemented under the grant aid of Japan. In the following, details of the Project will be examined from the viewpoint of grant aid and the basic design will be conducted. It is reasonable that details of the request be partially modified, which has already been mentioned in the examination of the requested facilities and equipment.

### 3-3 Outline of the Project

#### 3-3-1 Implementing Agency and Management System

The Environmental Impact Management Agency (BAPEDAL) is the agency implementing the Project. BAPEDAL was established on June 5, 1990 as an agency under the direct control of the President. The agency supports the Ministry of State for Population and Environment (KLH), under the control of KLH, and promotes the development of human resources that efficiently enforce measures for environmental conservation and the improvement of technologies for environmental conservation. The Hon. Emil Salim, the Minister of KLH, acts as the Head of the agency.

On November 22, 1990, two Deputy directors under the control of Minister Salim were assigned. One is in charge of coordinating activities pertaining to environmental pollution control, and the other is in charge of development concerning environmental pollution control. A task force, headed by Mr. P. L. Coutrier Deputy Director for Development, was organized for promoting the Project's implementation. Dr. Noegroho, one of the task force members, takes charge of preparations such as the ensuring of necessary appropriations for the Project's implementation. He continues to be in charge of giving directions and holding negotiations with the agencies concerned.

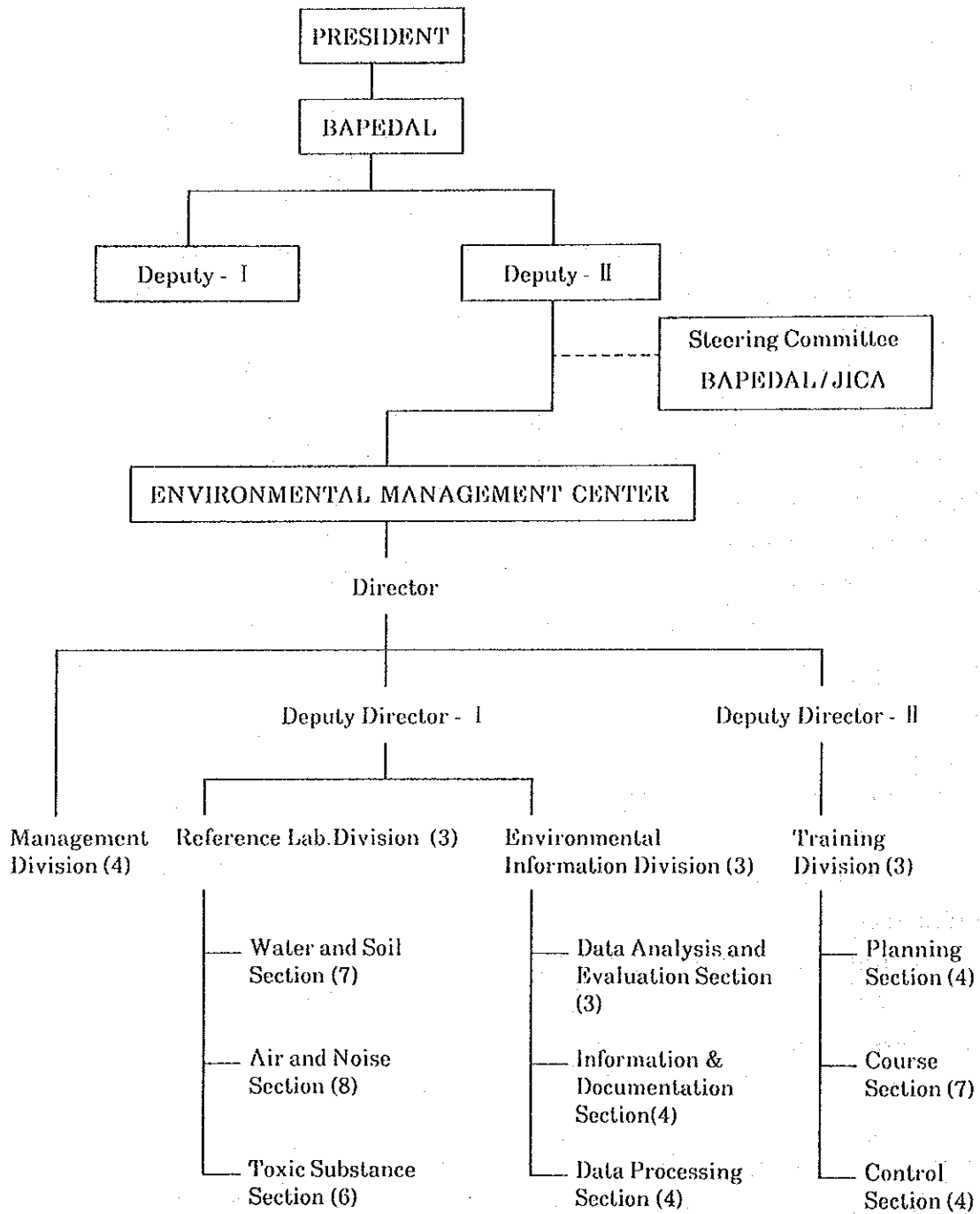
The EMC is organized as four divisions under the control of the Director as mentioned below.

- Reference Laboratory Division
- Environmental Information Management Division
- Training Division
- Management Division

Activities in the EMC are planned to be started by seven staffs of BAPEDAL, nine staffs from other ministries, 47 newly employed staffs (15 university graduates, 18 college graduates, and 14 high school graduates), totaling 63 staffs.

The organizational and personnel plans of the EMC are shown in Fig. 3-2-1.

Fig. 3-2-1. Organization Chart and Staff Number of EMC



( ) : Staff Number  
Total 63 Staffs