1.2 Physical Conditions

1) Flood area

The southern part of Pagelaran in Kab. Pandeglang, located at the mouth of the Ciliman river and Cilemer river, is spread out in the lowland on the alluvial plain.

Frequent floods hit this area because the natural drainage systems in the area are not well developed and the slope of land is too flat to drain the excess runoff from the most heavy rainfall in the western coast [See Fig. I(F)-4].

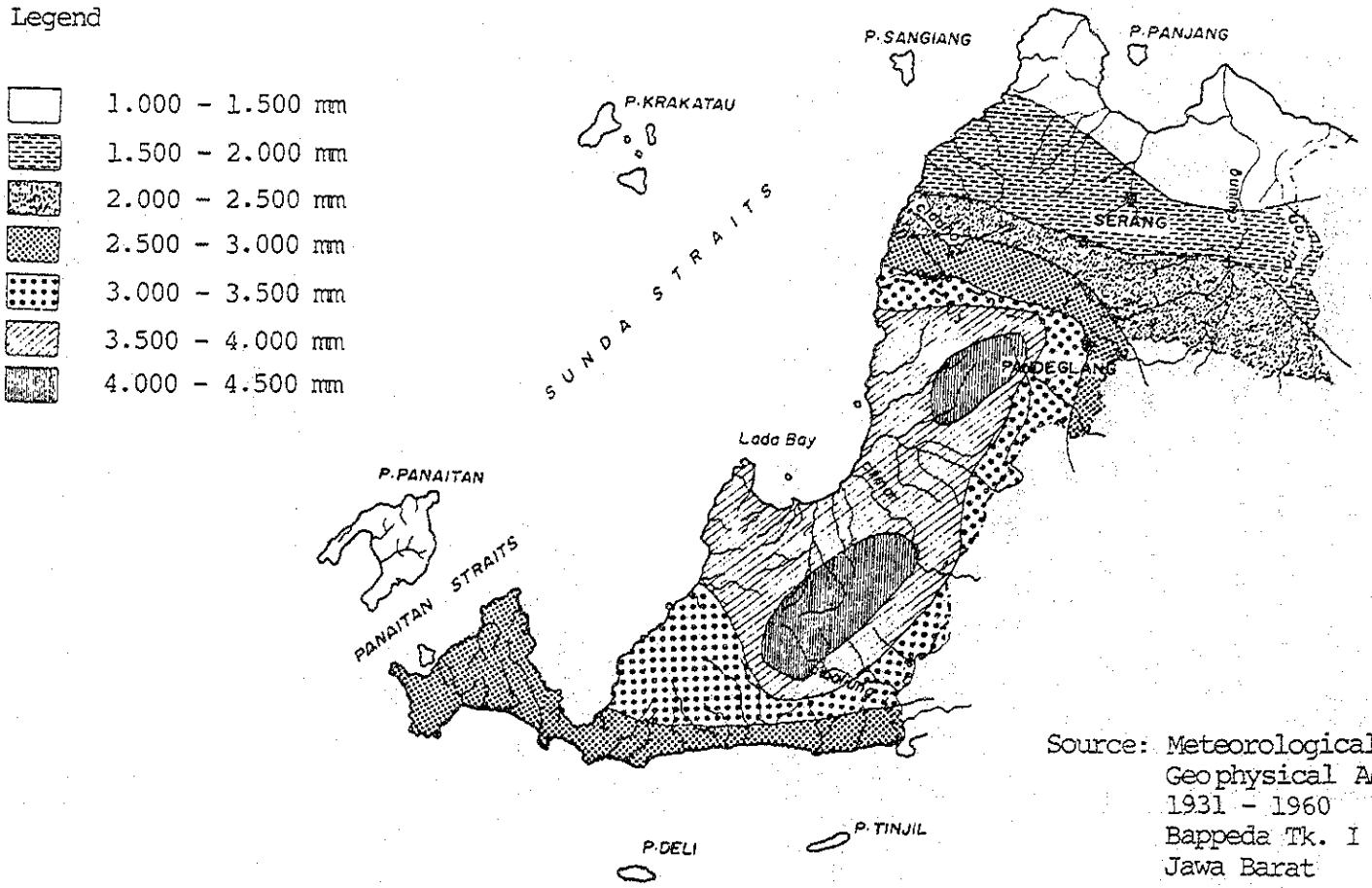
The rainfall intensity in Lubuan or Menes is over 200 mm/day (in 10 year return period), while that in Serang is around 130 mm/day [See Tables I(F)-7 and I(F)-8].

River conservation works are being carried out by the Department of Public Works, Directorate of Irrigation with the levee and the short-cut of the river. However, the low lying area and coastal strip adjacent to the river Ciseukeut [see Fig. I(F)-5)] are located the same elevation as the high tide and are periodically inundated with the backwater influence of the high tide.

In this area, it is strongly recommended to construct pumping systems to alleviate flood damage.

2) Water resources

Surface water from the river discharge is almost used up for irrigation in the dry season. Therefore, a dam development project is in progress for the supply of industrial water in Cilegon.



Source: Meteorological and Geophysical Agency
1931 - 1960
Bappeda Tk. I
Jawa Barat

Scale: 1:1,000,000

0 10 30 50 Km

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Fig. I(F)-4
AVERAGE ANNUAL RAINFALL

Table I(F)-7 ESTIMATED PROBABLE DAILY RAINFALL (1)

(Unit: mm/day)

	Return period		
	1/50	1/10	1/5
Serang	168	133	116
Pandeglang	164	135	121
Rangkasbitung	165	131	114
Lubuan	364	267	224
Ciomas	217	170	148
Menes	271	215	188
Rankas	319	236	199

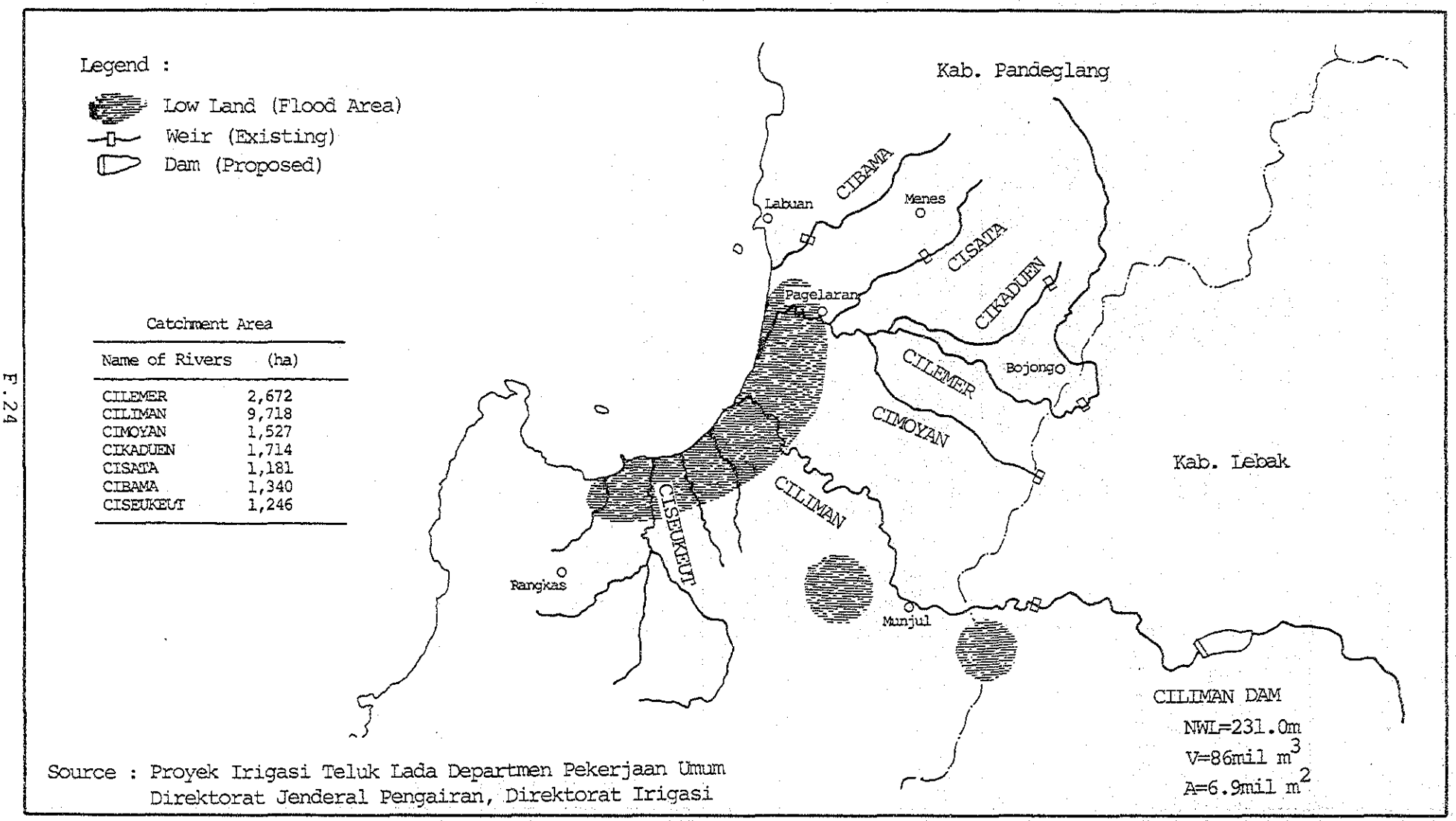
Source: Master Plan Study on North Banten Water Resources Development, Appendix, July 1983, Jakarta

Table I(F)-8 ESTIMATED PROBABLE DAILY RAINFALL (2)

(Unit: mm/day)

	Return period		
	1/50	1/10	1/5
Menes	221	198	156
Rankas	272	193	150
Munjul	231	166	132
Bojong	164	137	108

Source: Departmen Pekerjaan Umum, Directorat Jenderal Pengairan, Directorat Irigasi.



Catchment Area

Name of Rivers	(ha)
CILEMER	2,672
CILIMAN	9,718
CIMOYAN	1,527
CIKADUEN	1,714
CISATA	1,181
CIBAMA	1,340
CISEUKEUT	1,246

Source : Proyek Irigasi Teluk Lada Departmen Pekerjaan Umum
Direktorat Jenderal Pengairan, Direktorat Irigasi

0 1 3 5 10 15 km

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Fig. I(F)-5
LOCATION OF RIVERS AND LOWLAND AREAS IN THE SOUTHERN PART OF LABUAN

Considering the small water requirement in the tourism development in comparison with the water demand in the industrial and agricultural sectors, it seems easier to plan the tourism water source development; it is possible to integrate it into the dam development for industrial water or to develop an independent ground water source.

The distribution of the ground water is shown in Fig. I(F)-6. A dense area of ground water is observed around the G. Karang, where the depth of the groundwater varies from 1 to 12 m below the ground surface and springs are not a farity on the eastern foot of the G. Karang. Ground water is mostly from the uncontinued aquifer except for the deep confined aquifer in a few limited areas.

However, the water quality even from the unconfined aquifer is good in the study region aside from the salty water in the southern part of Labuan and the northern coastal area.

3) River water quality

The water quality of the rivers in the study region is relatively good except for a high turbidity (brown color) especially in rainy seasons [See Table I(F)-9].

However, judging from the available data, water in the closed water area is supposed to be badly contaminated.

4) Soil consideration for construction

The following considerations can be noticed based on Rencana Tata Ruang Kawasan Pantai Barat Banten, Bappeda DT 1, 1986.

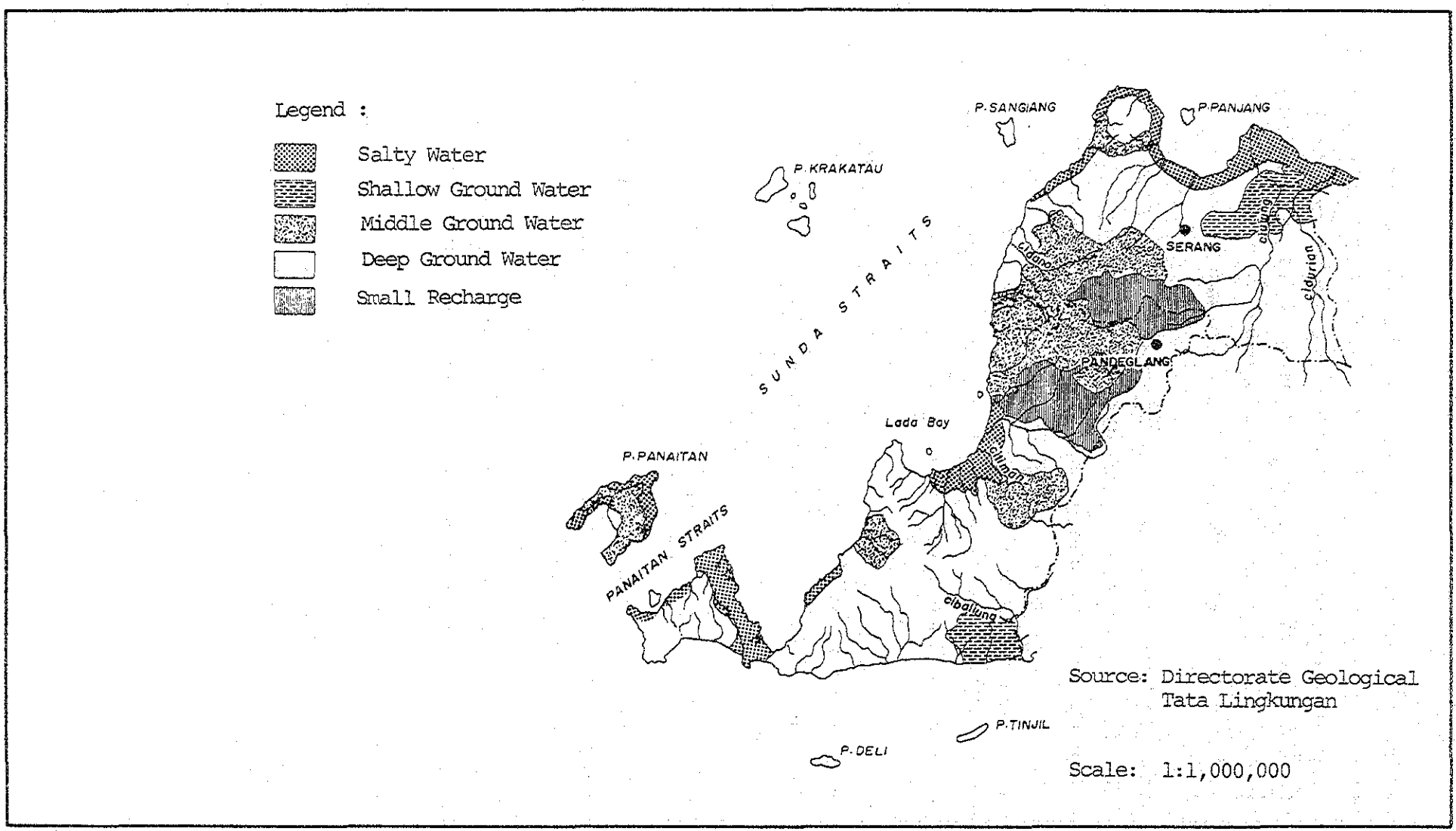
Legend :
Salty Water
Shallow Ground Water
Middle Ground Water
Deep Ground Water
Small Recharge
P. SANGIANG
P. PANJANG
P. KRAKATAU
SUNDA STRAITS
SERANG
Ciujung
Cidurian
PANDEGLANG
Lada Bay
P. PANAITAN
Ciliman
PANAITAN STRAITS
Cibaliung
P. TINJIL
P. DELI
Source: Directorate Geological
Tata Lingkungan
Scale: 1:1,000,000
0 10 30 50 Km
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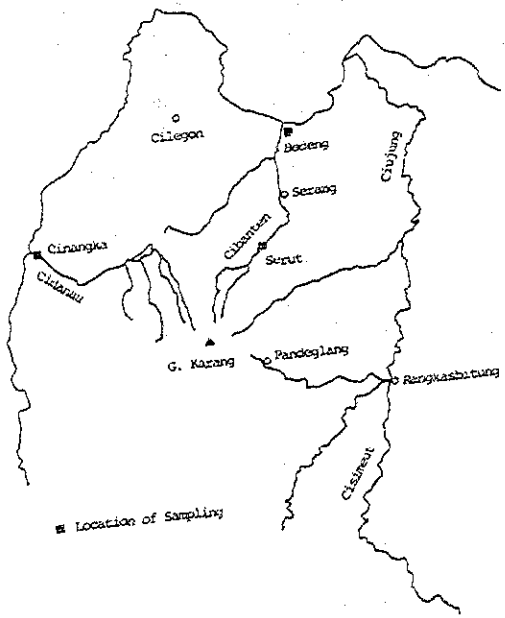
Fig. I(F)-6
GROUND WATER IN THE STUDY REGION

Table I(F)-9 QUALITY OF RIVER WATER

Substances		Unit	Serut Cibanten River (Dry Season)	Serut (Cibanten River) (West Season)	Bedent (Irrigation Canal) (Wet Season)	Cinangka (Cidanau River) (Wet Season)
PHYSICAL						
Temperature		°C	-	-	-	-
Colour		Unit Pt Co	10 K	40	25	70
Odour		-	-	-	-	-
Taste		-	-	-	-	-
Turbidity		ppm AiO_2	31.5	51.0	50.0	370.0
Dissolved Solid		ppm	102	144	93	186
Conductivity		micromho/cm	165	185	135	250
CHEMICAL						
pH		-	6.81	7.06	6.92	6.55
Calcium	(Ca)	ppm	11.06	11.18	15.17	15.17
Magnesium	(Mg)	ppm	4.26	4.62	1.70	5.72
Hardness		d°	2.51	2.63	2.52	3.43
Sodium	(Na)	ppm	13.40	14.20	6.09	19.30
Potasium	(K)	ppm	3.56	4.40	2.50	4.49
Nickel	(Ni)	ppm	ud	ud	ud	
Iron	(Fe)	ppm	1.49	2.32	0.93	4
Mangan	(Mn)	ppm	ud	0.01	0.02	0
Copper	(Cu)	ppm	ud	ud	ud	
Zinc	(Zn)	ppm	ud	0.01	0.02	0
Chrom Hexavalen	(Cr)	ppm	ud	ud	ud	
Cadmium	(Cd)	ppm	ud	ufd	ud	
Mercury	(Hg)	ppm	-	-	-	
Lead	(Pb)	ppm	ud	ud	ud	
Cyanide	(CN)	ppm	-	-	-	
Sulfide	(S)	ppm	-	-	-	
Fluoride	(F)	ppm	ud	ud	ud	
Chloride	(Cl)	ppm	5.81	5.65	5.65	12
Sulfate	(SO_4)	ppm	4.20	8.33	5.95	9
Ammonia	(NH_4-N)	ppm	0.30	0.25	0.23	0
Nitrate	(NO_3-N)	ppm	0.65	0.30	0.18	0
Nitrite	(NO_2-N)	ppm	ud	ud	ud	
Bicarbonate	(HCO_3)	ppm	79.3	85.40	58.56	96
Detergent	(MBAS)	ppm	-	-	-	
Phenolic Substances		ppm	-	-	-	
Grease and Oil		ppm	-	-	-	
Boron	(B)	ppm	ud	0.05	0.12	0
Premanganate Number		ppm $KMnO_4$	14.16	14.13	12.64	70
Phosphate	(PO_4)	ppm	-			
Free Carbon Dioxyde	(CO_2)	ppm	-			
CO_2 Aggressive		ppm	-			
Silica	(SiO_2)	ppm	-	-	-	-
% Na		-	36.94	37.13	21.95	38.36
S.A.R.		-	0.87	0.90	0.40	0.18
R.S.C.		-	0.40	0.46	0.06	0.35
Faecal Coli		MPN/100 ml	-	-	-	-



Remark: ud = Undetected, K = Koloid
Source: Master Pan on North Banten Water Resources Development, 1983, JICA.

The plain zone from Anyer to Carita beach mainly consists of grey clay, tuff clay sand and crushed coral which in general can support light to moderate structures.

The hilly area behind Carita beach, consisting of the residual soil from Banten tuff, is rather solid with the supporting capability of light structures.

Regosol soil up to grey regosol and alluvial association can be observed in Coastal area from Carita Bay to Paninbang.

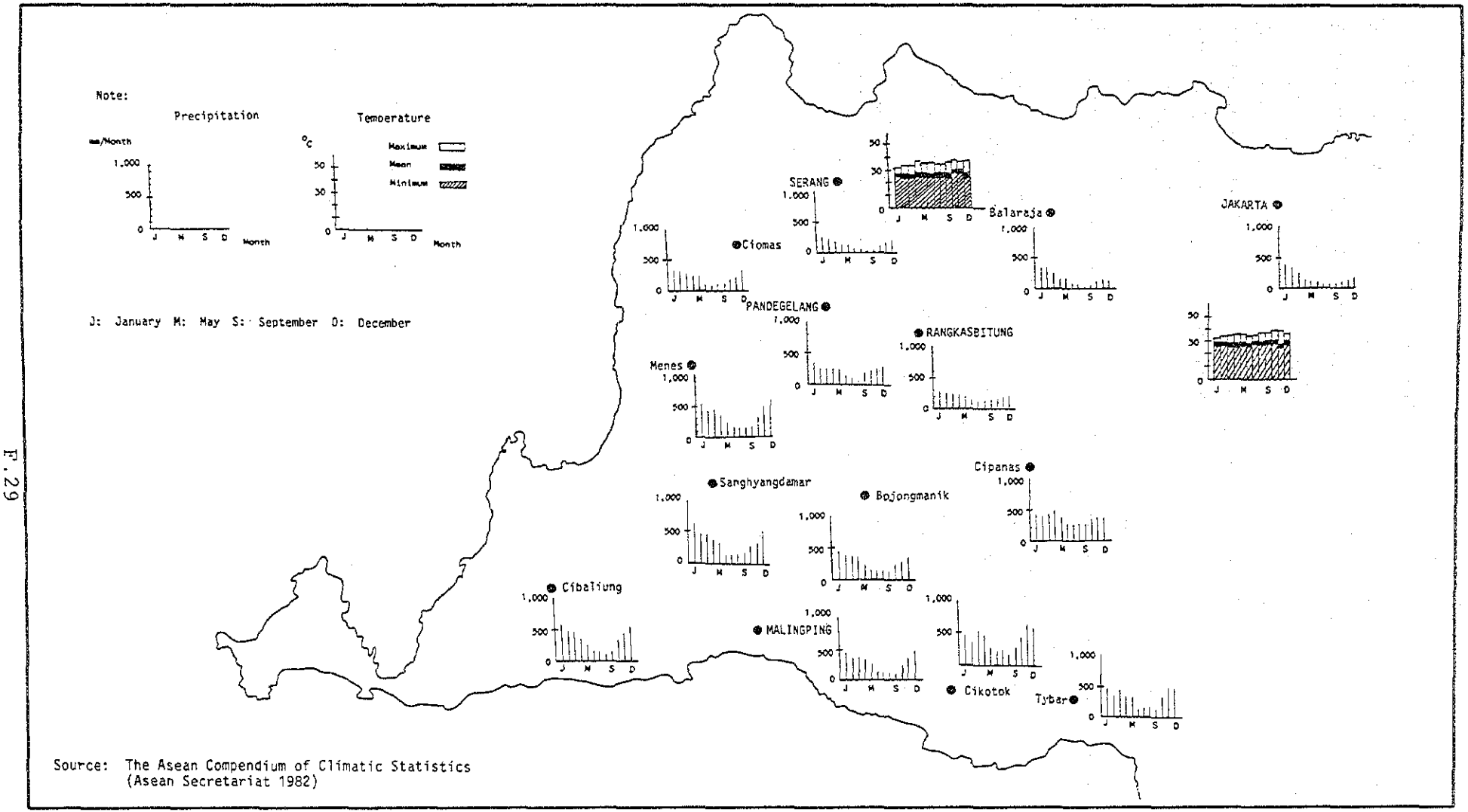
- Coastal shallowness due to the formation of mud from the upstream parts of the rivers must be taken into consideration in the case of construction.

- As for the Banten area, especially the western coast, earthquakes owing to the active tectonic-volcanic factor are major problems. The Sunda straits zone is subject to frequent shallow tectonic earthquakes which cause Tsunami.

5) Climate

The Serang station is the sole meteorological observation station in the study region where temperature, rainfall, humidity, air pressure, wind velocity and wind direction are recorded. As for rainfall, the gauging stations are scattered in Kab. Serang and Kab. Pandeglang as shown in Fig. I(F)-7.

Abundant rainfalls during the rainy season depend on the monsoon from the west, which is a characteristic phenomenon in the western part of West Java in comparison with Eastern Java.



Source: The Asean Compendium of Climatic Statistics (Asean Secretariat 1982)

F.29

Non-scale

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Fig. I(F)-7
PRECIPITATION AND TEMPERATURE RECORDS IN THE STUDY REGION

The wind velocity and direction are shown in Table I(F)-10. From December to March, the wind from the west and south is dominant and the velocity is comparatively strong.

On the other hand, during the summer season from April to October, the wind from the north is dominant and the velocity is weak.

As for the additional climatic data, the progress report on October 1986 should be referred to.

Table I(F)-10 WIND FORCE AND DIRECTION IN SERANG

Month	Monthly Average of daily average (m/sec)	Maximum velocity (m/sec)	Dominant wind direction
January	3.1	7.7	S
February	3.6	11.3	S
March	3.6	10.3	W
April	3.1	7.7	N
May	2.6	5.1	N
June	2.6	7.2	N
July	2.6	7.7	N
August	2.6	7.7	N
September	3.1	7.2	N
October	3.1	8.7	N
November	3.1	7.7	N
December	3.1	7.7	W

Source: Direktorat Jenderal Perhubungan Udara
Lembaga Meteorologi dan Geofisika

1.3 Social Conditions

1) Administrative boundary

The Republic of Indonesia consists of twenty-seven provinces [see Fig. I(F)-8]. West Java province is composed of twenty Kabupatens (District) and four Kotamadyas (Municipality). The study region comprising Kab. Serang and Kab. Pandeglang are located in the western part.

Kab. Serang and Pandeglang include 26 Kecamatans (Sub-districts) and 16 Kecamatans respectively, as shown in Fig. I(F)-9.

Each Kecamatan has several Desa (Village) and the average population for the each Desa is supposed to be about 5,000.

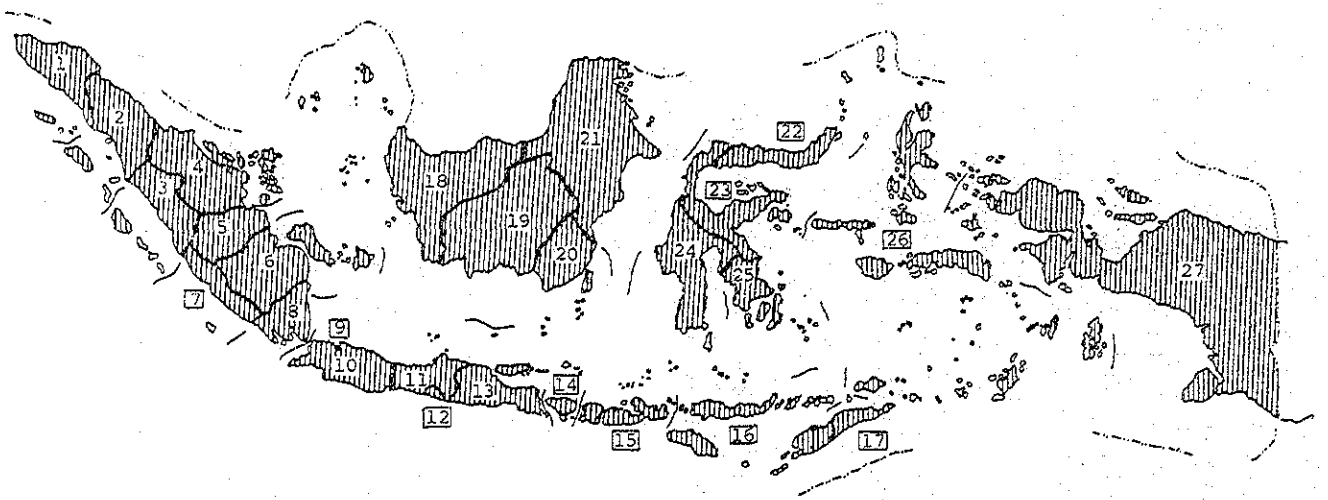
2) Regional division of the West Java (Bappeda)

Bappeda Tingkat I, West Java, the provincial level planning board, is adopting a 7 region system for the planning of regional development as shown in Fig. I(F)-10.

Banten, the far-west region comprises the study region (Kab. Serang and Kab. Pandeglang) and the northern half of Kab. Lebak. However, the Krakatau islands administratively belong to the Kab. Lampung Selatan in the Lampung Province.

3) Classification of cities

On the basis of the "National Urban Development Strategy Study, 1985", the characteristics of the cities in the study region are indicated as follows.



1. Daerah Istimewa Aceh
2. Sumatera Utara
3. Sumatera Barat
4. Riau
5. Jambi
6. Sumatera Selatan
7. Bengkulu
8. Lampung
9. DKI Jakarta
10. Jawa Barat
11. Jawa Tengah
12. Daerah Istimewa Yogyakarta
13. Jawa Timur
14. Bali
15. Nusa Tenggara Barat
16. Nusa Tenggara Timur
17. Timor Timur
18. Kalimantan Barat
19. Kalimantan Tengah
20. Kalimantan Selatan
21. Kalimantan Timur
22. Sulawesi Utara
23. Sulawesi Tengah
24. Sulawesi Selatan
25. Sulawesi Tenggara
26. Maluku
27. Irian Jaya

Non-scale

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Fig. I(F)-8

PROVINCIAL DIVISION OF THE REPUBLIC OF INDONESIA

1:1,000,000

0 5 10 20 30 km

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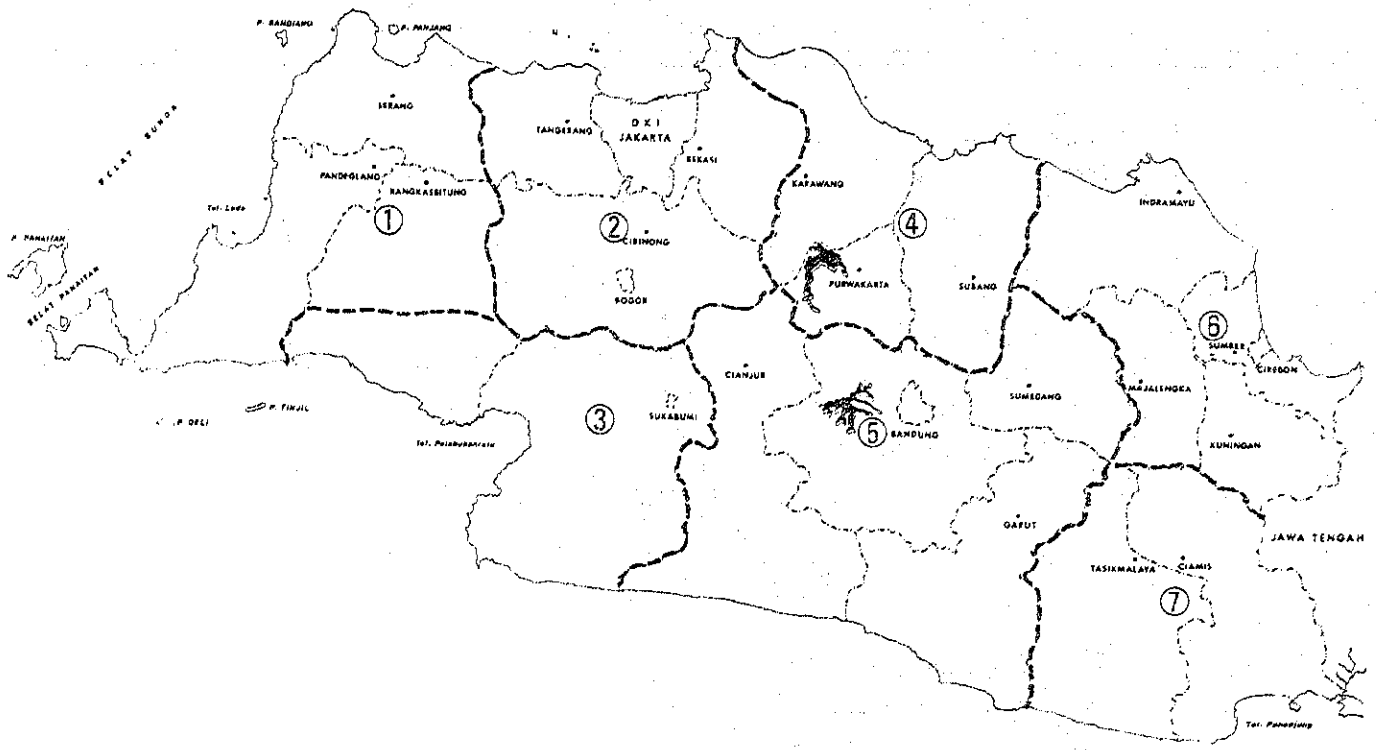
Fig. I(F)-9
ADMINISTRATIVE DIVISION



Legend

1	Banten
2	Botabek
3	Sukabumi
4	Purwasuka
5	Bandung Raya
6	Cirebon
7	Priatim

Batas Wilayah Pembangunan

SOURCE : BAPPEDA JABAR TAHUN 1980

0 10 30 50 100 Km

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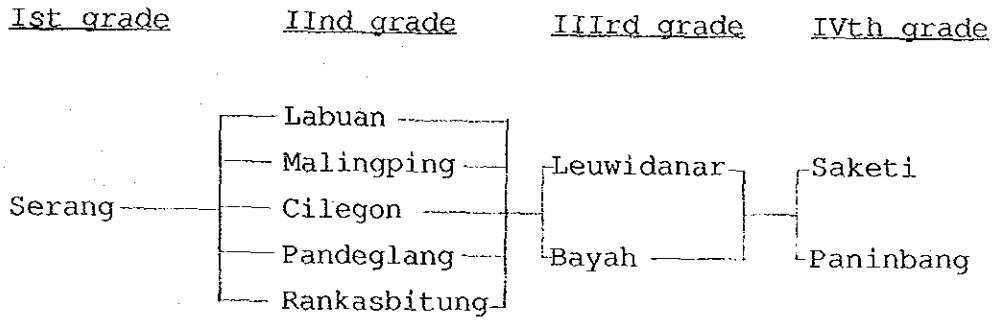
Fig. I(F)-10

REGIONAL DIVISION OF THE WEST JAVA

City	Characteristics
Serang	: Inter-Regional Development Centre
Cilegon/Merak	: Inter-Regional Development Centre
Pandeglang	: Local Development Centre
Labuan	: Regional Development Centre
Rankasbitung	: Regional Development Centre

On the other hand, the hierarchy of the cities in and around the study region is shown in the "West Java Regional Development Planning, Draft final, 1986, Aug., Bappeda Tk I".



In view of the above characteristics and hierarchy of the cities, the cities of Serang and Cilegon could be the core areas to form a northern development corridor and the cities of Labuan, Pandeglang and Rankasbitung might be the centers of regional development.

4) Industrial area

As mentioned in the preceding chapter, the land in the western part of West Java is mostly covered with farm land and forests for the time being except for the following industrial complexes formed in the northern part of the study region.

(1) Cilegon Industrial Estate

- Area : 550 ha (built-up area 118 ha)
- Heavy industry : Iron and steel
- Cigaden public port (4 berths) is now under construction

(2) Merak Ferry Port and Railway Terminal

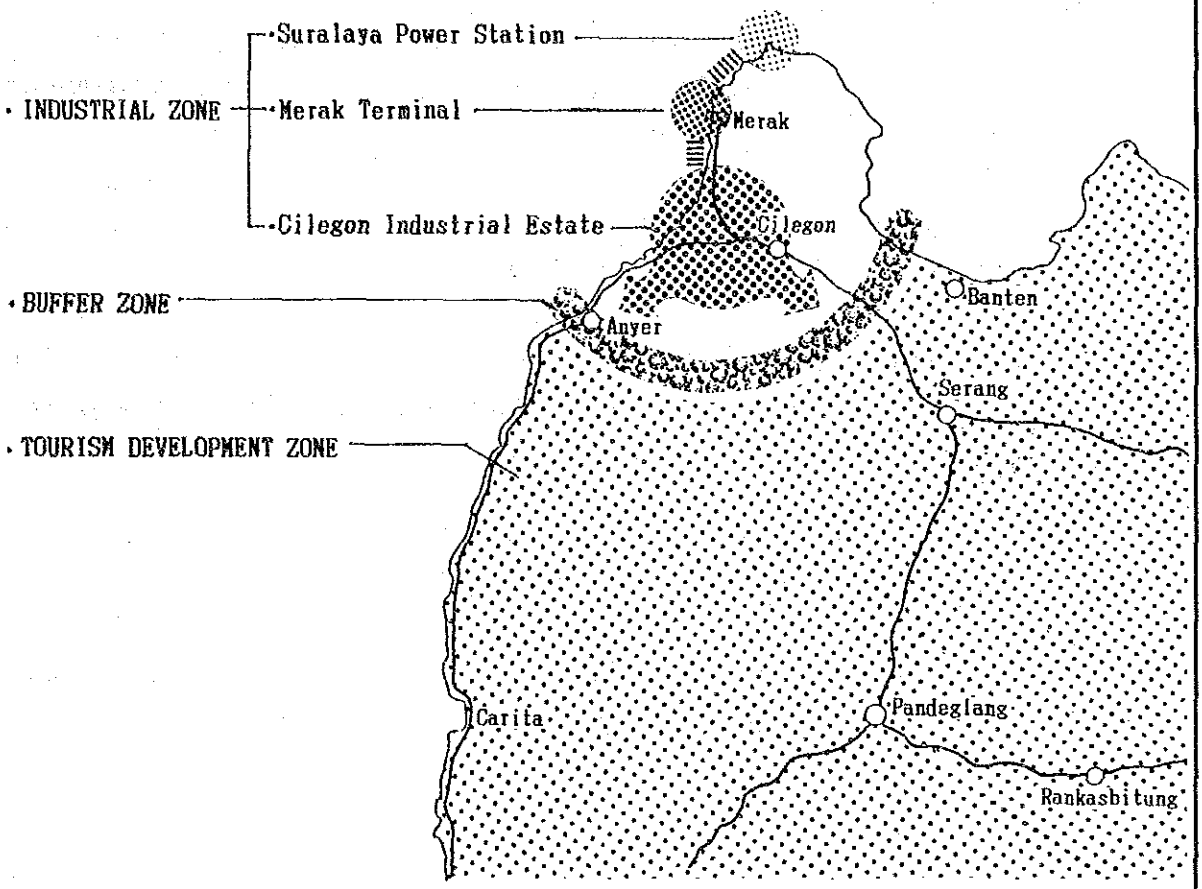
Merak is a nodal point for the traffic of passengers and cargoes between Java and Sumatra.

(3) Suralaya power station

The giant red stack, the open shed of ash and the high voltage transmission line might damage the landscape of tourism spots.

From the viewpoint of natural scenery conservation, some inconveniences come into question, especially in the northwest coastal area.

Therefore, the tourism development, especially nature oriented tourism, should be allocated apart from the northwest coastal area to avoid conflicts between industrial activity and nature sightseeing [See Fig. I(F)-11].



Source : THE JICA STUDY TEAM

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Fig. I(F)-11

SUITABLE ZONE FOR THE TOURISM DEVELOPMENT

Non-scale

CHAPTER 2 ENVIRONMENTAL REGULATIONS

2.1 Environment Impact Analysis

The government regulation with regard to the Analysis of Impacts upon the Environment shall enter into force as of 5 June 1987 and the execution of the environment impact analysis (EIA) should be compulsory for all projects to be implemented in the Republic of Indonesia.

According to this regulation, the procedure needed for the completion of EIA is shown in Fig. I(F)-12.

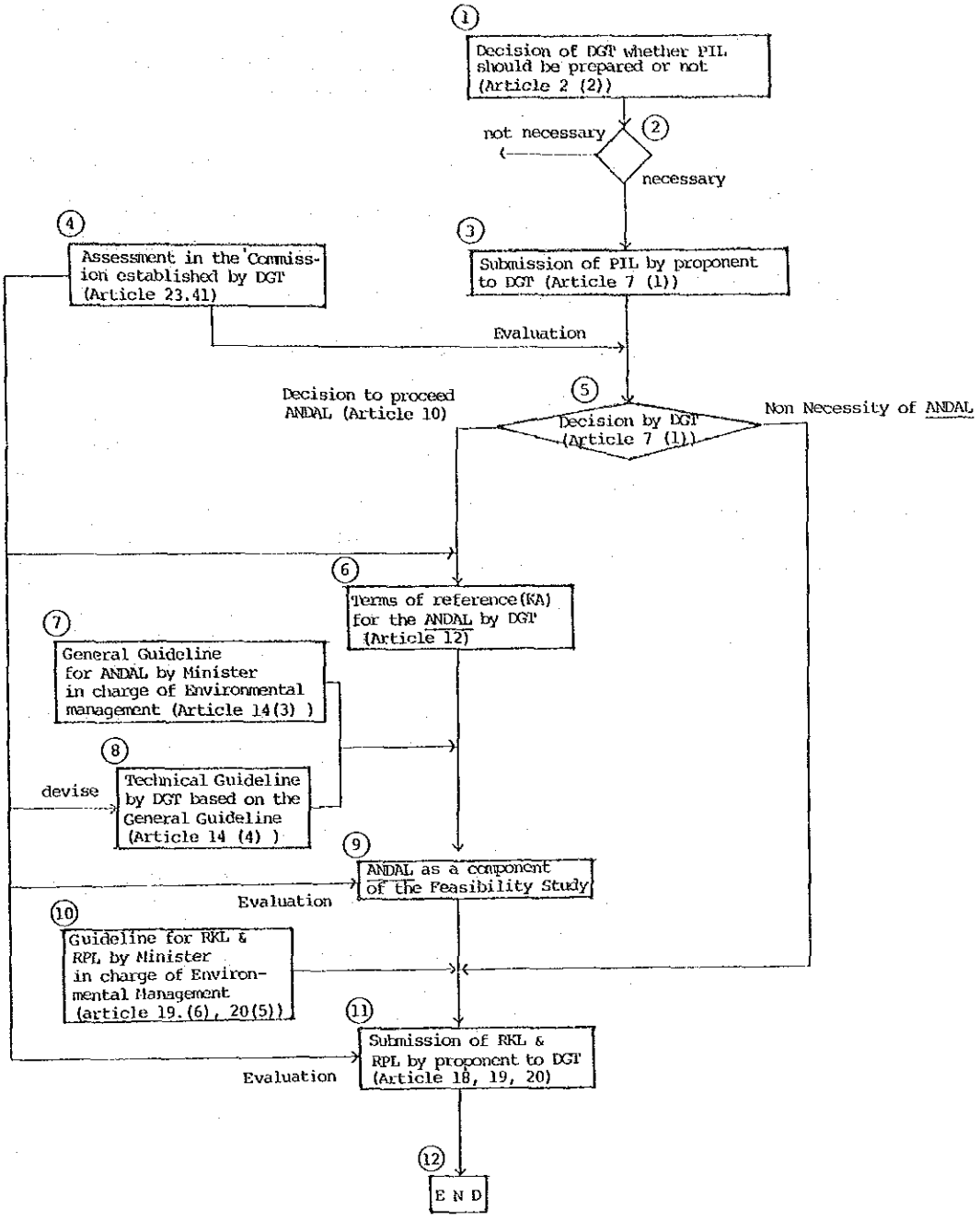
1) The Preliminary Environment Information Report (PIL) should be prepared so as to judge whether the Environment Impact Analysis (ANDAL) is necessary or not.

2) In the case of the recognition of serious impacts upon the environment, ANDAL should be executed.

3) The Monitoring Plan (RPL) and the Managing Plan (RKL) should be executed after the admission of ANDAL by the Commission.

For the study on tourism development, the execution of ANDAL is required by the Department of State for Population and Environment, skipping over PIL because tourism usually generates considerable impacts upon the environment.

The authorities concerned with the environment assessment are shown in Table I(F)-11.



Notes : PIL : Penyajian Informasi Lingkungan (The Preliminary Environment Information Report)

ANDAL: Analisis Dampak Lingkungan (The Environment Impact Analysis)

RKL : Rencana Pengelolaan Lingkungan (The Proposed Environment Management Plan)

RPL : Rencana Pemantauan Lingkungan (The Proposed Environment Monitoring Plan)

Notes :

* This chart is arranged based on the government regulation of the RI, Analysis of Impacts upon the Environment, the Office of the Department of State for Population and Environment, Nov. 29 1986.

** The Regulation for the Analysis of Impacts upon the Environment shall enter into force as of June 1987.

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Fig. I(F)-12

PROCEDURE FOR THE ENVIRONMENTAL IMPACT ANALYSIS IN THE CASE OF THE TOURISM DEVELOPMENT

Table I(F)-11 FUNCTIONS OF AUTHORITIES CONCERNED IN THE ENVIRONMENT ASSESSMENT OF THE TOURISM DEVELOPMENT

Authority	Functions
1. DGT (Directorate General of Tourism)	1) Judgement of the implementation of PIL (Article 2). 2) Judgement of the implementation of ANDAL (Article 10). 3) Preparation of the technical guideline for ANDAL (Article 14) 4) Examination of ANDAL (Article 15). 5) Examination of RKL and RPL (Article 19, 20). 6) Establishment of the commission (Article 23).
2. Department of State for Population and Environment	1) Advice to DGT for the judgement of the implementation of PIL (Article 2). 2) Decision of the directive concerning the composition of works and organization of the Commission (Article 23, 24). 3) Permanent member of the commission (Article 23). 4) Preparation of the Guideline for PIL (Article 7). 5) Preparation of the General Guideline for ANDAL (Article 14).
3. Other Authorities Concerned	1) Permanent and/or temporary member of the commission (Article 23). 2) Advice to DGT for the judgement of the necessity of PIL (Article 2).
4. Commission	1) Evaluation of PIL (Article 23). 2) Evaluation of ANDAL (Article 23). 3) Preparation of the Technical Guideline for ANDAL (Article 23). 4) Establishment of the terms of reference for ANDAL (Article 23). 5) Evaluation of RKL and RPL (Article 23).
5. Governor	1) Establishment of the Provincial Commission (Article 25). 2) Membership of the Commission (Article 23).
6. Proponent	1) Proposition of PIL 2) Proposition of ANDAL 3) Proposition of RKL 4) Proposition of RPL

2.2 Protection of Nature

1) Flora to be protected

The flora species to be protected based on the Decree of Department of Agriculture, are as follows:

(1) The protection priority is given to the following trees:

a. The tree species which are protected on the basis of the Nature Protection Ordinance Year 1941, State Gazette 1941 Number 107.

b. Trees used as bee-hives, and constituting a means of living for the local people.

c. Parent trees.

d. Trees growing in areas/places which are declared as sacred.

e. Trees growing around water source/river bank areas with a minimal radius of 50 meters.

(2) Trees being protected can be felled/cut, after having complied with the stipulated provisions, as contained in Table I(F)-12.

2) Fauna to be protected

In order to prevent the extinction of certain wild life, several regulations have been stipulated for the conservation of certain wild-life species, among others:

- Government Regulation on Wild-life Protection 1931,

Table I(F)-12 LIST OF THE PROTECTED TREES WHOSE FELLING IS ALLOWED LEGISLATIVELY

Local Name	Botanical Name	Diameter at the height of the chest (cm)
(1) The tree species which produce the sticky resin		
1. Balam merah, Sumban getah merah	Palaguium gutta	50
2. Damar, kopal	Agathis labillardieri	50
3. Jelutung	Dyera sp.	60
4. Hangkang	Palaquium Leiocarpum	30
5. Kapur barus	Dyrobalanops camphora	60
6. kemenyan	Styrac sp.	30
7. Keruing (minyak)	Dipterocarpus sp.	50
8. Katiau	Ganua motleyana	30
9. Mata kucing (damar)	Shorea sp.	60
(2) The tree species which produce the fruits		
1. Balam suntai	Palaquium walsurifolium	40
2. Jambu monyet	Palaquium burckii anacardium occidentale	30
3. Durian	Durio zibethinus	60
4. Kemiri	Aleurites moluccana	50
5. Enau	Arenga pinnata	40
(3) The tree species of which bark can be used, and which produce the essence of color		
1. Mata buta, garu	Exceoecaria agailocha	25
2. Hongi, Saya	Myristica argentea	30
3. Kayu kuning	Cadrania sp.	10
4. Kayu manis	Cinnamomum burmannii	25
5. Kayu sepang	Caesalpinia sappan	10
6. Kulit lawang	Cinnamomum cullilawan	25
7. Massoi	Cryptocria massoi	25
(4) The tree species of which trunk can be used for the timber		
1. Bayur	Pterospermum sp.	60
2. Bulian, Ulin	Eusideroxylon zwageri	60
3. Eucalyptus	Eucalyptus sp.	40
4. Imba	Azadirachta indica	50
5. Ipil	Intsia amboinensis	60
6. Kayu hitam	Diospyros sp.	60
7. Ketimunan	Timonius sericcus	40
8. Kulim, kau bawang	Scorodocarpus borneensis	50
9. Purnamasada	Cordia subcordata	40
10. Sawo kecik	Manilkara kauki	45
11. Sonokeling	Dalbergia latifolia	50
12. Suren	Toona sureni	60
13. Taker, Benuang	Duabanga moluccana	60
14. Tembesu	Fagraea fragans	50
15. Cendana	Santalum album	50
16. Trenggulung	Protium javanicum	50

Source: Vademecum Kehutanan Indonesia 1976

- Degree of the Department of Agriculture Years 1971, 1972, 1973 and 1974, protecting 77 groups of wild-life, consisting of 52 families, 211 general, with 351 species.

The wild-life species to be protected can be classified as follows:

(1) Wild-life species which are almost extinct,

(2) Wild-life species which are feared to become extinct, and

(3) Scarce/rare wild-life species.

Protected wild-life are prohibited to be:

(1) Caught, killed, owned/possessed/maintained, transported and traded, in living/live or dead condition.

(2) Take-out inter-insularly or exported.

Their hides/skins, feathers, other parts of their feathers, shall not be traded, and shall not be taken out inter-insularly and also exported.

The list of protected wild-life is presented in Table I(F)-13.

Table I(F)-13 LIST OF THE PROTECTED ANIMALS AND THEIR HABITAT

	Local Name	Scientific Name	Distribution
1.	Binatang hantu, singa, Puar, kukang	Jenis-jenis Tarsius	Java, Sumatra, Kalimantan, Sulawesi
2.	Orang utan, mawas	Pongo-pygmeus	Sumatra, Kalimantan
3.	Semua jenis owa, kera tak berbuntut	Hylobatidac	Java, Sumatra, Kalimantan
4.	Kahau	Nasalis larvatus	Kalimantan
5.	Badak jawa, badak Sumatra	Rhinoceros sondaicus & Rhinoceros sumatrensis	Java, Sumatra
6.	Tapir, cipan, tenuk	Tapirus indicus	Sumatra
7.	Kambing hutan dari	Nemorhaedus sumatrensis	Sumatra
8.	Trenggiling, peusing	Manis javanicus	Java, Sumatra, Kalimantan
9.	Burung dara laut	Sternidae laridae	Java, Sumatra, Sulawesi, Maluku, Irian
10.	Wili-wili, bebek laut	Esacus magnirostis	Lautan Hindia and Pacific
11.	Marabu, bangau tong	Leptoptilos javanicus	Java, Sumatra, Kalimantan, Sulawesi
12.	Bluwok, walangkadak	Ibis cinereus	Java, Sumatra
13.	Bangau hitam, sandang lawe	Ciconia episcopus	Java, Sulawesi
14.	Gangsa laut	Palecanidae	Java, Sumatra, Maluku, Irian
15.	Kuntul, bangau putih	Jenis-jenis Egretta & bubulcus ibis	Java, Sumatra, Kalimantan, Maluku, Irian
16.	Ibis putih, pelatuk besi	Thresklornis aethiopica	Java, Sumatra, Kalimantan
17.	Ibis hitam, roko-roko	Plegadis falcinellus	Archipelago of Indonesia
18.	Koak merah	Kycticorax caledonicus	Irian
19.	Alap-alap putih, alap-alap tikus	Accipiter novaehollandiae, Elanus	Maluku, Aru, Irian
20.	Burung dara mahkota, burung titi, mambruk	Junis-junis Goura	Irian
21.	Punai, burung mas, minata	Caloenas nicobarica	Irian

22.	Julang, enggang, rankong, kangkareng	Bucerotidae	Java, Sumatra, Kalimantan, Irian
23.	Burung udang, raja udang	Alcedinidae	Sumatra, Kalimantan
24.	Kasumba, suruku, burung luntur	Trogonidae	Java, Sumatra, Kalimantan
25.	Burung paok, burung cacing	Pittidae	java, Sumatra, Kalimantan, Maluku, Sulawesi
26.	Burung Cendrawasih	Paradiseidae	Ambon, Seram, Aru, Irian
27.	Burung madu, jantingan, klaces	Nectariniidae	Java, Sumatra, Kalimantan, Nias
28.	Burung sesap, pengisap madu	Meliphagidae	Sulawesi, Maluku, Nusa Tenggara, Irian
29.	Biawak besar dari Flores & Komodo	Varanus komodoensis	Flores, Padu, Rinca, Komodo
30.	Gajah	Elephas maximus	Sumatra, Kalimantan
31.	Banteng	Bos sondaicus	Java, Kalimantan
32.	Sapi hutan, anoang	Anoa depressicornis	Sulawesi
33.	Babirusa	Babyrousa babyrussa	Sulawesi
34.	Menjangan, rusa, sambar	Jenis-jenis Cervus	Java, Sumatra, Kalimantan, Sulawesi, Nusa Tenggara
35.	Kidang, muncak	Muntiacus muntijak	Java, Bali, Kalimantan, Lombok
36.	Kancil, pelanduk, nupa	Jenis-jenis Tragulus	Java, Sumatra, Kalimantan
37.	Macan jawa	Panthera tigris sondaicus	Java
38.	Jalak putih (Bali)	Leucopsar rotschildii	Bali
39.	Mcan kumbang	Panthera pardus	Java
40.	Burung maleo	Magacephalon maleo	Sulawesi
41.	Burung gosong	Megapodius reindt waardtii	Kalimantan, Maluku, Irian
42.	Monyet hitam sulawesi	Cynopithecus niger	Sulawesi
43.	Kakatua raja, kakatua hitam	Probosciger aterrimus	Aru, Irian]
44.	Kakatua putih besar (jambul kuning)	Cacatua galerita	Aru, Irian
45.	Kuau	Argusianus argus	Sumatra, Kalimantan
46.	Kangguru pohon	Dorcopsis mulleri	Irian

47.	Rusa bawear	Axis kuhli	Bawean
48.	Beo jeni	Gracularobustus or eulabus robustus	Nias Island
49.	Kauei	Casuarius casuarius	Ceram, Aru, Irian
50.	Burung alap-alap,	Accipitridae	Java, Sumatra, Kalimantan, Sulawesi
51.	Macan gembong/harimau loreng sumatra	Panthera tigris sumatrensis	Sumatra
52.	Simpai mentawai	Simias concolor	Mentawai
53.	Bajing tanah/tupai tanah	Lariscus insignis	Java, Sumatra, Kalimantan
54.	Kelinci liar sumatra	Nesolagus netcheri	Sumatra
55.	Itik liar	Cairina scutulata	Java, Sumatra, Kalimantan
56.	Musang air	Cynogale bennettii	Sumatra, Kalimantan
57.	Mandar sulawesi	Aramidopsis plateni	Sulawesi
58.	Burung kipas biru	Muscinapa ruecki	Sumatra
59.	Ikan duyung	Dugong-dugong	Indonesia
60.	Nori merah berkepala hitam	Larius domicella	Maluku
61.	Bayan	Larius rorattus	Maluku, Aru, Irian
62.	Beruang madu	Helarctor malayanus	Sumatra, Kalimantan
63.	Jelarang	Ratuja bicolor	Java, Sumatra, Kalimantan, Aru, Bali
64.	Kubung	Cynocephalus veriegatus	Java, Sumatra, Kalimantan
65.	Cukko, bajing terbang	Petaurista elegans	Java, Sumatra, Kalimantan
66.	Landak semut irian	Proechidna bruijnii	Irian
67.	Pecuk ular	Anghinga sp.	Java, Sumatra, Kalimantan, Sulawesi, Irian
68.	Gangsa batu	Sula leucogaster	Aru, Irian
69.	Burung kipas	Rhipidura javanica	Java, Sumatra, Kalimantan
70.	Soa-soa, biawak ambon	Hydrosaurus anboinensis	Sulawesi, Maluku, Irian
71.	Burung merak	Pavo muticus	Java
72.	Kucing hutan, meong congkok	Celis bengalesis	Java, Sumatra, Kalimantan, Bali
73.	Kuwuk	Felis marmorata	Sumatra, Kalimantan

74.	Harimau dahan	Neofelis nebulosa	Sumatra, Kalimantan
75.	Malu-malu	Nycticebus coucang	Java, Sumatra, Kalimantan, Natuna
76.	Lumba-lumba air tawar	Orcella fluminalis	Kalimantan
77.	Lumba-lumba air laut	Dolphin	Kalimantan

Source: Vademecum KEHUTANAN INDONESIA, 1976

2.3 Water Quality Standard

1) Drinking water quality standard

(1) Drinking water quality standard

The Department of Health sets forth the standard for the drinking water quality as shown in Table I(F)-14. The water analysis for the certification providing eligibility to the standard is required for each agency in charge of the water supply.

(2) Effluent quality standard

In the Republic of Indonesia, the effluent quality standard stipulated by the Department of State for Population and Environment compels the factories and/or the offices not to discharge the coarse quality of effluent into the public water channels [See Table I(F)-15]

(3) Public water quality criteria

Table I(F)-16 shows the criteria for the public water quality determined by the Department of State for Population and Environment. The criteria is divided into 4 classes from A to D based on the use of water.

The class A is the criteria for the direct drinking water and the class B is that of the raw water for drinking, for instance.

Table I(F)-14 STANDARD OF POTABLE WATER QUALITY ADOPTED BY THE DEPARTMENT OF HEALTH, INDONESIA AND WHO

No.	Constituents	Units	Department of Health Indonesia			WHO
			A	B	C	
I. PHYSICAL						
1.	Temperature	O_e			Air-temperature	
2.	Colour	Pt-Co scale	-	5	50	5-50
3.	Odour	-	-	-	-	Not disturb
4.	Turbidity	SiO_2scale	-	5	25	5-25
II. CHEMICAL						
5.	pH	-	6.5	-	9.2	6.5-9.2
6.	Total Solids	mg/lit	-	500	1,500	500-1,500
7.	Organic Substance	-	-	-	10	-
8.	Aggressive CO_2	-	-	-	0.0	-
9.	Total Hardness	Oj	5	-	10	-
10.	Calcium Ca	mg/lit	-	75	200	200
11.	Magnesium Mg	mg/lit	-	30	150	150
12.	Iron Fe	mg/lit	-	0.1	1.0	0.3-1.0
13.	Manganese Mn	mg/lit	-	0.05	0.5	0.1-0.5
14.	Copper Cu	mg/lit	-	0.05	1.5	1.0-1.5
15.	Zinc Zn	mg/lit	-	1.00	15	5-15.0
16.	Chloride Cl	mg/lit	-	200	600	200-600
17.	Sulphate SO_4	mg/lit	-	200	400	200-400
18.	Hydrogen Sulphide H_2S	mg/lit	-	-	0.0	-
19.	Flouride F	mg/lit	1.0	-	2.0	1.0
20.	Ammonia NH_4*	mg/lit	-	-	0.0	-
21.	Nitrite NO_2	mg/lit	-	-	0.0	-
22.	Nitrate NO_3	mg/lit	-	-	20.0	40
23.	Phenolic (as Phenol)*	mg/lit	-	0.001	0.002	0.001-0.002
24.	Arsenic As*	mg/lit	-	-	0.05	0.2
25.	Lead Pb*	mg/lit	-	-	0.10	0.1
26.	Selenium*	mg/lit	-	-	0.01	0.05
27.	Chromium Cr*	mg/lit	-	-	0.05	0.05
28.	Cyanide CN*	mg/lit	-	-	0.05	0.01
29.	Cadmium Cd*	mg/lit	-	-	0.01	-
30.	Mercury Hg*	mg/lit	-	-	0.001	-
III. RADIO-ACTIVITY						
31.	Alpha Rays	µc/ml	-	-	10^{-9}	10^{-9}
32.	Beta Rays	µc/ml	-	-	10^{-8}	10^{-8}
IV. MICROBIOLOGY						
33.	Parasitic Organism	-	-	-	0.0	-
34.	Pathogenic Organism	-	-	-	0.0	-
35.	Total Coliform limit in 100 ml of sample water	-	-	-	0.0	-

Remarks: A = Minimum Allowable Concentration,
B = Maximum Permissible Concentration,
C = Maximum Allowable Concentration,
* = Chemical Carsinogenic Matter

Source: Master Plan on North Banten Water Resources Development, July 1983, JICA.

Table I(F)-15 STANDARD OF EFFLUENT QUALITY

Parameter		Unit	Class of Effluent Quality			
			I	II	III	IV
Physical						
Temperature		°C	35	38	40	45
Dissolved Solid		mg/lit	1,500	2,000	4,000	5,000
Suspended Solid		mg/lit	100	200	400	500
Chemical						
pH			6-9	6-9	6-9	5-9
Iron	(Fe)	mg/lit	1	5	10	20
Mangan	(Mn)	mg/lit	0.5	2	5	10
Barium	(Ba)	mg/lit	1	2	3	5
Copper	(Cu)	mg/lit	1	2	3	5
Zinc	(Zn)	mg/lit	2	5	10	15
Chrom Hexavalen	(Cr)	mg/lit	0.05	0.1	0.5	1
Chrom total	(Cr)	mg/lit	0.1	0.5	1	2
Cadmium	(Cd)	mg/lit	0.01	0.05	0.1	0.5
Mercury	(Hg)	mg/lit	0.001	0.002	0.005	0.01
Lend	(Pb)	mg/lit	0.03	0.1	1	2
Tin	(Sn)	mg/lit	1	2	3	5
Arsenic	(As)	mg/lit	0.05	0.1	0.5	1
Selenium	(Se)	mg/lit	0.01	0.05	0.5	1
Nickel	(Ni)	mg/lit	0.1	0.2	0.5	1
Cobalt	(Co)	mg/lit	0.2	0.4	0.6	1
Syanide	(Cn)	mg/lit	0.02	0.05	0.5	1
Sulfide	(H_2S)	mg/lit	0.01	0.05	0.1	1
Flouride	(F)	mg/lit	1.5	2	3	5
Chlorid	(Cl_2)	mg/lit	0.5	1	2	5
Ammonia	(NH_3-N)	mg/lit	0.02	1	5	20
Nitrate	(NO_3-N)	mg/lit	10	20	30	50
Nitrite	(NO_2-N)	mg/lit	0.06	1	3	5
Biochemical Oxigen Demand	(BOD)	mg/lit	20	50	150	300
Chemical Oxigen Demand	(COD)	Mg/lit	40	100	300	600
Methylene		mg/lit	0.5	5	10	15
Phenol		mg/lit	0.01	0.5	1	2
Oil		mg/lit	1	5	10	20
Mineral Oil		mg/lit	1	10	50	100
PCB			-	-	-	-

Remarks: The standard has four classes I - IV: Class I is the desirable standard, class IV is the standard. The quality of effluent must be improved step by step.

Source: Buku Muta Lingkungan Hidup Pengendalian Pencemaran Lingkungan dan Analisis Mengenai Dampak Lingkungan, 1986, Kependudukan dan Lingkungan Hidup Asisten I, Menteri Negara.

Table I(F)-16 WATER QUALITY CRITERIA BY PURPOSE OF USE FOR THE PUBLIC WATER CHANNELS

Parameter	Unit	Class A (Direct drinking)		Class B (Raw water for drinking)		Class C (Fishery and animal use)	Class D (Irrigation, industry, electricity use, etc.)
		Desirable	Maximum	Desirable	Maximum		
Physical							
Temperature	°C	normal	normal	normal	normal	3°C	normal
Colour	P_tC_o	5	50	-	-	-	-
Odour	-	Undetectable	Undetectable	-	-	-	-
Taste	-	Undetectable	Undetectable	-	-	-	-
Turbidity	mg/lit.S_1O_2	5	25	-	-	-	-
Dissolved Solid	mg/lit	500	1,500	500	1,500	2,000	1,000-2000
Conductivity	micromho/cm	-	-	-	-	-	1,750-2,250
Chemical							
pH	-	6.5-8.5	6.5-8.5	5-9	5-9	6-9	5-9
Calcium (Ca)	mg/lit	75	200	-	-	-	-
Magnesium (Mg)	mg/lit	30	150	-	-	-	-
Barium (Ba)	mg/lit	nil	0.04	nil	1	-	-
Iron (Fe)	mg/lit	0.1	1	1	5	-	-
Mangan (Mn)	mg/lit	0.05	0.5	0.05	0.5	-	2
Copper (Cu)	mg/lit	nil	1	nil	1	0.02	0.2
Zinc (Zn)	mg/lit	1	15	1	15	0.02	2
Chrom Hexavelen (Cr)	mg/lit	nil	0.05	nil	0.05	0.05	1
Cadnuyn (Cd)	mg/lit	nil	0.01	nil	0.01	0.01	0.01
Mercury (Mg)	mg/lit	0.0005	0.001	0.0005	0.001	0.002	0.005
Lead (Pd)	mg/lit	0.005	0.1	0.05	0.1	0.03	1
Arsenic (As)	mg/lit	nil	0.05	nil	0.05	1	1
Selenium (Se)	mg/lit	nil	0.01	nil	0.01	0.05	0.05
Syanide (CN)	mg/lit	nil	0.05	nil	0.05	0.02	0.5
Cobalt	mg/lit	-	-	-	-	-	0.2
Sulfide (S)	mg/lit	nil	nil	nil	nil	0.002	-
Fluoride (F)	mg/lit	-	1.5 (minimum 0.5)	-	1.0 (minimum 0.5)	1.5	-
Chloride (Cl)	mg/lit	200	600	200	600	-	-
Boron (B)	mg/lit	-	-	-	-	-	1
Sulfate (SO_4)	mg/lit	200	400	200	400	-	-
Na	mg/lit	-	-	-	-	-	60
Ammonia (NH_4)	mg/lit	nil	nil	0.0	0.5	0.016	-
Nitrite (NO_3)	mg/lit	5	10	5	10	-	-
Nitrite (NO_2)	mg/lit	nil	nil	-	-	0.06	-
Permanganate number	mg/l.$KMnO_4$	nil	nil	10	-	-	-
Methylene	mg/lit	nil	0.5	nil	0.5	0.2	-
Phenol	mg/lit	0.001	0.002	0.001	0.002	0.001	-
Oil and grease	mg/lit	nil	nil	nil	nil	1	-
Carbon, Chloroform	mg/lit	0.04	0.5	0.04	0.5	-	-
Fee Chlorine (Cl_2)	mg/lit	-	-	-	-	0.003	-
Biochemica Oxigen Demand (BOD)	mg/lit	-	-	6	-	-	-
Chemical Oxigen Demand (COD)	mg/lit	-	-	10	-	-	-
Dissolved Oxigen (DO)	mg/lit	-	-	6	6	3	-

PCB	mg/lit	nil	nil	nil	nil	-	-
SAR	mg/lit	-	-	-	-	-	10-18
RSC	mg/lit	-	-	-	-	-	1.25-2.5
Microbiology							
Total Coliform	MpN/100ml	nil	nil	10,000	-	-	-
Fecal Coliform	MpN/100ml	-	-	2,000	-	-	-
Radioactivity							
Total Radioactivity	Pci/lit	-	100	-	100	1,000	1,000
Strontium-90	Pci/lit	-	2	-	2	10	10
Radium-226	Pci/lit	-	1	-	-	3	3
Pestside							
DDT	mg/lit	nil	nil	nil	0.012	0.002	-
Endrine	mg/lit	nil	nil	nil	0.001	0.004	-
BHD	mg/lit	nil	nil	nil	-	0.21	-
Methyl Parathion	mg/lit	nil	nil	nil	-	0.10	-
Malathion	mg/lit	nil	nil	nil	-	0.16	-
Addrin	mg/lit	nil	nil	nil	0.017	-	-
Chlordane	mg/lit	nil	nil	nil	0.003	-	-
Dieldrin	mg/lit	nil	nil	nil	0.017	-	-
Heptachlor	mg/lit	nil	nil	nil	0.018	-	-
Lindane	mg/lit	nil	nil	nil	0.056	-	-
Metoxy Chlor	mg/lit	nil	nil	nil	0.035	-	-
Carbonate	mg/lit	nil	nil	nil	0.100	-	-
Toxaphene	mg/lit	nil	nil	nil	0.005	-	-

Remark: - Non definition
Source: Buku Muta Lingkugan Hidup, Pengendalian Pencemaran Lingkungan dan Analisis Mengenai Dampak Lingkungan, Laporan Khusus Asisten I, Menteri Negara

2.4 Land Use Control

The following regulations and instructions in regard to the land use control are enforced by the authorities concerned.

1) Ijin Mendirikan Bangunan (IMB) to be issued following the regulation Pekerjaan Umum Kabupaten (PUK), public works is a permission for the building construction.

   The building code (permission) in Serang, enforced in 1976, contains the following articles.

   a. The height of the fence must be below 1.2 meters.

   b. The structure must be set back 10 m from the road edge in the urban area and 8 m in the rural area.

   c. The height of the structure is subject to restriction of the certain level.

2) Instruction for the beach area protection

   Bappeda TK II Serang issued the following instruction in 1986.

   a. The setback of the structure on the beach area should be at least 25 meters from the shore edge line in high tide.

      The land use in setback area is proposed for tourist road with 7-8 meters width and 17 meters for public beach.

   b. The distance between the structures on the beach area must be more than 3-4 meters.

c. The beach area owners especially along the coast from Anyer Cinangka up to Pasauran are presently instructed not to do any land transaction.

3) Instruction for the prohibition of construction

Bappeda TK II Pandeglang issued the following instruction in 1985.

New construction works, both houses and other kinds of buildings including extension works are not allowed without permission of the Bupati, head of DT II Pandeglang on the west coast area of Kec. Labuan and the surrounding areas.

CHAPTER 3 OCEANOGRAPHY

3.1 Sea-bed Topography

Fig. I(F)-13 shows the contour lines of sea-bed.

Three shoaly bays exist in the study region as follows.

1) Teluk Banten (Banten bay)

The bay with the width of 15 km from east to west is shallow with depth of less than 5 m within 2 km from the shore.

Many islands including Pulau Dua nature reserve are scattered in the bay and coral reefs surround the islands. However, the mud from the river flowing into the sea, especially around Pulau Dua island, aggravates the sea water transparency.

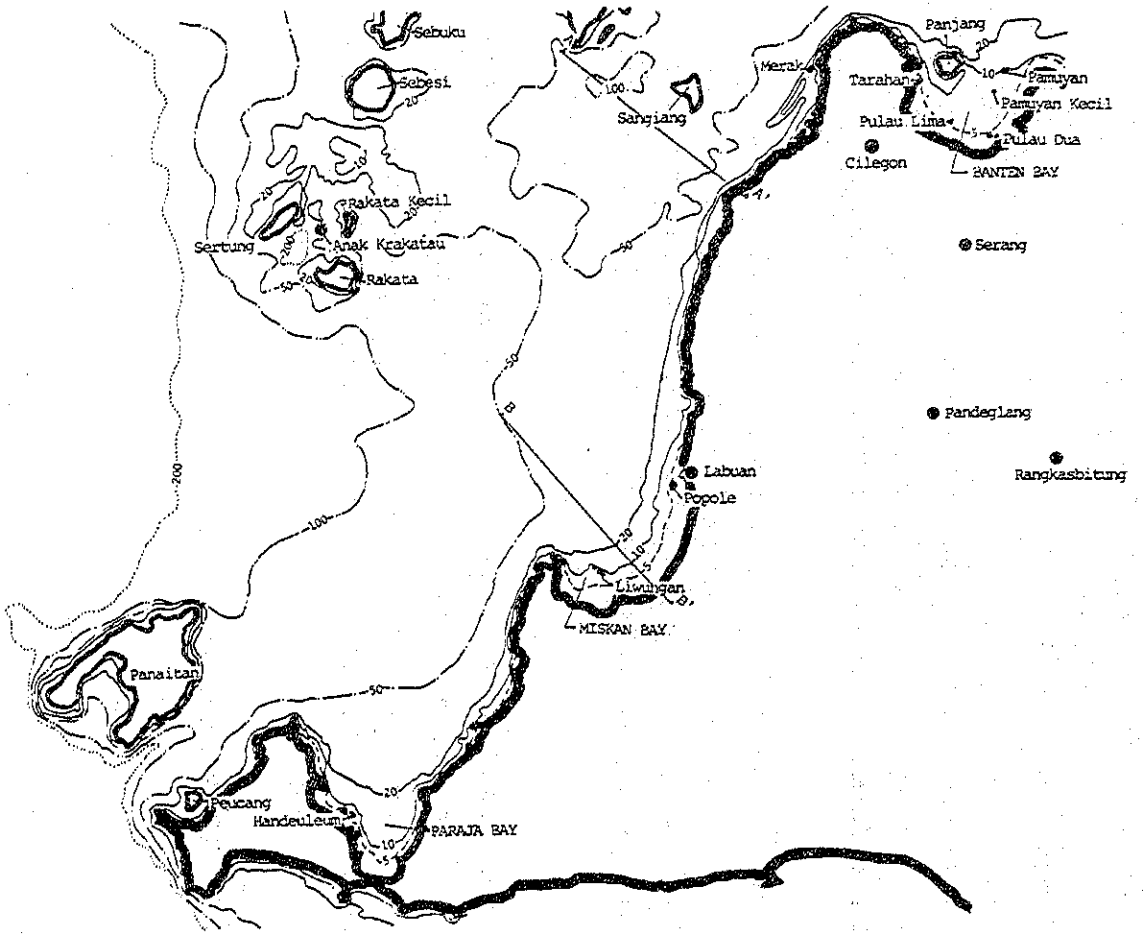
2) Teluk Miskam (Miskam bay)

Miskam bay,which spreads in the southern part from Labuan, is shallow to a great distance from the shore due to the accumulation of mud from the Ciliman river and other rivers.

3) Teluk Paraja (Paraja bay)

Paraja bay is located in the neck of the Ujung Kulon national park. Many islands such as Handeleum are scattered in the bay where clear sea water is suitable for diving activities.

The coasts other than the above three bays show steep sections as seen in Fig. I(F)-14 (Section of Anyer coast).



Note : This map was made based on the Oceanoglaphycal Map (1:200,000), prepared by Jawatan Hidro-Oseanografi.

Source : THE JICA STUDY TEAM

0 5 10 20 30 km

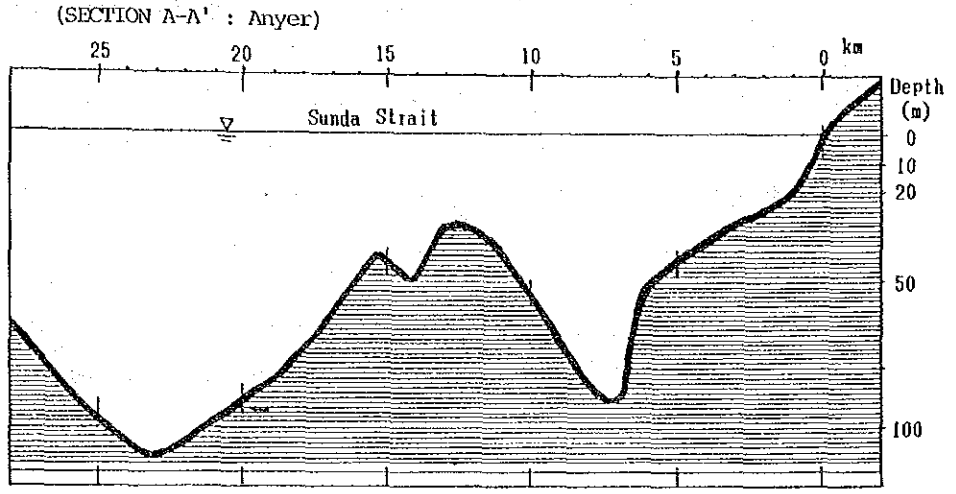
DEPARTMENT OF TOURISM, POST AND TELECOMMUNICATION
DIRECTORATE GENERAL OF TOURISM

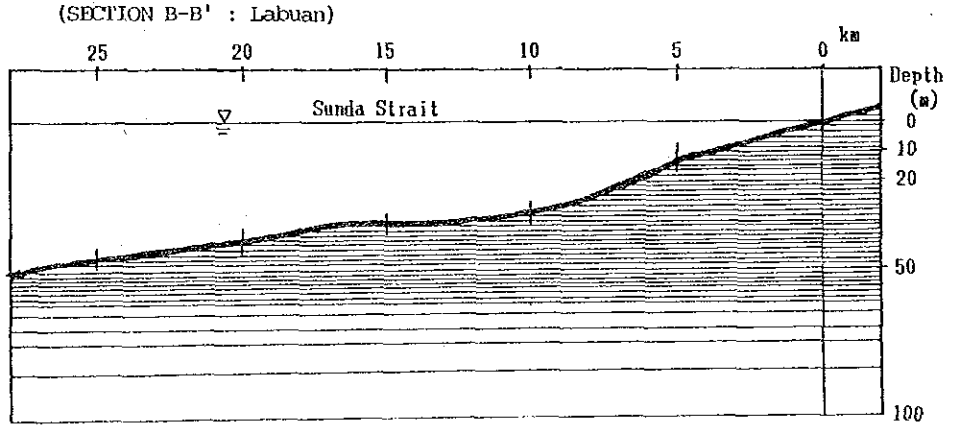
JAPAN INTERNATIONAL COOPERATION AGENCY

THE STUDY ON THE REGIONAL DEVELOPMENT PROJECT IN THE WESTERN PART OF JAVA

Fig. I(F)-13

SEA-BED TOPOGRAPHY





Source : THE JICA STUDY TEAM

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DIRECTORATE GENERAL OF TOURISM

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THE STUDY ON THE REGIONAL DEVELOPMENT PROJECT
IN THE WESTERN PART OF JAVA

Fig. I(F)-14

SECTIONS OF SEA-BED TOPOGRAPHY

3.2 Sea Water Quality

Generally speaking, the sea water quality of the northern coast in the study region is not so attractive because of its turbidity due to the industrial development in the vicinity.

However, the total Coliform/100 ml in Merak beach based on the data from the National Institute of Oceanography shows 90 MPN/100 ml that is far less than the water quality standard/*.

In Anyer beach and Carita beach, the sea water quality is good in spite of its brownish color containing sands engulfed by wave.

The sea water quality in the coast of Ujung Kulon is excellent compared with those of other famous seas in the world.

Note: /* Total Coliform standard of sea water is below 1,000 MPN/100 ml according to Kantor Menteri Negara Kependudukan Dan Lingkungan Hidup (1985) as shown in Table I(F)-17.

3.3 Tidal Condition

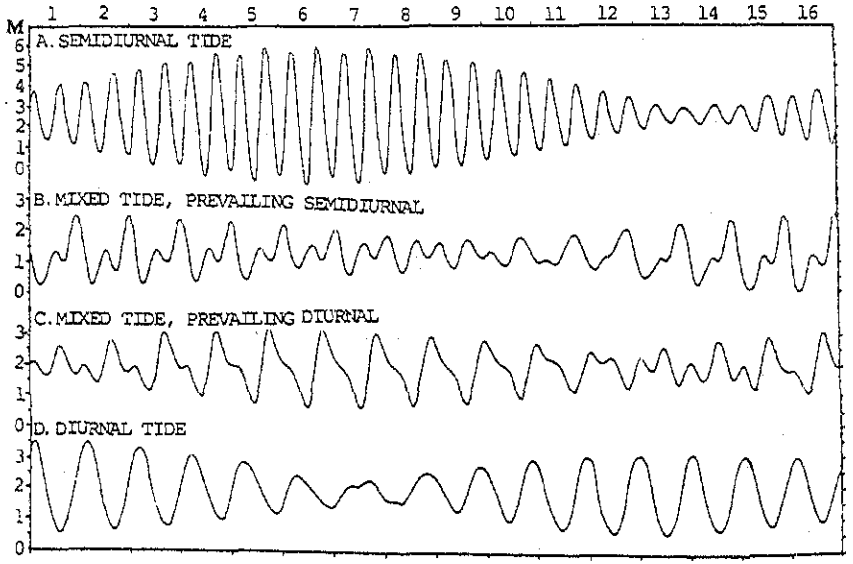
1) Tidal pattern

The tidal pattern in the southeast Asia sea is divided into four types based on "the Physical Oceanography of the Southeast Asia Waters, by Klaus Wyrtki" [See Fig. I(F)-15].

Table I(F)-17 STANDARD OF QUALITY OF SEA WATER

Item	Unit	Classification of Usage		
		Swimming	Natural Environment	Fish Pond
Temperature	°C	26-32	±2°C variation	±2°C variation
pH	-	6.5-8.5	6.5-8.5	6.5-8.5
Salinity	o/oo	-	±10 o/oo variation	18-32
BOD	mg/lit	≤6.0	≤6.0	≤6.0
COD	mg/lit	≤12	≤11	≤11
SO	mg/lit	≥ 5	≥ 4	≥ 5
Total coliform	MPN/100ml	≤1000	-	≤1000

Source: Pedoman Umum Baku Mutu Air Laut, Kantor Menteri Negara Kependudukan Dan Lingkungan Hidup, 1985



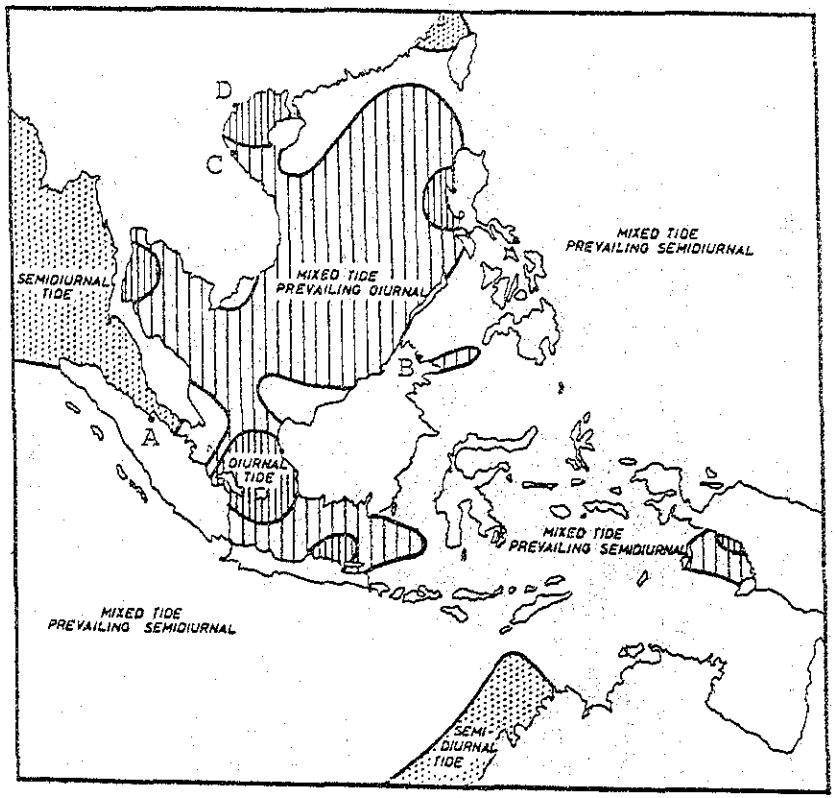
Typical tidal curves in the Southeast Asian Waters, representing the four types of tides during a period of 16 days.

A. SEMIDIURNAL TIDE:
Two high waters and low waters are almost the same levels.
Example: Bagan Siapiapi, Malacca Straits.

B. MIXED TIDE, PREVAILING SEMI-DIURNAL:
Two high waters and two low waters are obserbed but different in height.
Example: Sandakan, Sulu Sea.

C. MIXED TIDE, PREVAILING DIURNAL:
Only one higt water and one low water are obserbed daily but occasionally two high waters and two low waters occur. The difference in height is remarkable.
Example: Hon NieNieu, Vietnam

D. DIURNAL TIDE:
Only one high and low water daily.
Example: Cua Cain, Gulf of Tonkin.



Geographical distribution of tidal types in Southeast Asia.

Source : PHYSICAL OCEANOGRAPHY OF THE SOUTHEAST ASIA WATERS, KLAUS WYRTKI; 1960.

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Fig. I(F)-15

TIDAL TYPES IN THE SOUTHEAST ASIA

(1) Semi diurnal tide

This type of tide is observed in the Malacca straits and its western Indian Ocean with two high waters and two low waters per day. The difference between high and low reaches approximately 6 m.

Most of the Indian Ocean and the Sulu sea including the Sunda straits follow this kind of tidal pattern. The difference between high and low tides is less than 2.5 m.

(2) Mixed tide, prevailing diurnal

Only one high water and one low water are observed daily, but occasionally two high and low waters come out. The phenomenon can be seen from the Siam bay to the Philippines. The difference between high and low tides is less than 3 m.

(3) Diurnal tide

Only one high water and one low water are observed daily in the Tonkin gulf. The difference between high and low tides is less than 3 m.

2) High tide and low tide in Labuan

The data from the Navy's Oceanographic Department (Jawatan Oceanografi Angkatan Laut) represent the sea level related to the gauge station in Labuan.

Mean sea level	MSL = +0.70 m
Highest high tide	HHT = +1.20 m
Mean lowest high tide	MLHT = +0.90 m
Mean highest low tide	MHLT = +0.50 m
Lowest low tide	LLT = +0.20 m

The difference between HHT and LLT is 1.0 m.

3) Surface current

In the Sunda Straits, the water movements are in general directed towards the Indian Ocean and are strongly related to the surface gradient of the sea level. The sea level in Tanjung Priok of Jakarta is 10-40 cm higher than the level in Pelabuhan Ratu facing the Indian Ocean.

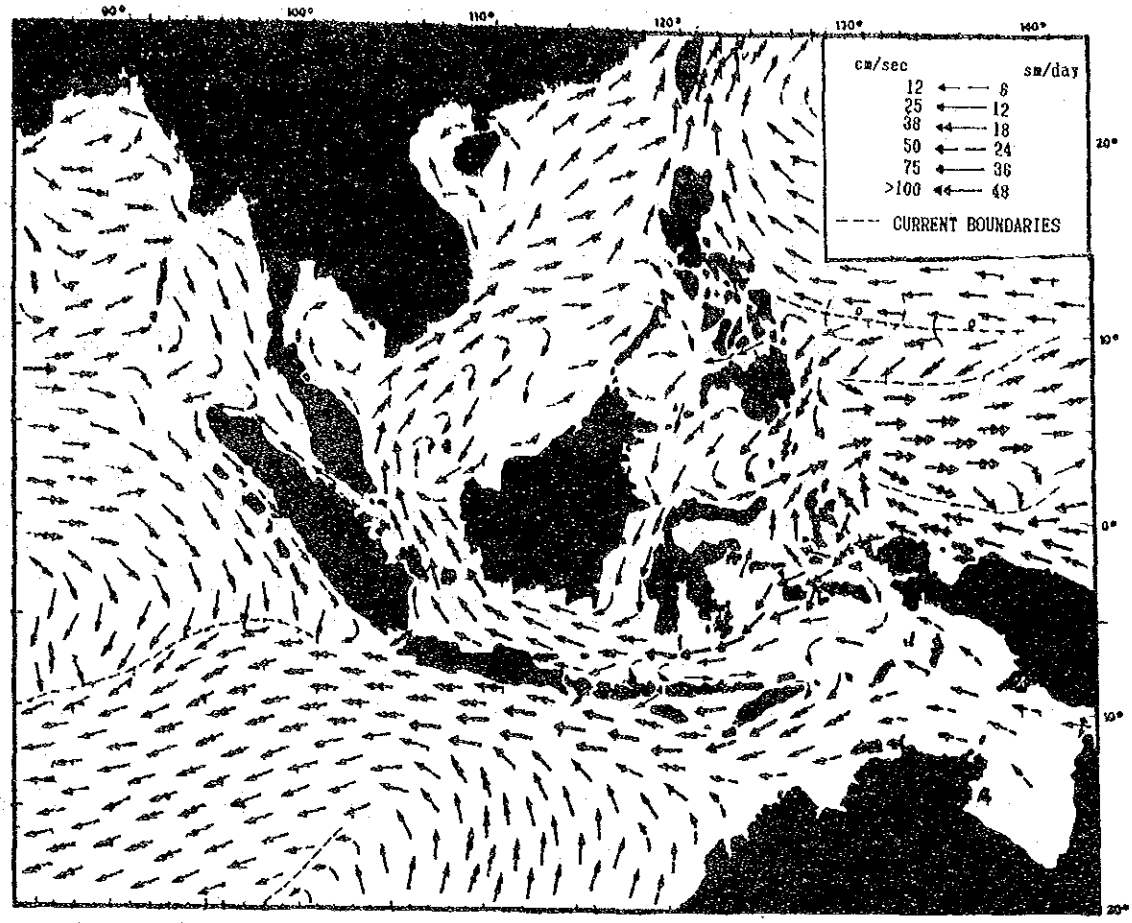
The velocity of the surface current in the Sunda Straits reaches its maximum in August when the wind from the north is the strongest [See Fig. I(F)-16].

The mean velocity is 0.4 m/sec (1.4 km/hour) and the maximum is approximately 1.2 m/sec (4.4 km/hour) in that season.

3.4 Wave Height

The wooden jetty in Labuan was destroyed by the storm in 1975 according to attestation of an old fisherman. The wave height at that time was supposed to be over 2.5 - 3 m.

The maximum wind velocity must have reached to 15 - 18 m by the estimation based on the wave height of 2.5 -3 m.



Note: Most frequent direction and the average velocity in this direction is represented as the arrow in six steps by featuring.

Source: Physical Oceanography of the Southeast Waters, Klaus Wyrtki, 1960

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Non-scale	Fig. I(F)-16 DIRECTION AND VELOCITY OF SURFACE CURRENT IN AUGUST

CHAPTER 4 ENVIRONMENTAL IMPACTS

4.1 General

The environmental impacts subsequent to the project implementation can be classified into two categories; those for natural environment and for socio-cultural environment. The socio-cultural factors constitutes very important components in the environmental impact analysis. The items of natural environment to be evaluated consist of the air quality (including the offensive odor), water quality, noise and vibration, lithosphere system including topographical and geological features, soil contamination, and ecological system including vegetation and animals and so on.

Those of socio-cultural environment consist of the population, industry, traffic and transport, solid waste, health and sanitation, complaints about environmental pollution, historic spots and cultural assets, landscape, administration and community constitution and so on. Several items among them just like historic spots and cultural assets, landscape, etc., have the common matters to both on natural and socio-cultural environments. These items also include some factors for which it is difficult to do a quantitative analysis, but it is necessary to consider them as much as possible. The relationship among the environmental factors for development projects is shown in Fig. I(F)-17.

The items above are used for evaluation of environmental impacts in general and, therefore, all the items will not necessarily be examined for a specific project.

4.2 Evaluation of the Environmental Impacts

The items to be investigated vary with the objective area and the details of development project (scale, type, purpose and so on). Therefore, it is essential to prepare properly the

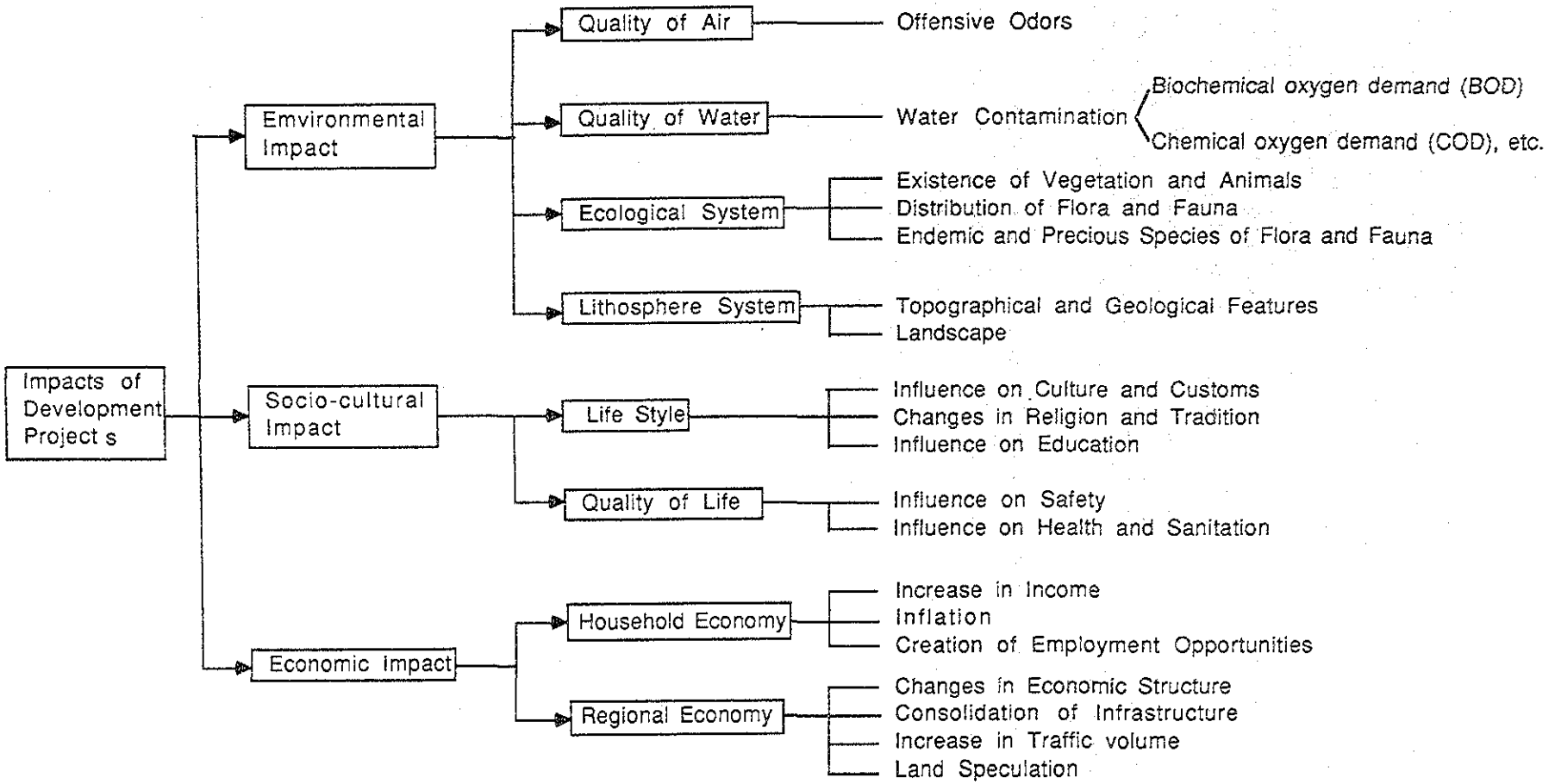

Fig. I(F)-17 FACTORS OF IMPACTS TO BE EVALUATED FOR TOURISM DEVELOPMENT PROJECTS

questionnaire form for each project. The flow chart of the survey on the environmental impacts is shown in Fig. I(F)-18. The Regional Development Project in West Java, which is focusing on the tourism development, covers a wide area.

The environmental impacts in the objective area of each project were broadly forecasted and evaluated on the basis of existing data and the development features of each project. As regards the natural environment, it is considered that three themes, such as water contamination, vegetation and animals, landscape take a leading part in this study. About socio-cultural environment, many influences and changes can be forecasted. They are changes in socio-economic structure, and activities, improvement of regional infrastructure, preservation on transformation of traditional arts and crafts, influence on traffic condition (increase of traffic and traffic accident, etc.) and so on.

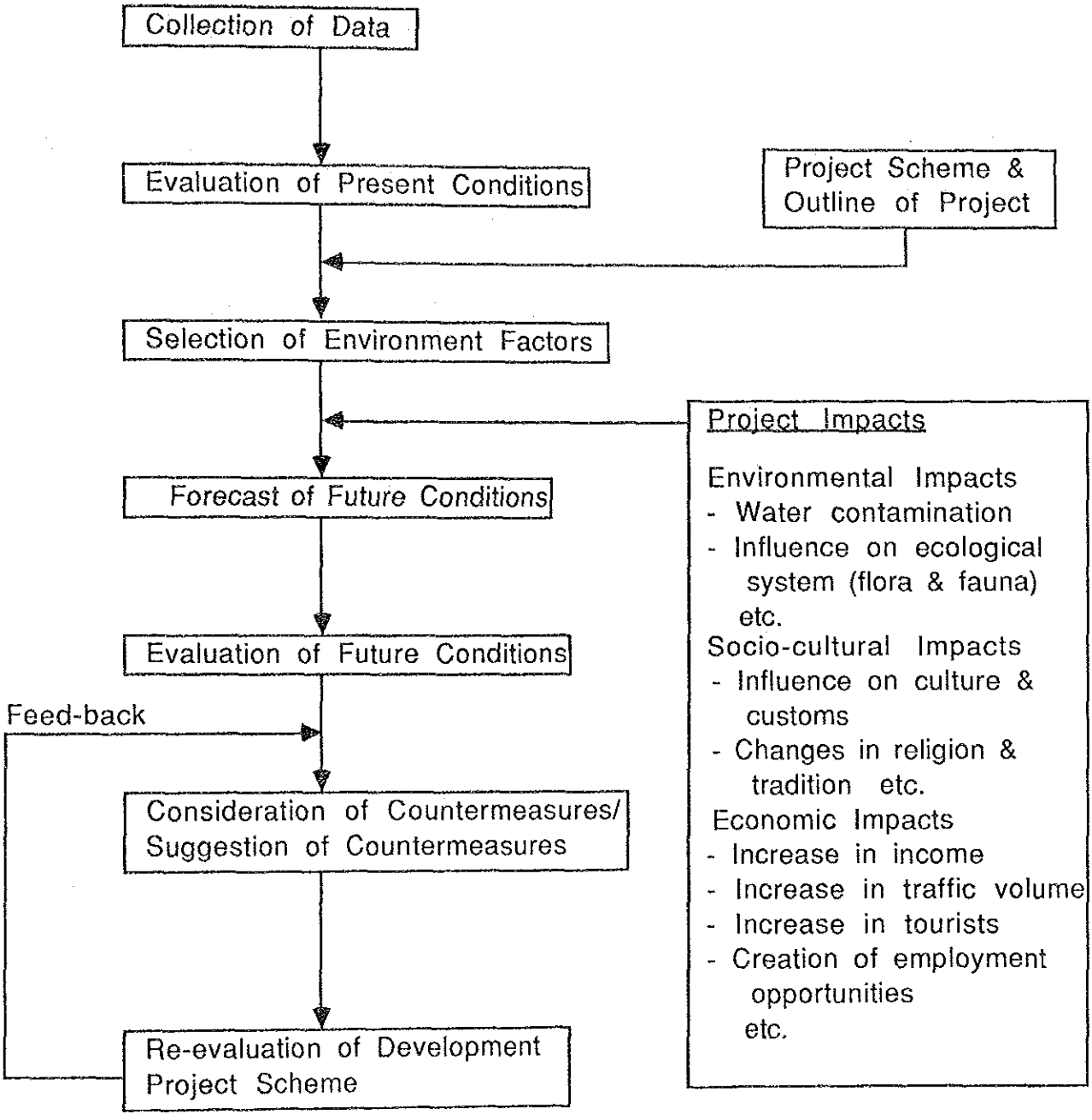

Fig. I(F)-18 FLOW CHART OF EVALUATION FOR TOURISM DEVELOPMENT PROJECT

VOLUME 3

MASTER PLAN
(ANNEX I)

JICA