Annex 8 : List of Equipments

No.	Instrument	Quntity	Code No.	Model No.
1	Gas Chromatograph-Mass Spectrophotometer	1	1-1	JEOL/JMS-AX505W
2	X-Ray Fluorescence Spectrophotometer	1	1-3	SHIMADZU/VF-320A
3	Atomic Absorption Spectrophotometer	6	1-8-A-(1)	SHIMADZU/AA-625-11 (1)
			1-8-A-(2)	SHIMADZU/AA-625-11 (1)
			1-8-A-(3)	JARRELL-ASH/728 (2)
			1-8-A-(4)	PERKIN ELMER/2100 (1)
	Atomic Absorption Spectrophotometer,Graphite Furnace		1-8-C	HITACHI/Z-9000 (1)
4	Air Compressor	3	1-8-F	HITACHI KOKI/SC-72
5	Gas Regulator (Brass)	32	1-8-G	CROWN GAS/FR-II-S-OP(13)
	Gas Regulator (Stainless)		1-8-H	CROWN GAS/FR-I-S-OP(19)
6	Mecury Analysis	4	1-14	HIRANUMA SANGYO/HG-1
7	Electron Microscope	1	1-22	JEOL/JSM-5400
8	Heavy Metals Waste Treatment Apparatus	1	1-25	KOTOBUKI/LB-50
9	Clean Bench	2	2-32	DALTON/PAU-1600BN
	Draft Chamber with Exhaust Scrubber	3	2-33-A	DALTON/DSC-U-8E
	Draft Chamber	13	2-33-B	DALTON/DS-8E
	Vacuum Type Constant Temperature Oven	1	2-7	VOR-300
	Blowing Type Constant Temperature Oven	3	2-8-A	FS-620
	Middle Temperature Oven	2 sets	2-8-B	FG-220
	High Temperature Oven	2 sets	2-8-C	FH-35
	Low Temperature Oven	3 sets	2-12-C	IS-2200
	Oven for Glass Wares	3 sets	2-9	FP-300
	Table Top Type Autoclave	1 set	2-10	NAC 1200
	Incubator	2 sets	2-12-A	CI-612
	CO2 Type Incubator	1 set	2-12-B	CF-241
	Constant Low Temperature and Relative	13 sets	2-12-D	AE-215 (1)
	Auto-Dry-Desiccator		4-30	DC-II (12)
	Locker for Reagents	10 sets	8-26	BF-IV-900
	Autoclave	1		
10	Cold Storage Chamber	3	2-35-A	SANYO/MCU-1000
	Freezed Storage Chamber	1	2-35-B	SANYO/MCU-1000
	Cooling Unit	1 lot	2-27-D	LC-300FC/LC-80F/IC-130F/IC-130C
	Ice Maker	1 set	2-38	F-120B+IM-50J

No.	Instrument	Quntity	Code No.	Model No.
	Freezer	1 set	2-37-A	MDF-192AT
	Refrigerator	12 sets	2-36	SR-324F2
11	Laboratory Cart	40	2-42-F	OBATA/WG-B
12	AC Stabilizer	16	2-46-(1)	YAMABISHI/STAD-20K(1)
			2-46-(2)	YOKOYAMA/AP-2000-RS(15)
13	Water Bath (6x2)	18 sets	2-27-A	LB-260 (6)
	Water Bath (10x2)		2-27-B	LB-212 (6)
	Water Bath (6x1)		2-27-C	WB-6S (6)
14	Portable SO2 Monitor	2	4-1	KIMOTO/365P
	NOX Monitor	2	4-2	KIMOTO/265
	Portable CO Monitor	2	4-3	HORIBA/APMA-350E
	Ozone Monitor	2	4-4-A	KIMITO/845
	Oxidant Monitor	1	4-4-B	KYOTO ELECTORONICS
	Non-Methane HC Monitor	2	4-5	KIMOTO/730
	Orsat Analyzer	3 sets	4-19	6072-3
	Datalogger	6 sets	4-31	DR-F1
	Acid Rain Monitor	1 set	4-34	AW-301
15	Zero Air Generator	7 sets	4-22	STEC/SGPU-22 (1)
	Air Purifier		4-29	a-600 (6)
16	Gas Phase Diluter	1	4-23	STEC/SEC-400 MARK II Special
17	อุปกรณ์แสงเสียงห้องประชุมใหญ่	1	8-5	PHILIPS/CCS400 (LBB 3350/00, 3351/00,LBB 3300/00)
18	D.P.E. Set for for Electron Microscope	1	8-23	LPL/CPE-2 & OTHER
19	White Board	12	8-27	UCHIDA/266-5036
	Black Board	5	8-28	UCHIDA/266-1436
20	Fixed Type Roll-up Screen	6	8-29	BRETFORD/1070M
	Fixed Type Screen	1	8-30	BRETFORD/5092M
21	A/V System for Audio Visual Room	1	8-31	MATSUSHITA/TC-2680XR/ NV-G500EM/WA-755N/WS-A10/ WN-172N/WN-422N/WN-306Y/ WM-611N/WTR-135DX
	A/V System for Seminar Room	1	8-32	MATSUSHITA/WR-8312K/ WP-9220/WA-750N/WZ-9311/ WX-960S/WU-L07N/SL-P333/

No.	Instrument	Quntity	Code No.	Model No.
				RS-TR335/WS-A70/NV-G500EM/
				TC-485XR/WS-A300/TC-AV33XR/
				WS-4991GN/WM-D65/WX-470A/
				WX-335AN/WN-5100AN/WN-5200AN/
				WN-172N/WVT-F10/WV-KT100/
				NV-180E/WM-D55/WM-D70
22	OPEN RACK	22	9-22 (1)	UCHIDA/220-3001 (16)
			9-22 (2)	UCHIDA/220-3041 (6)
23	High Speed Centrifuge	1 set	2-4-A	H-7000S
	Tabletop Type Centrifuge	3 sets	2-4-B	H-103N
	Tabletop Type High Speed Centrifuge	1 set	2-4-C	H-1500FR
	Centrifuge	2 sets	2-4-D (1)	H-195-C
			2-4-D (2)	H-150-C
	High Speed Homogenizer	6 sets	2-19-A	T-25
	Cup Type Homogenizer	3 sets	2-19-B	AM
24	Muffle Furnace (for Organic)	6 sets	2-5	KM-420 (2)
	Muffle Furnace (for Metal)		2-6	KM-420 (3)
	Hot Air Oven		6-4	FV-1000 (1)
	Heater for 250 ml Kjeldahl flask	18 sets	2-20-B	KD-4 (9)
	Heater		2-20-C	Special (9)
	Mantle Heater	5 sets	2-20-D	SAFR-1 50x1, SAFT-10x2
	Constant Water Bath	6 sets	2-23	85-K1
	Burner for Glass Work	3 sets	2-39	B
	Column Oven	1 set	4-36	LL-75
26	Rotary Evaporator	20 sets	2-14-A	RE-111C-SW (15)
			2-14-B	RE-10E-100 (2)
	Centrifuging Type Test Tube Evaporator		2-14-C	CVE-200D (2)
	Test Tube Evaporator		2-15	TC-8G (1)
27	Fraction Collector	6 sets	2-16-A	SF-2120
	Simple Type Fraction Collector		2-16-B	DC-40
28	Shaker Middle	14 sets	2-17-A	SR-II (5)
	Shaker Large		2-17-B	SR-IIW (6)
	Recipracating Shaker		2-17-C	WS-240 (3)
	Sieve Shaker	1 set	6-3	SS-93

No.	Instrument	Quntity	Code No.	Model No.
	Culti-Bath shaker	1		
	Culti-Shaker	1		
29	Mixer	12 sets	2-18	VA-3300M
30	Hot Plate Large	24 sets	2-21-A	HPS (12)
	Hot Plate Small		2-21-B	TYPE 2 (12)
31	Magnetic Stirrer	55 sets	2-22-A	L-35 (12)
	Multi magnetic Stirrer		2-22-B(1)	SR-356 (4)
			2-22-B(2)	SR-350 (16)
	Rotary Vacuum Pump(Diaphragm Pump)		2-24-B(2)	DA-30S (8)
	Heating Type Magnetic Stirrer		2-22-C	SR-550 (15)
32	Rotary Vaccum Pump	1 lot	2-24-B(1)	USW-100,300
	Roller Pump	1 set	2-25-A	RP-5/10/30/60/MP-32
	Mini Pump	6 sets	2-26	P-2
	Gas Pump	2 sets	4-25	NG-17C
33	Ultrasonic Cleaner	3 sets	2-28-A	SH-1216-450-18
	Small Power Ultrasonic Cleaner	6 sets	2-28-C	2200-J3
	Ultrasonic Pipette Cleaner	7 sets	2-29-A	PU-100
	Siphon Type Pipette Cleaner	15 sets	2-29-B	S4-6302
34	Separate Type Ultrasonic Generator	1 set	2-28-B	UT-1204R/UI-1204R
35	Ion Exchanger	3 sets	2-30-A	CPW-200
36	Water Distillation Unit (All Glass)	5 sets	2-30-B	QS-15S (3)
	Water Distillation Unit (All Glass)			
	Water Distillation Unit			
37	Stainless Steel Sink	13 sets	2-42-H(1)	B2-IV (1)
			2-42-H(2)	A-F-IV (12)
38	V-Type Blender	1 set	2-43	1101-10
	Milling Machine	1 set	6-2	1029-C
	Blender	1		
39	Potentiometric Automatic Titrator	1 set	2-45	E-686 Set
40	Dust Monitor	1 set	4-6-(1)	P-5L2
	Dust Monitor (Baeta-Ray Method	1 set	4-6-(2)	BAM-102S
41	High-Volume Air Sampler	2 sets	4-7	HVC-1000A
	Low-Volume Air Sampler	2 sets	4-8	L-30
	Andersen Air Sampler	1 set	4-9	AN-200

No.	Instrument	Quntity	Code No.	Model No.
	Deposit Gauge Dust Jar	3	4-10	8008-01
42	Combined Wind Vane and Anemograph	4 sets	4-11-A	3-1395-01(1)
			4-11-B	3-1460-04(3)
43	Thermo-Hygrograph	3 sets	4-12	3-1120-11
	Pluviometer	3 sets	4-13	3-1561-01
	Uitra-Violet Meter	5 sets	4-14(1)	3-2080-02 (1)
			4-14 (2)	MS-140 (1)
	Potrable Black Fume Monitor		4-18	DSM-10 (3)
44	Kitagawa Type Gas Sampler with Detector Tube	3 sets	4-21	ASP-1
	Gas Meter	1 set	4-26	W-NK-10+W-NK-5
	Rotar Meter	1 set	4-27	S3-2201
	Mass Flow Meter	2 sets	4-28	400 MARK III
45	Digital Multimeter	3 sets	4-32	VOAC 7407
46	Wet Type Gas Collector Unit	5 sets	4-20	8003-05
	Stack Sampler	2 sets	4-24(1)	NG-6/NG-4/NG-12/NG-5/NG-21/NG-23
			4-24(2)	NG-Z-4-D, NG-Z-4-V,NG-7-S
47	Oscilloscope (digital)	2 sets	4-33	3060D
48	Air Pollution Monitoring Unit	3 sets	4-35(1)	AP-350E
	Running Test		4-35 (2)	LAX-55
49	Sound Level Meter	57 sets	5-1	NL-01A (9)
	Extension Code 10m		5-2-A	EC-04B (9)
	Extension Code 30m		5-2-B	EC-40C (9)
	Level Recorder		5-3	LR-04 (9)
	Tape Recorder+B151		5-4-A	TC-D5M (9)
	All Weather Screen		5-7	WS-03 (9)
	Piston phone		5-8	NC-72 (3)
	Noise Monitoring Unit	2 lots	5-12	LA-220, VM-51,J-3100GS001,
				VP-1350
50	Data Processing Unit	1 lot	5-10-A	UC-52, PV-57, SA-27, NA-29, CP-10
51	Real-Time Wave Analyzer	1 set	5-11	SM-2100B
52	Tacho Meter	1 lot	5-9	HT-446, SE-250, GE-450
53	3 ch Vibration Meter	8 sets	5-14	VM-51 (3)
	Turnable Band Pass Filter		5-15	SA-77 (1)
	Accelerometer Calibrator		5-16	VP-33 (1)

No.	Instrument	Quntity	Code No.	Model No.
	Transceiver		5-17	C112E (3)
	Transit	1 lot	5-18	TM20ES, RED mini 2
54	High Precision Sound Meter	3 sets	5-5	NL-11, CP-01
55	Traffic counter mcahine	30 sets	5-6-A	FH-102PM (15)
56	Calorie Meter	2 sets	6-5	1013B
57	Kjeldahl Condensation Unit	1 set	6-8	SE-6
58	NH3 Distillation Unit	2 sets	6-9	S2-4104
59	Solid Waste Sampling/Mixing/Separating Tool Unit	2 sets	6-10	TD-113P
60	Flash Point Measurement Unit	2 sets	6-11	200 ESR
61	Corrosion Tester	1 set	6-12	660-10T
62	Constant Bath for Vapor Pressure Test	1 set	6-13	180-032
63	FDD Converter	2 sets	8-2-C	GD-535M
64	VTR Editing Set	1 lot	8-4-B	AG-6500/AG-A750/BT-M1400PSN
65	Laboratory Practice Table (Center:2400)	73	2-42-A	DALTON/GN-IV (3)
			2-42-A	DALTON/GN-IV (6)
			2-42-A	DALTON/GI-IV (11)
	Laboratory Practice Table (Side:1500)		2-42-B	DALTON/D-F-IV (18)
	Laboratory Practice Table (Side:3000)		2-42-C	DALTON/D-F-IV (4)
			2-42-C/1	DALTON/D-F-IV (8)
	Laboratory Practice Table (Side:2400)		2-42-D	DALTON/D-F-IV (12)
			2-42-D/1	DALTON/D-F-IV (1)
	Laboratory Practice Table (Side:1800)		2-42-E	DALTON/D-F-IV (6)
			2-42-E/1	DALTON/D-F-IV (3)
	Laboratory Practice Table		2-42-G	DALTON/A-F-IV-1200 (1)
66	Work Table (Center:2400)	15	2-42-A2	DALTON/GN-IV (12)
	(Work Table)		2-42-I	DALTON/UT-C-IV 93)
67	Copy Machine	2	8-13	RICOH/FT5560
68	Eletric Typewriter	2	8-14	OLYMPIA/STANDARD 200
69	Semi-Micro Analytical Balance	4 sets	2-1-A	AE240 (4)
	Micro Analytical Balance	1 set	2-1-B	UM3 (1)
	Top-Pan Eletronic Analytical Balance (6kg)	15 sets	2-2-A	PJ6000 (5)
	Top-Pan Electronic Analytical Balance (3,100g)		2-2-B	PJ 3600 (5)
	Top-Pan Electronic Analytical Balance (Semi-micro)		2-2-C	PM 460 (5)
	Standing Electronic Balance	8 sets	2-3-A	S3-1203 (3)

No.	Instrument	Quntity	Code No.	Model No.
	Platform Scale		2-3-B	MW-150K (1)
	Platform Scale (60 kg)		6-1-A	S3-1203 (2)
	Platform Scale (20 kg)		6-1-B	S3-1201 (2)
	Top-Pan Electronic Balance (12 kg)	2 sets	6-1-C	PJ12 (2)
70	Aluminium Block Heater	4 sets	2-20-A	TB-320
71	Table for Micro Analytical Balance	1 set	2-47-A	BTM-75
	Table for Semi-Micro Analytical Balance	3 sets	2-47-B	BTM-75 Special
72	Stop Watch	15 sets	2-41	S-025
73	Personal Computer (Thai/English)	10 sets	8-2-A	IBM System/2, Model 8530/F31
	Personal Computer	5 sets	8-2-B	Dyna Book J-3100GS001
74	Personal Computer OHP System	1 set	8-2-D	5090
	Over-Head Projector	5 sets	8-7	HP-A305LV
	Slide Projector	5 sets	8-8	OMNIGRAPHIC 253
75	Camera	1 set	8-12-A	F-801AF
	Under Water Camera	1 set	8-12-B	NIKONOS-V
	Camera (35mm Auto-Type)	2 sets	8-12-C	FM-2
76	Printing Machine	1 set	8-15	4150
77	Binding Machine	1 set	8-16	c-450
78	Micro Bus	1 set	8-17-A	BB21R-MDR
	Station Wagon	1 set	8-17-B	RX72RG-XWMNS
	Land Cruiser for Trailer	2 sets	8-17-C	HZJ80R-GCMNS
	Trailer, aluminum truck van	2 sets	8-17-D	Special
79	Grass Cutter	3 sets	8-19	KF84-G20
80	D.P.E. Set	1 set	8-24	C-6700L & Other
81	Drafting Set	4 sets	8-25	AP-3 & Other
82	Bottle Cabinet	2 sets	7-8	BCB-5
83	FT-IR Spectrophotometer	1 set	1-4	FTIR-8101M
	Infrared Spectrophotometer (FTIR)	1 set	1-4-B	FTIR-8101
	Single Beam UV/VIS Spectrophotometer	5 sets	1-5-A(1)	U-1100
	Double Monochrome UV/VIS Spectrophotometer	1 set	1-5-B	UV-2201
	Double Monochrome UV/VIS Spectrophotometer	2 sets	1-5-C (1)	U-3210
			1-5-C (2)	
	Flourescence Spectrophotometer	1 set	1-6-A	RF-5000
83	ECD Gas Chromatograph	4 sets	1-9-A(1)	GC-12APE (2)

No.	Instrument	Quntity	Code No.	Model No.
			1-9-A(2)	GC-12APE (2)
	ECD/ECD Gas Chromatograph	1 set	1-8-A2	GC-14APEE
	ECD Gas Chromatograph (Varine)	1 set	1-9-A3	3600
	FID/FPD Gas Chromatograph	3 sets	1-9-C1	GC-12APFFP (1)
			1-9-C2	-2
	FID/FTD Gas Chromatograph		1-9-E	GC-12APFFT (2)
	Capilary Gas Chromatograph	1 set	1-10	GCMS-QP2000A
	High Performance Liquid Chromatograph	2 sets	1-11	LC-9A (2)
	Ion Chromatograph	1 set	1-12	L-6000
84	Auto Analyzer	1 set	1-13-A	Continuous Flow Analysis System and Equipment
85	CHON Analyzer	1 set	1-15	MT-3E
86	Thin Layer Chromato-scanner	1 set	1-17-A	CS-9000
	Thin Layer Developper	15 sets	1-17-B	HPS-204
	Spray Chmber for Thin Layer Chromatograph	1 set	7-12	SP-600
87	GM Survey Meter	1 set	1-18	TGS-121
88	NaI-Tl Scintillation Counter	1 set	1-19	TCS-151
		2 sets	1-20-A	HI-8114
			1-20-B	N-8M
			1-20-C	HM-50AT
89	Microscope	6 sets	1-23-A	Y2B-11
	Microscope (High Performance)	1 set	1-23-B	X2F-31
90	1 ch Recorder	2 sets	1-24-A	R-61
91	X-Y Recorder	2 sets	1-24-B	RW-201T
92	2 ch Recorder	5 sets	1-24-C	TR-250-2P
93	TOC Analyzer	2 sets	3-1	TOC-500
94	Hand Type DO Meter	5 sets	3-3-A	DO-2
	DO Meter	5 sets	3-3-B	DO-8F
95	Total Nitrogen Analyzer	1 set	3-4	TN-201
96	Total Phosphorus Analyzer	1 set	3-5	PHS-301
97	Tintmeter	1 set	3-6	371-AF900ES
98	Turbidity Meter	4 sets	3-7	PC-06-10
99	Handy Type Conuctivity/Temperature Meter	4 sets	3-8-A	CM-11P
100	Conductivity Meter	3 sets	3-8-B	CM-40S

No.	Instrument	Quntity	Code No.	Model No.
101	Salinity Meter	1 set	3-9	SAT-2A
102	Water Sample	7 sets	3-10	S3-8708
103	Autometic Water Sample	1 set	3-11	702
104	EXMAN Berge Grab Sampler	6 sets	3-14	5141A
105	Plankton Net	6 sets	3-14-A	5502
106	Core Sampler	2 sets	3-15	5166
107	Water Velocity Meter	3 sets	3-15-A	5377-A
108	deep meter	2 sets	3-16	TDM-9000
109	Jar Tester	1 set	3-17	JR-12
110	Automatic Dispenser	2 sets	3-18-(1)	DL-1
			3-18-(2)	E-665-8+E552-10B
111	Colony Counter	3 sets	3-19	CC-04
112	254 nm UV-Light	2 sets	3-23-A	UVG-54
	360 nm UV-Light	1 set	3-23-B	UVL-56
113	Table Type Gas Stove	15 sets	3-14	LC-1000
114	Brush Washer	6 sets	3-27	W-1
115	Handy Type Water Analysis Kit	4 sets	3-28	No.5
116	pH Colorimeter	4 sets	3-29	A
117	Microorganism Collector Unit	3 sets	3-30	STU-6G
118	Sextant	1 set	3-31	MS-833
119	Handy Type Oxygen Meter	1 set	4-37	OMA-3A
120	Portable HC/CO Analyzer for Exhaust Gas	3 sets	4-38	RI-503AD
121	Portable Automatic SOx Analyzer for Stack	1 set	4-39	EIR-500S
122	Portable Automatic NOx Analyzer for Stack	1 set	4-40	NOA-305A
123	Tacho-Dwell Tester	3 sets	4-41	DACS-010-2A
124	High Speed Homogenizer	3 sets	7-5	BM-2
125	Solventness sampler injection equipment	2		
126	Blender	3 sets	7-6	VA-3300M
127	Bottle Cabinet	2 sets	7-8	BCB-5
128	All Glass Solvent Refine Unit	3 sets	7-9	HP-1000B
	Soxhlet Extractor	1 lot	7-10	4202/WB-6S/A-1270/WB-1S
129	Spirits Oil Extraction Unit	1 lot	7-11	4341-011
130	Acid Agent Distillation Unit	1 set	7-15	Special
131	Lathe	1 set	9-1	TSL-5500

No.	Instrument	Quntity	Code No.	Model No.
132	Grinding Machine	1 set	9-3	GBK-2
133	ARC Welder	2 sets	9-5	AT-SS250
134	Shearing Machine	1 set	9-6	B-1000
	Drilling Machine	1 set	9-10	B13
	Hand Drill	1 set	9-16	D-10C/PR-25B
	Power Hacksaw	1 set	9-11	Kilser-180
	Circular Saw	1 set	9-14 (1)	C-6
	Power Planer	1 set	9-14 (2)	P-40
	Pipe Threading Machine	1 set	9-15	80AOX
135	Tool Set	1 set	9-19	CU-601/TC-3000
136	Working Bench	2 sets	9-21	UT-C-IV-S
140	personal computer	30 set		
141	ICP/MS	1 set		
142	Deep Freezer	1 set		
143	Vacuum meter	1 set		
144	Electron Microscope	1 set		
145	CO2 Analysis	1 set		
146	O2 meter	1 set		
147	Water sampler	1 set		
148	Ultrasonic bath	1 set		
149	Gas Chromatograph	1 set		
150	Subboiling	1 set		
151	Handy Type Slinity/Condutivity/temp. Meter	1 set		
152	Water Quality Checker	1 set		
153	Water Distillation Unit	1 set		
154	Portable Gas Chromatorgraph 311	1 set		
155	Soil Probing Unit	1 set		

Annex 9 : Training Courses (1998-2000)

Year	Training Course
1998	1. Public Participation (1) 2. Coastal Resource Management 3. Environmental Economics 4. Environmental Monitoring 5. GIS and Natural Resource Management 6. Water Quality Analysis for Food Industries 7. Wastewater Treatment Technology 8. Environmental Law 9. Public Participation (2) 10. Solid Waste Management 11. Noise Pollution 12. Water and Wastewater Analysis 13. Environmental Impact Assessment 14. Emergency Response Plan 15. Public Awareness
1999	1. Environmental Law 2. Natural Resource Management 3. Public Participation 4. Environmental Education 5. Environmental Awareness 6. Air Quality Management 7. Solid Waste Management 8. Wastewater Treatment Technology 9. Water and Wastewater Analysis 10. Environmental Impact Assessment
2000	1. Industrial Waste Management 2. Water Pollution Management 3. Environmental Economic 4. Environmental Impact Assessment 5. Environmental Education 6. GIS and natural resource management 7. Biodiversity 8. Emergency Response Plan 9. Water Quality Monitoring 10. Hazardous Waste Management 11. Environmental Conflict and Management 12. Local administration

- Please describe the contents of new course which you expect to be implemented in Saitama prefecture.

The contents of new course will be discussed with the Mission from Saitama

THE NUMBER OF PARTICIPANTS FOR TRAINING COURSES 1992 - 1999

YEAR	CENTRAL GOVERN	LOCAL GOVERN	PRIVATE SECTOR	EDUCATED INSTITUTE	OTHERS	TOTAL
1992	39	20	22	-	-	81
1993	119	227	38	60	-	444
1994	129	212	51	95	-	487
1995	105	171	88	133	-	497
1996	110	168	78	100	-	456
1997	196	159	164	59	16	594
1998	149	91	116	118	38	512
1999	107	108	53	119	-	387
TOTAL	954	1,156	610	684	54	3,458

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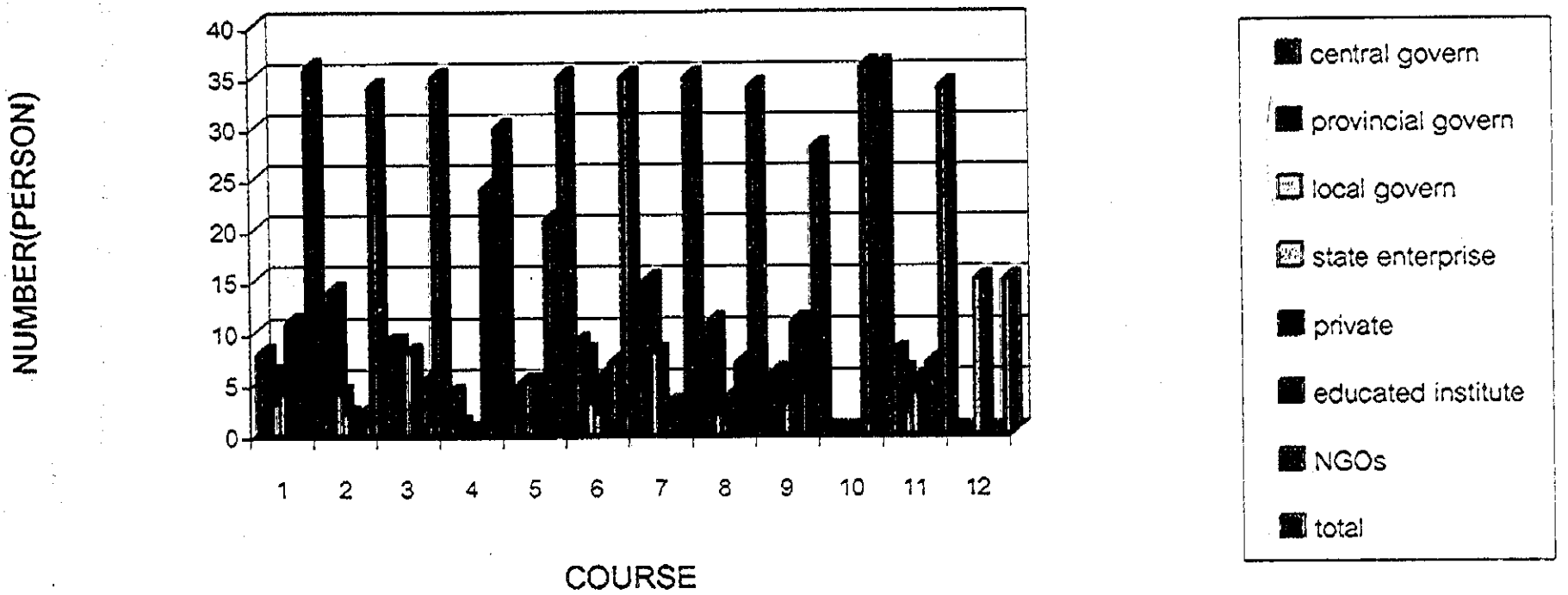
Training Courses Fiscal Year 1999

COURSES	PARTICIPANTS	DAYS	DURATION
1. Environmental Law	36	5	18-22 January 1999
2. Environmental Management Planning	34	5	15-19 February 1999
3. Public Participation	35	5	8-12 March 1999
4. Environmental Education	30	5	22-26 March 1999
5. Environmental Awareness	35	5	10-14 May 1999
6. Air Quality Management	35	5	24-28 May 1999
7. Solid Waste Management	35	5	7-11 June 1999
8. Waste Water Treatment Technology	34	5	21-25 June 1999
9. Water and Waste Water Analysis	28	5	19-23 July 1999
10. Hazardous Waste Management	36	4	17-20 August 1999
11. Environmental Impact Assessment	34	5	23-27 August 1999
12. Solid Waste Management	15	5	6-9 September 1999
TOTAL	387	58	-

Plant 2/งบประมาณ 42 น.3

NUMBER OF PARTICIPANTS IN FISCAL YEAR 1999



(エ) 工業省 (MOI) Questionnaire

For the Preliminary Study for the Country Focused Training Course

to The Ministry of Industry (MOI)

(1) Environment –related Field

Please describe the current environmental issues and their countermeasures, especially environmental pollution in the industrial area.

The current environmental issues in Thailand is that various problems resulting from sharp economic growth in the past decade. Such problems include water and air pollution caused by industrial activities, and air pollution caused by heavy traffic. The main air pollutant in Bangkok is dust which come from traffic and construction, industries are the second pollution source.

Industries are required to comply with

- Air emission standards as stipulated in Announcement of MOI no.2 (AD.1993), no.9 (AD.1995), no.3 (AD 1996)
- Effluent discharge standards as stipulated in Announcem of MOI no.2 (AD 1996).
- Management of hazardous and non-hazardous wastes as stipulated in Announcement of MOI no.6 (AD 1997). no.1 (AD 1998), respectively

(2) Policy

Please describe the policy and strategy in the environmental field in MOI

-Industrial pollution control policy has shifted from command and control approaches to the principle of prevention, emphasizing waste reduction at source, through the application of clean technology.

-Development of Economic Instruments for industrial environmental management

-Decentralize industrial growth by relocation of industries to industrial estate in rural area by providing infrastructure

-On line monitoring installation to ensure compliance for wastes discharge

-Encourage industrial sector to comply with ISO 14000. Applying these standards enables industries to ensure that production has minimum impact on environment and resources have been used discreetly

(3) Jurisdiction

Please describe the juridsiction to which the environmental field of MOI is subject, and explain the problems in the jurisdiction, if any.

Any person failing to comply with ministerial rules prescribed or announcement of the Minister prescribed shall be subject to a fine or an imprisonment or both according to Factory Act BE. 2535 (1992年)

Please explain the current situation of cooperation with other environment-related ministries and governmental organization.

Representative from environmental related ministries/departments come together to set Announcement of Ministry or industrial environment guideline.

(4) Local Branch Offices

Please note the names of local branch offices under MOI and their assignments for the environmental preservation.

Local branch offices under MOI

1. Provincial Industrial Office of each provinces approve industrial site suitability and waste treatment facility before issuance of a permit. When there are extreme pollution cases, Provincial Industrial Office will pass the cases to central authority.
2. Regional industrial environment laboratory in north, south, east, west, north-east.
   Each regional center has responsibility to analysis industrial wastes in the region.

(5) Human Resources Development

Does MOI have any human resources development plan for the staff members in the field of environmental conservation at headquarter, local branch offices, and other environment related research institutions under MOI? If MOI has been carrying out any plans, please explain the contents of them in detail.

Yes, MOI does.

Human resource development plan in MOI

1. Disseminate environmental information through the curriculum of various training programs
2. Exchange up to date technology with other countries
3. Establish environmental information system, including development of capacity of personnel to handle environmental database

Does MOI recognize the training needs in the field of research study analysis training and monitoring for the environmental pollutants? If so, please explain the strategy on the staff training.

Yes, MOI does.

MOI cooperate with University or. Environmental institute to arrange training course for MOI staff

(6) **Research and Analysis Institutions in the Field of Environment**

Please give us the following information.

Names of the environmental research analysis training and monitoring institutions with the names of industrial area

Industrial Environmental Management Bureau

Budget organization chart (please attach herewith), numbers of the staff members is each section and academic carect and degree of the staff members.

Organization chart of Industrial Environmental Management Bureau attach herewith.

Total numbers of staff of Indostrial Environmental Management Bureau are 83. Most of the staff are engineers and scientists.

Strategy of human resources development and its present situation.

Cooperate with University or environmental institute to arrange training course for staff

Training needs of the staff members in the field or research study analysis training and monitoring for the environmental pollutants.

Clean technology

Toxic waste recycle/reuse

Industrial waste management

(7) **An Ongoing Plan of the Country Focused Training Course in "Survey Method for Environmental Pollutants for Thailand" in F.Y. 2000**

Please explain your interest or suggestions on the country focused training course scheduled in F.Y. 2000

The country focused training course scheduled in F.Y. 2000 are

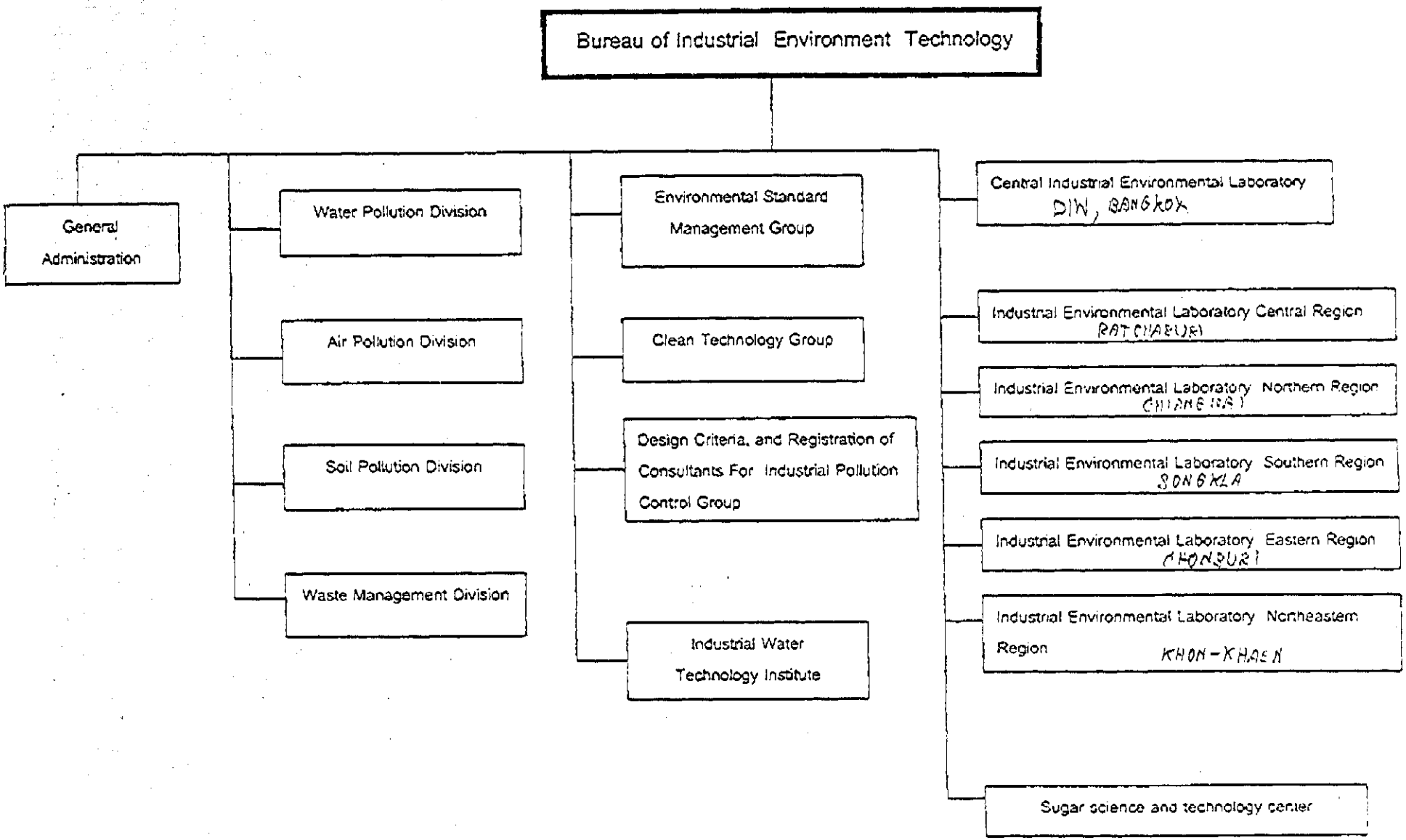
1. Toxic wastes recycle technology
2. Clean Technology for each factory type
3. Industrial waste management

(8) **Related Information**

If MOI has any information on environmental institutions for the environmental pollutants in the private sector, please provide them to us.

Thailand Environment Institute

(Federation of Thai Industrial Institute と NGOs)


Bureau of Industrial Environment Technology
General Administration
Water Pollution Division
Air Pollution Division
Soil Pollution Division
Waste Management Division
Environmental Standard Management Group
Clean Technology Group
Design Criteria, and Registration of Consultants For Industrial Pollution Control Group
Industrial Water Technology Institute
Central Industrial Environmental Laboratory DIW, BANGKOK
Industrial Environmental Laboratory Central Region RATCHABURI
Industrial Environmental Laboratory Northern Region CHIANGMAI
Industrial Environmental Laboratory Southern Region SONGKLA
Industrial Environmental Laboratory Eastern Region CHONBURI
Industrial Environmental Laboratory Northeastern Region KHON-KHAEN
Sugar science and technology center

(オ) バンコク首都圏庁 (BMA)

Questionnaire (Department of Public Cleansing)

for the Preliminary Study for the Country Focused Training Course to Bangkok Metropolitan Administration (BMA)

1. Administration

-Budget

Budget in Fiscal Year 1999 was Baht. 1,441,218,500
(Please look for more information in the attachment)

-an organization chart

(Please look for more information in the attachment)

-number of the staff member in each section,

(Please look for more information in the attachment)

-academic career and degree of staff member,(especially in the environment related section.

(Please look for more information in the attachment)

2. Environmental -related Field

-Environmental pollution and countermeasure

-

-Monitoring on the air and water pollutants

-

-Waste management

*Public Cleansing Department has the power, duties and responsibilities are in charge of planning, control , and implement mainly related to public cleanliness, solid waste and nightsoil management including provision and maintenance temporary toilet and nightsoil mobile car.

-Domestic effluent

-

3. Policy

-Policy, strategy, rule and regulations on the environmental preservation.

Public Cleansing Department, Bangkok Metropolitan Administration has a policy to enhance the efficiency of solid waste and nightsoil management in collection, transportation, and disposal , as well as completing the solid waste sorting daily. Through introducing sophisticated technologies, the power extracted from the solid waste disposal could be utilized for electric generation, and household hazardous wastes could be sorted out, collected, and eliminated from general solid waste, The personnel would be educated and developed in both cleaning, and process flow comprehensive efficiencies. Solid waste minimization

would be promoted through all kind of campaigns, and public relation, encouraging the public to sort the solid wastes, and recycle the left-over material, as well as, encouraging the private sectors to participate in solid waste management in order to prevent the environmental, and public hygienic impacts.

- Present situation of the environmental management planning.

Environmental management plan, related to solid waste and nightsoil management consists of 5 plans, as specified in the 5th year Bangkok Development Plan 1997-2001 as bellows:

1. Encouragement plan for solid waste quantity minimization
2. Efficiency improvement plan for waste collection
3. Efficiency enhancement plan for waste disposal
4 Efficiency improvement plan for nightsoil disposal elimination
5. Encouragement plan for solid waste management

-Tests and survey which will be required in the future to implement the environmental preservation plan.

Public Cleansing Department , Bangkok Metropolitan Administration has a demand for an action plan to undertake the solid waste elimination efficiently, and economically, in order to maintain the environmental quality of Bangkok, and public hygiene. Solid waste management would be developed continuously, so that collection, transportation, and disposal systems would be sophisticated, and not affect adversely to the public and ecological system, and land resources utilization, Bangkok Metropolitan Administration would allow the public to participate in improvement solid waste management, as much as possible.

-Methods of dealing with the complaints from the community people.

Public Cleansing Department, Bangkok Metropolitan Administration will perform a survey, and inspection by assigning the concerned officials to collect data based on geographical responsibility. After acquiring data and information, Public Cleansing Department will explain and clarify the complaints as well as recommending , and resolving the problems.

-Limit of the rule and regulation in your local government.

- Lack of rule and regulation enforcement
- Rule and regulation do not be in line with main law ,and outdated due to lack of modernization

4. Human Resources Development

- Does your BMA have any human resources development plan for the staff member? If so, please explain the contents of them with the present situation, problems and the program in future

Public Cleansing Department, Bangkok Metropolitan Administration currently has a human resources development plan as follows:

- Arrangement of environmental technical training, and seminars to personnel
- Developing the organization by arrangement of seminars to personnel within and between the organizations
-Sending personnel for visual education both domestically and internationally.

-Does BMA(Public Cleansing Department) recognize the training needs for the staff members in the field of research, study, analysis, training and monitoring for environmental pollutants? If so, please explain the strategy on the staff straining.

Public Cleansing Department, Bangkok Metropolitan Administration provides training to personnel according to their preference and demand through questionnaire.

5. Research and Analytical Institutes in the Field of Environment in BMA

-Names of the environmental research, analysis, training, and monitoring institutions.

Public Cleansing Department, Bangkok Metropolitan Administration does not have a direct responsible unit or institute to perform the tasks of environmental research, analyzing, training, and inspection (solid waste, nightsoil disposal, and hazardous wastes.) Nevertheless, Public Cleansing Department, through the research unit of Technical and Planning division, has a responsibility to study, and find out the solutions, and improve the solid waste collection and elimination systems , as well as solid waste transferring and nightsoil disposal elimination. Through analyzing the information of solid waste collection and elimination servicing, incorporate with the analytical study of scientific operations about the solid wastes, organic fertilizers, water quality, other surrounding factors at the place of solid waste elimination, as well as the research, expenses, investment, operation of other systems, comparison study, and improvement recommendations are made possible to develop the system of solid waste management, and nightsoil disposal properly and efficiency.

Budget, an organization chart(please describe herewith), number of the staff members in each section, academic career and degree of the staff member.

1. The budget of Public Cleansing Department in Fiscal Year 1999 was Baht 1,441,218,500.

2. Public cleansing Department (Total staffs 429 persons)
2.1 Office of secretary (Total staffs 50 persons)
- Administrative Assistant Section
- General Administration Section
- Personal Sub-division
- Finance Sub-division
- Public Relation Sub-division

2.2 Public Cleansing Service(Total staffs 50 persons)
-General Administration Section
-Solid Waste Collection Sub-division
-Rive and Canal Solid Waste Collection
-Vehicle and Mechanical Sub-division

2.3 Nightsoil Control Division(Total staffs 113 persons)
-General Administration Section
-Nightsoil Collection Sub-division
-Nightsoil Disposal Sub-division

2.4 Solid waste disposal division(Total staffs 141 persons)
-General Administration Section
-Engineering Sub-division
-Onnut Solid Waste Disposal Plant Sub-division
-Nong Khaem Solid Waste Disposal Plant Sub-division
-Solid Waste transfer & Landfill station sub-division

2.5 Technical & Planning Division (Total Staffs 40 persons)
- General Administration Section
- Planning Sub-division
- Research Sub-division

-Names or types equipment for chemical and data analysis, monitoring for environmental pollutants in the institutions.

1. Hydrogenchloride Analyzer
2. Bomb Calorific meter
3 Burner /to find Volatile Solid/Combustible ash
4 Oven to find moisture content
5 Crusher
6 Water analysis equipment in terms of finding BOD, COD, Total Solid, Suspended solid/Turbidity value.

-Results and problems of the environmental research, analysis, training, and monitoring for environmental pollutants.

The Department of Public Cleansing has carried out the research on quantity of some kinds of hazardous waste from households and retail stores in Bangkok Metropolis in 1992. The result of the research bring in the conclusion that the ratio of hazardous waste compare to the total municipal waste was 0.29(by weight)
Problem faced by the research

- People felt confusing about what the hazardous waste is, and how to sort it out by categories.
- The majority of the target group was the employee, maid, who had low education. Therefore, it was necessary for the researcher to keep contact and explain them clearly.
- The research required the continuous public relation in order to alert for people participation and proper practice.

-Strategy of human resources development and it's present situation.

Arrangement seminar training course in terms of solid waste management to the personnel.

-Training needs for your staff in the field of research, study, analysis, training and monitoring for environmental pollutants.

1 Waste minimization
2 Handling of Hazardous waste
3 Use of waste as a source of energy
4 Lab Analysis

6. An On Going Plan for the Country Focused Training Course in "Survey Method for Environmental Pollutants for Thailand" in F.Y. 2000

-Please explain your interests and comment on the country focused training course scheduled in F.Y. 2000

*Public cleansing department ,local government is interested in training Program B because it would be useful to be implemented in terms of waste management. However, if local government can attend to join training program A: so that local government can obtain more practical knowledge.

-Please describe the contents of the course which you expect to be implemented in Saitama prefecture

* Insufficient detail to comment on Saitama prefecture.

Questionnaire (Department of Health)

for the preliminary study for the country focused training

course to Bangkok Metropolitan Administration (BMA)

It would be greatly appreciated if you Kindly answer the following of questions.

1. Administration

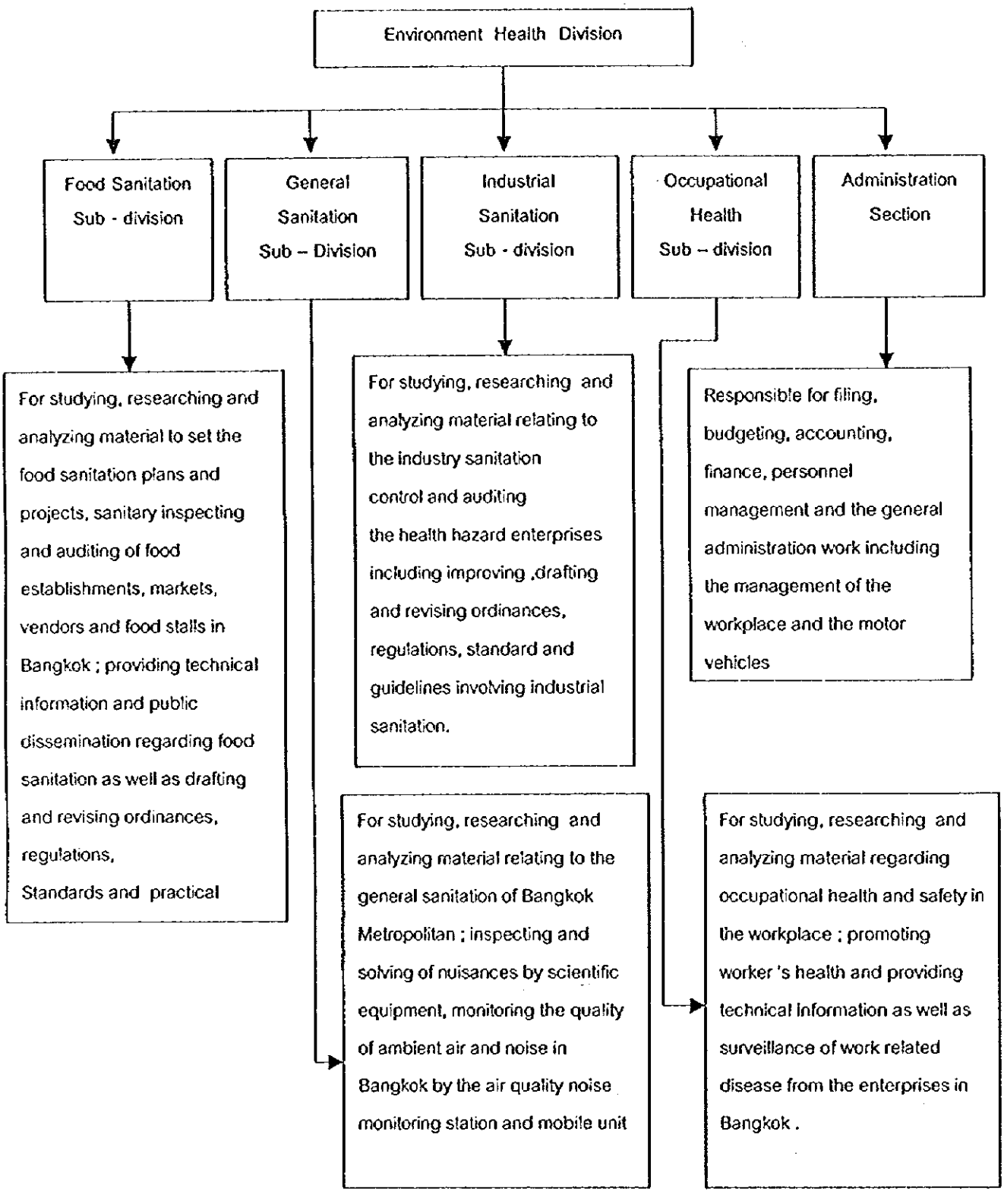
please give us the following information ;

-Budget an organization chart (please attach here with), member of the staff member in each section , academic career and degree of staff. Member, especially in the environment -related section.

Budget chart of the Environmental Health division by category of expenditure, 2000

Budged Category	Amount , Baht
1.salaries and permanent employees' wages	8,520,400
2.compensation, use and materials	1,593,400
3.public utilities	68,800
4.equipment,landand construction	50,627,800
5.miscellaneous	11,731,600
-food project=7	5,174,400
-environmental pollution project=4	6,557,200

Organization chart of the Environmental health Division, BMA



-method of dealing with the complaints from the community people.

According to the Public Health Act B.E. 2535, BMA has been authorized to inspect complaints from the community. Sometime, BMA 's staff inspect complaints by using scientific equipment such as sound level meter, particulate sampler , toxic gas and vapor analyzer, etc. The results of measurement are used to determine whether it is compliant. If so, BMA' official order to person who cause of such nuisance to abate prevent the nuisance.

-Limited of the rule and regulation in your local government.

The main regulations that BMA is currently implementing is the Public Health Act B.E 2535 ,which authorize local government to issue local provisions. However, BMA 's ordinance is still out of data and proposed ordinance has not been (authorized) by the Bangkok Assembly.

4. Human Resources Development.

-Does your BMA have any human resources development plan for the staff members ? it so , please explain the contents of them with the present situation, problems and the program in future.

None.

-Does BMA recognize the training need for the staff member in the field of research, study, analysis, training and monitoring for environmental pollutants ? if so please explain the strategy on the staff training.

Yes, BMA recognize the need for developing capability of BMA 's staff members in the field of analysis, measurement, training and monitoring for environmental pollutants. BMA has organized short course training (1-2 days) on environmental field, however, it is still insufficient for BMA' s staff. They request additional training course. As a result of budget limitation, BMA is not able to provide them. With those course.

5.Research and analytical institutes in the field of environment in BMA.

Please give us following in formation.

-Names of the environmental research, analysis, training and monitoring institutions.

Grease-trapping efficiency of grease trap, Effluent quality from grease trap in food establishments.

-Budget, an organization chart (please describe here with) , number of the staff members in each section, academic career and degree of the staff member.

1. Budget of organization about research B.E 2541-42 =768,000 baht.

2.Nember of the staff members in each section, academic career and degree of the staff member of Environment Health Division Following ;

Food Sanitation sub-division

- Sanitary Scientist 10 officials;

Bachelor of science { B.Sc.} (Public Health) major sanitary science=7

B.Sc. (Health Education)=1

B.Sc. (Nursing)=1

MTH.(Tropical Health)=1

General Sanitation sub-division

-Sanitary Scientist 7 officials ;

B.Sc.(Public Health) major sanitary science=6

Master of Science {M.S} (Environmental Technology)=1

Industrial Sanitation sub-division

-Sanitary Scientist 8 officials;

B.Sc.(Public Health) major sanitary science=1

Bachelor of Public Health = 2

M.Eng.(Environmental Engineering)=1

M.s.(Industrial Hygience)=1

M.Sc.(Environmental Pollution)=1

M.A.(บริหารรัฐกิจ)=1

Occupational Health sub-division

-Sanitary Scientist 4 officials;

B.Sc.(Public Health) major sanitary science=1

B.Sc.(Sanitary science)=1

B.Sc.(Public Health) major occupational health and safty=1

M.S.(Environmental Technology)=1

-Health Promotion Researcher 1 official ;

The graduate diploma in Public Health(Occupational Health Nursing)=1

-Names or types equipment for chemical and data analysis ,monitoring for environmental pollutants in the institutions.

Gas Chromatography, portable Gas Chromatography , Toxic Vapor Analyzer, Sound Level Meter , etc.

-Results and problems of the environmental research , analysis, training, and monitoring for environmental pollutants.

Nuisance standards have never been established by any related government organization. BMA' s staffs do not have enough knowledge ,skill and expertise on the data analysis and the use of scientific equipment..

-Strategy of human resources development and its present situation .

None.

-Training needs for your staff in the field of research , study , analysis, training and monitoring for environmental pollutants.

BMA in actively interested in attending environmental training courses on;

-Indoor Air Quality

-Industrial Air Sampling and Analysis

-Noise Management

-Chemicals Leakage Monitoring

-Measurement based on Gas Chromatography

-Ambient Air Monitoring and Management

-wastewater Treatment

-Nuisance Abatement and Control

-Environmental Redemption

Questionnaire (Department of Policy and Planning)

For the Preliminary Study for the Country Focused Training Course to Bangkok Metropolitan Administration (BMA)

It would be greatly appreciated if you kindly answer the following questions.

(1) Administration

Expenditure a Budget Fiscal Year 2000

1. Work – plan general administration 16,045,600.- baht
2. Work – plan Promotion of administrative system 146,019,400.- baht
3. Work – plan Land development and traffic system 35,259,700.- baht

Academic career and degree of staff members, especially in the environment-related section

No.	Name	Degree of staff
1	Ms. Usa Lertyaso	Bachelor of Arts (Political Sciences) Master of Arts (Political Sciences)
2	Ms. Laong Satichantrakul	Bachelor of Arts (Political Sciences)
3	Ms. Napa Vilaikruad	Bachelor of Arts (Political Sciences)
4	Ms. Namfon Yoodee	Bachelor of Education Subject Business, Bachelor of Arts (Political Sciences)
5	Mr. Kangwan Janprasirt	Bachelor of Science in Plant Production Technology Major Horticulture
6	Ms. Nutvasa Charoen	Bachelor of Education Major Health Education (B.Ed.) Master of Education Major Health Education (M.Ed.)
7	Ms. Yuwadee Ongvanich	Bachelor of Arts (B.A.) in General Management

(3) Policy

(3.1) Policy, Strategy, rule and regulations on the environmental preservation.

1. Green Urban Area :

- Trees (plant trees along our streets)
- Public Park (green commons for recreation)

2. Separation of Wastes :

- Action such reducing wastes by using "4 Rs"

  - Reuse
  - Repair
  - Recycle
  - Reject

And house hold more opportunities to work locally.

- Project on look good, good look of the front of house.
- Limit of time for keeping wastes.
- Separation infectious waste from large and small hospital and also clinics.

3. Pollution Control

- Dust control from construction, vehicle, service places.
- Campaigning Against Air Pollution 1999 Project This project has 13 measures has follows :

1. To set up the checking point and modify the engine service for public.
2. To increase the checking point for black smoke emission.
3. To provide car care handbook for public.
4. To increase the mobile checking point for black smoke emission.
5. To establish the checking point for white smoke and noise from motorcycles.
6. To report air quality in sensitive area.
7. To define No Pollution Free Zone.
8. To renovate road shoulder.
9. To strict on the using of canvas in the construction area.
10. To strict on lorries investigation.
11. To provide campaign posters.
12. To define No Car Zone.
13. To improve petrol oil quality for vehicles.

(3.2) Present situation of the environmental management planning.

Environmental Plan :

The environmental management planning aims at promoting and maintaining the quality of Bangkok's environment and sequel control of pollution of all kinds. The environmental management system is promoted to make it efficient and completely effective. The plan comprises with the following :

1. Work Plan for Development of Environmental Conditions.

- Vacant public spaces are developed into recreation areas.
- To promote more green areas in the development of the public and private sectors.
- Knowledge and laws on environment are disseminated to the general public as well as students in school under the BMA so as to make them aware that they should participate in solving environmental problems.

2. Work Plan for Flood Prevention and Drainage System.

- Flood prevention walls are constructs.
- Suburban low-land is developed for temporary storage of water (The Monkey's Check Project) before discharging it into canals and the sea.
- The news on flood prevention and the irrigation system of the BMA is publicized continually.
- The computer system of the BMA' s center for flood prevention is developed.

3. Work Plan for Waste Water Treatment.

- The quality of waste water from work places and places of services is controlled to ensure that it complies with the standard.
- Work places and newly constructed buildings are encouraged to have common waste water ponds and treat waste water by appropriate technique before discharging at into the public drainage system.
- Public relations programs and campaign are launched to encourage public participation and awareness in the conservation of environmental conditions.

4. Work Plan for Disposal of Garbage, Night Soil and Hazardous Waste.

- A technologically modern garbage disposal system is used so as not to cause pollution to the environment.
- Campaign is made to instill public awareness concerning garbage disposal.
- The transport system of waste is improved.
- Garbage is separated and recycled.
- Hazardous waste is isolated from communities.
- There is service for collection infectious waste from large, small hospital and also clinic.
- Personnel development to carried out for the BMA 's personnel of all levels in the fields of planning, work improvement, operation techniques and technical knowledge in collecting garbage and waste matters.

- Grease is separated from waste matters produced by restaurants.

5. Work Plan for Prevention Solution of Air and Noise Pollution and Vibration.

- Sources of air and noise pollution and vibration are controlled in accordance with the standard.

- Personal development is carried out to make the officials concerned knowledgeable and able to control and conduct examination of air and noise pollution at least once a year.

- Training, seminars and public relations on laws are organized for the personal and business operator of trucks carrying rock, soil, sand and others.

- A coordination center is set up to carry out work concerning the environment in BMA.

(3.3) Tests and survey which will be required in the future to implement the environmental preservation plan.

- Tests and survey of DANCED Environmental Strengthening of Bangkok Metropolitan Administration about Urban Environmental Management, Urban Planning, Public Participation will be required in the future to implement the environmental preservation plan.

(3.4) Methods of dealing with the complaints from the community people.

The BMA has hot line center for receiving complaints from the community people. Methods of dealing with problems are checking, monitoring, modification problems and then report data to hot line center.

(3.5) Limit of the rule and regulation in your local government.

- The law enforcement do not strict and efficient control of pollution.

- The BMA do not have local law to enforce environmental ease.

Questionnaire (Department of Drainage and Sewerage)

For the Preliminary Study for the Country Focused Training Course to

Bangkok Metropolitan Administration (BMA)

It would be greatly appreciated if you kindly answer the following questions.

(1) Administration

Please give us the following information;

- Budget, an organization chart (please attach herewith), number of the staff members in each section, academic career and degree of staff members, especially in the environment-related section.

(2) Environment-related Field

- Please describe the present situation and problems in your BMA on the following matters;
  - Environmental pollution and countermeasure
  - Monitoring on the air and water pollutants
  - ☐ Water pollution in canals and Chao Phraya River have a direct effect for public health and water sourecs.
  - Wastes management
  - ☐ For wastewater management BMA has 6 large scale wastewater treatment projects 7 areas.
  - Domestic effluent
  - ☐ Domestic effluent is the main problem of water quality in canals because the domestic effluent discharg to canals directly.

(3) Policy

- Please describe the following matters.
  - Policy, strategy, rule and regulations on the environmental preserbation.

- Present situation of the environmental management planning.

- Tests and survey which will be required in the future to implement the environments preservation plan.

- Methods of dealing with the complaints from the community people.

- Limit of the rule and regulation in your local government.

(4) Human Resources Development

- Does your BMA have any human resources development plan for the staff members? If so, please explain the contents of them with the present situation, problems and the program in future.

☐ No, BMA don't have any human resources development plan but BMA want development BMA Staff.

- Does BMA recognize the training needs for the staff members in the field of research, study, analysis, training and monitoring for environmental pollutants? If so, please explain the strategy on the staff training.

☐ Yes, BMA need especially wastewater analysis technique and equipments.

(5) Research and Analytical Instituted in the Field of Environment in BMA

Please give us following information.

- Names of the environmental research, analysis, training, and monitoring institutions.

☐ Technical Sub-Division, Water Quality Management Division

- Budget, an organization chart (please describe herewith), number of the staff members in each section, academic career and degree of the staff member.

☐ Technical Sub – Division

- Wastewater Anaiysis Section (17 Staffs.)
- Wastewater Treatment System Development Section (8 Staffs)
- Monitoning Section (12 Staffs.)

- Names or types equipment for chemical and data analysis, monitoring for environmental pollutants in the institutions.

☐ For wastewater momistoring : pH, DO, BOD, SS, N, P , Coliform Bacteris.

☐ Equipment : GC, AA, IC, TOC

- Results and problems of the environmental research, analysis, training, and monitoring for environmental pollutants.

☐ - Low budget.

☐ - Staff don't have experience for equipment svch as GC, IC , AA, TOC

☐ - Textbook

- Strategy of human resources development and its present situation.

- Training needs for your staff in the field of research, study, analysis, training and monitoring for environmental pollutants.

☐ Survey Method.

☐ Wastewater analysis technique and equipments

☐ Wastewater Treatment Plant research.

(6) An On Going Plan for the Country Focused Training Course in "Survey Method for Environmental Pollutants for Thailand" in F.Y.2000

- Please explain your interests and comment on the country focused training course scheduled in F.Y.2000

Survey Method.

☐ Survey Method.

☐ Wastewater analysis technique and equipments

☐ Wastewater Treatment Plant research.

☐ Research, analysis and monitoring for wastewater

☐ Japan

- Please describe the contents of the course which you expect to be implemented in Saitama prefecture.

Survey Method.

- ☐ Survey Method.
- ☐ Wastewater analysis technique and equipments
- ☐ Wastewater Treatment Plant research.
- ☐ Research, analysis for wastewater and Treatment Plant
- ☐ Data Analysis

Thank you very much for your cooperation.

（5）　タイ関係機関に説明した英文コース概要案

An Information of the Country Focused Training Course in "Survey Methods of Environmental Pollutants for Thailand" in F.Y.2000

1. Course Objectives

By the end of the training program, participants are expected to obtain knowledge and techniques of sampling methods, chemical analysis and data analysis to examine environmental pollutants in the air, water and wastes through the practical training using the analyzing equipments.

2. Duration of the Training

3 (three) months for the technical training
Tentatively, the course is scheduled to start in January 2001.

3. Number of Participants

4 (four) – one or two participants will be trained in the field of air, water and wastes respectively.

4. Target Group

- Staff members of ERTC
- Technical staff from the environmental pollutants research institutions under the Government of Thailand　organization（工業省からの指摘）
- Staff members of local government

5. Training Program

The course has two programs according to the target group. Objectives of the each program are as follows;

- **Program A** (see attached paper for detail)
  Target group : Staff members from ERTC and technical staff from environmental pollutants research
  institutions under the Government of Thailand

  (1) To obtain knowledge of planning on the proper field of survey through adequate sampling and screening methods in order to accurately examine environmental pollutants in the air, water and wastes.

  (2) To obtain techniques of advance chemical analysis methods using sophisticated equipment.

  (3) To cultivate the faculty of leading a local government to the appropriate research plan according to the level of their technology.

- **Program B** (See attached paper for detail)
  Target group : Staff members from local government

  (1) To understand the system of laws related to the environmental preservation and wastes deposit and methods of administrative guidance.

  (2) To obtain fundamental knowledge and techniques of sampling and screening methods and chemical analysis.

  (3) to obtain knowledge of chemical analysis using sophisticated equipments, and technique of data analysis.

6. Training Institutions

- Saitama Center for Environmental Science (tentative name)
  Saitama Prefectural Government
- Tokyo International Centre, JICA

7. Accommodation

- Saitama Center for Environmental Science (tentative name)
  Saitama Prefectural Government
- Tokyo International Centre, JICA

Program A

Target Group : Staff members from ERTC, and technical staff from environmental pollutants research institutions under the Government of Thailand.

- First Step : to acquire the sampling methods at site and screening method through simple analysis.
- Second Step : to raise the technical level of chemical analysis using sophisticated equipment and data analysis.

* Participants will be requested to chose one field among air, water and wastes.

1) First Term (two weeks)
   a. An outline of the each analysis course
   b. Test Sampling method
   c. Methods for the environmental monitoring

2) Chemical and Instrumental Analysis (8 weeks)
   * Participants will be requested to chose either course (a) or (b)

   (a) Organic Chemical and Instrumental Analysis Course
   - Sample Pretreatment Methods
   - Measurements based on Gas Chromatography
   - Measurements based on Gas Chromatography / Mass Spectrometry
   - Measurements based on High Performance liquid Chromatography

   (b) Inorganic Chemical and Instrumental Analysis Course
   - Sample Pretreatment Methods
   - Measurements base on Absorption Spectophotometry
   - Measurements based on Atomic Absorption Spectrometry
   - Mercury Analysis by Atomic Absorption Spectrometry (Atomic Vaporized by reduction)
   - Measurements based on Inductively Coupled Plasma Atomic Emission Spectrometry
   - Measurements based on Inductively Coupled Plasma Mass Spectrometry
   - Measurements based on Ion Chromatography

3) Second Term (two weeks)
   a. Data analysis method
   b. Summary of the Course

Program B

Target Group : Staff members from Local government

First Step : to acquire sampling methods at site, and screening method through simple analysis.
Second Step : to learn the basis on chemical analysis using sophisticated equipment and data analysis technique.

1) First Term (6 weeks)
   a. An outline of the fields of air, water and wastes
   b. Test sampling method
   c. Methods for environmental monitoring (including environmental monitoring method using living thing)

2) Chemical and Instrumental Analysis (4 weeks)

   * Participants will be requested to chose either course (a) or (b)

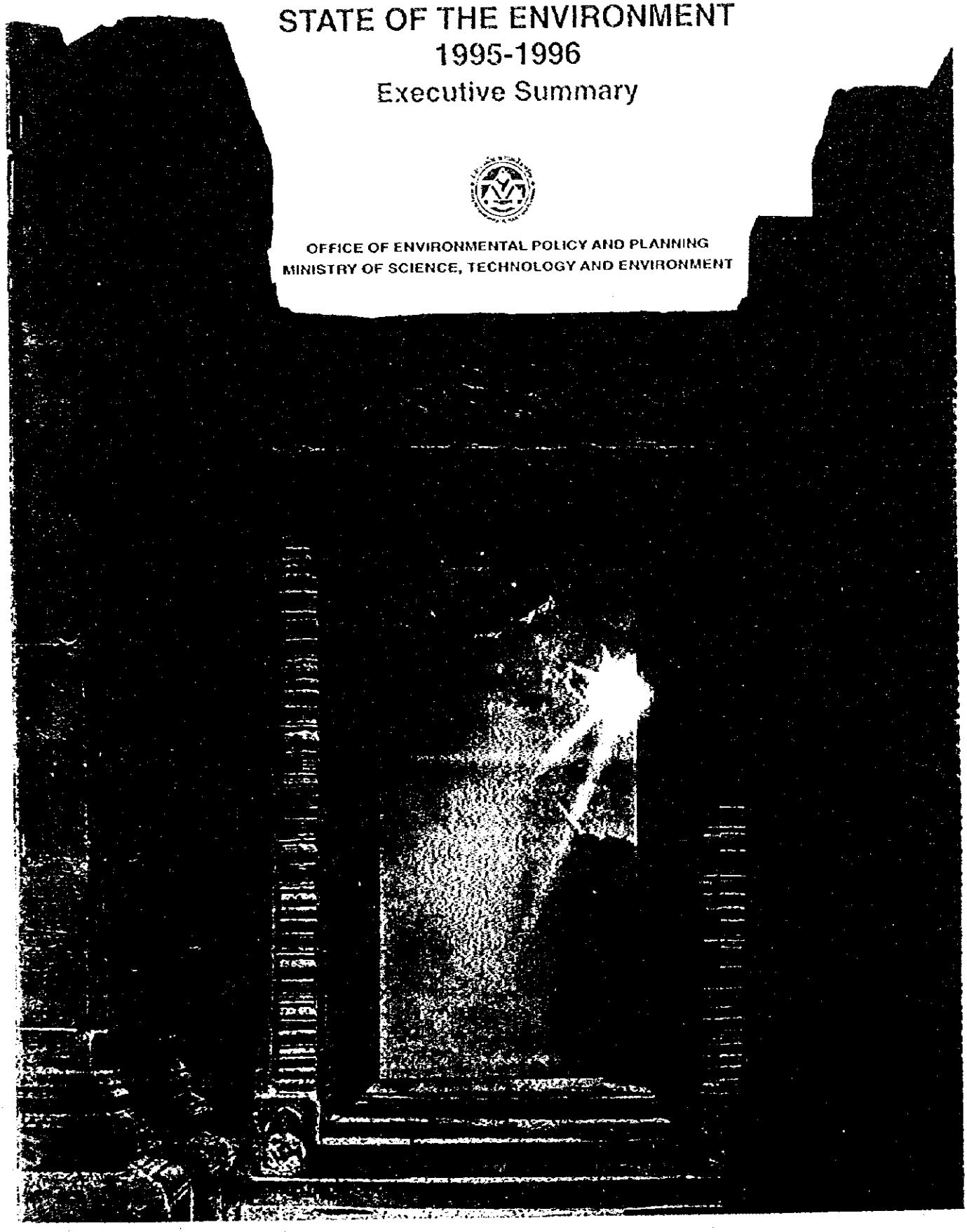
   (a) Organic Chemical and Instrumental Analysis Course
      • Sample Pretreatment Methods
      • Measurements based on Gas Chromatography
      • Measurements based on Gas Chromatography / Mass Spectrometry
      • Measurements based on High Performance Liquid Chromatography

   (b) Inorganic Chemical and Instrumental Analysis Course
      • Sample Pretreatment Methods
      • Measurements base on Absorption Spectophotometry
      • Measurements based on Atomic Absorption Spectrometry
      • Mercury Analysis by Atomic Absorption Spectrometry (Atomic Vaporized by reduction)
      • Measurements based on Inductively Coupled Plasma Atomic Emission Spectrometry
      • Measurements based on Inductively Coupled Plasma Mass Spectrometry
      • Measurements based on Ion Chromatography

3) Second Term (two weeks)
   a. Data analysis method
   b. Summary of the Course

（6） 1995-1996 タイ環境状況報告（最新資料、OEPPより入手）

THAILAND
STATE OF THE ENVIRONMENT
1995-1996
Executive Summary



OFFICE OF ENVIRONMENTAL POLICY AND PLANNING
MINISTRY OF SCIENCE, TECHNOLOGY AND ENVIRONMENT

1.1 Natural Resources

Soil

Soil Erosion

According to the Department of Land Development, the number of areas affected by soil erosion has increased to 134.5 million rai or 42% of the total area of the country. Soil erosion results in land deterioration, making land no longer suitable for agricultural use. Currently, this is a crucial problem. The current level of soil erosion seen in the northeastern, northern, southern, central and eastern part of Thailand, has of 14.71%, 10.29%, 1.87% and 0.69% of the total land area, respectively. In order to overcome this problem, the government has identified measures for land conservation and utilization, for example, by developing land use plans for watershed areas. However, the government should also promote better understanding concerning the importance of land development and efficient use of land.

Soil Salinization in the Northeast

The northeastern part of Thailand, covering a total area of 105 million rai, has about 17% of the total area becoming salinized. The problem is found in 18 provinces, covering 94 districts, and totals 17.8 million rai. The area predisposed to this problem accounts for an additional 19.4 million rai. There are 2 major causes of soil salinization. Natural activity through the process of underground water coming up to the surface. The second cause is generated via human activities. The release of waste water from salt farms on to the neighboring land and deforestation which results in the overflow of salinized water to the nearby area are good examples. The Department of Land Development has initiated a reforestation campaign for planting trees to prevent the expansion of the soil salinization. Additionally, using new technology and the selection of plant species appropriate to the salinized soil condition are also recommended.

Besides, 1.5 million rai of the total land are inappropriate for agricultural use. To sustain those areas, the fast growing trees program in the salinized areas which has already been implemented accounting for 1.25 million rai.

Water Resource

Surface Water

The amount of surface water depends upon the amount of rainfall. According to rainfall statistics during the previous 40 years, the amount of rainfall has been declining. The average rainfall is 800,000 cu.m. annually, however, only 198,880 cu.m. directly contributes to runoff in rivers, canals, dams and reservoirs. Dams and reservoirs store only 19% of the total runoff in the country or 37,740 cu.m which indicates that most of rainfall has lost and in fact, the storage capacity is very limited. Moreover, various activities especially the habits of humans result in extravagant and inefficient use of water, thus contributing to water shortage. As a result, the government has raised public awareness for water conservation and the economical use of water.

Underground Water

Underground water has been withdrawn from all parts of the country to meet an increasing demand for water. The country has a total of 152,510 underground wells. In 1995, 16,286 new wells were dug by government agencies. 117 wells had been located in Bangkok and its peripheral area. Domestic consumption and business operation are the major uses of underground water. These wells in Bangkok and its vicinity can produce 20,464 cu.m. of water per day. With a total of 7,397 existing and new

underground wells, the total water utilization is accounted for 1,789,129 cu.m. a day. Such high demand and consumption have caused critical use of underground water and therefore land subsidence, especially in the Bangkok Metropolitan Area. Consequently, the government has launched some measures to control the use of underground water and has also monitored the level of land subsiding since 1983. These measures have to some extent reduced the rate of land subsidence.

Dams and Reservoirs

The government has developed dams and reservoirs in order to respond to the increasing demand for water. This has resulted in large, medium and small dams and reservoirs being constructed all over the country. Most small-scale dams and reservoirs are prepared for storing water for rural consumption. For the medium and large-scaled dams with high water storage capacity, these are designed for multipurpose supply. Currently, there are 28 large and medium-scale dams with a storage capacity of 66,360 million cu.m. According to the Royal Irrigation Department (1996), the water demand is projected to increase to 70,496 million cu.m. by the year 2006. Therefore, water utilization planning should be established to enhance the balance between water consumption and total water supply. Consequently, awareness of water use must be raised and water recycling should be promoted.

Forest and Wildlife Resources

Forest

According to the latest report of the Royal Forest Department, only 82 million rai of forest remained in Thailand in 1995, this accounted for 25% of the total area of the country. It continues to decline due to forest encroachment. The government has attempted to prevent further encroachment and to preserve forest areas. Legal measure such as the notification of forest conservation zone to be National Parks or Wildlife Sanctuaries is prescribed. In addition, the government has formulated a land use and reforestation plan. Campaigns to promote reforestation were initiated in 1994. By 1996, 1 million rai of tree planting has occurred. Furthermore, the Royal Forest Department has established guidelines to overcome forest resource deterioration through promoting public participation in forest resource conservation, forest rehabilitation and career development for people in rural areas.

Wildlife

Wildlife abundance has been reduced due to deforestation and the destruction of wildlife habitats. Additional causes contributing to the decline of wildlife is the illegal wildlife trade for both domestic and international markets, including wildlife capture for commercial sale or for the compound of indegeneous medicines, or even hunting for entertainment. The government has consequently introduced some measures to protect and conserve wildlife. During 1995-1996, the Royal Forest Department increased the area of wildlife sanctuaries and non hunting areas for wildlife habitat, and improved vigilant program therefore capturing more people committing illegal wildlife activities and violating the Wildlife Conservation and Protection Act 1992. The Royal Forest Department has also introduced measures to control and monitor wildlife business and also breeding programs to nurture endemic and endangered species, including those with the potential for economic benefit. At the present time, there are 17 such breeding centers nationwide.

Situation of Preserved Marine Wildlife

Dugongs

Dugongs have been found along both the Thai Gulf and Andaman coasts. Most of these have been caught or dragged along by seines and other fishing devices. According to the study of the Fisheries Department, the number of dugongs in Thai Water Areas have been reduced

and they might be extirpated from Thai Water Areas soon. The major causes are the reduction in sea grass areas which is their staple food and dugong hunting. Dugong is a slow breeding mammals. Therefore, the government has attempted to preserve them through legal measures according to the Fishery Act 1947. Also, the government has preserved sea grass areas. Activities to encourage people's participation in dugong conservation have also occurred.

Sea Turtles

The number of sea turtles has rapidly reduced due to excessive illegal hunting and capture, because every part of the sea turtle is usable. Besides, there are some other contributing causes which are collecting sea turtle eggs for consumption and commercial sale, destroying their reproduction and resting places, as well as destruction and competition for their food sources. The protection of sea turtles has become a condition for the removal of an international trade ban imposed by the United States. The USA has stopped importing sea shrimps stating that sea turtles have been found in the fishing nets. Thailand, therefore, solved this problem by introducing Turtle Excluder Devices (TED's), to all fishing nets.

Dolphins

Dolphins have become rare and endangered species in Thai Water Areas. The major cause is the direct hunting of dolphins. Also the habitat and food source has been destroyed by human activities and fishing devices. Thailand has started several long term studies on dolphins, particularly the one done by the Danish academic in 1991. After that, Thai academics conducted further research aiming at dolphins conservation. Public awareness concerning dolphin preservation has also been promoted.

Mineral Resource

In 1995, Thailand produced 40 different kinds of mineral, and has issued sea mineral mining licenses for 62 plots totaling 224,208.76 rai and inland mineral licenses to 1,364 plots totaling 279,105.37 rai, which accounts for 0.087% of the total area of the country. The total mineral value reaches 20,947.7 million baht. However, there are still constraints for efficient mineral resource development. These range from the lack of long term development plans, lack of correct geological information, lack of environmental measurements relevant to geological resources, lack of research studies, lack of suitable human resources and lack of public relations knowledge. To mitigate these constraints, the Mineral Resources Department has improved and revised the Mineral Act and introduced regulations, identifying preventive and monitoring measures of the mineral development. Furthermore, the department has also formulated guidelines for environmental management in order to prevent conflict in the use of natural resources, etc.

Energy Resource

During 1995-1996, the demand for energy consumption in Thailand has remained to increase, particularly, the demands for fuel consumption in the transportation sector. As a result, the government has focused on the provision of sufficient energy to meet an increasing domestic demand. At the same time, the government has also identified measures for safe and efficient use of energy. Nevertheless, energy consumption and production has generated many impacts to the environment and the quality of life, with air pollution being the major concern.

Moreover, the government has successfully implemented policies to abolish lead gasoline, reduce sulfur in fuel oil, install sulfur dioxide eliminating system in power generating plants, install steam collecting instrument in gas stations, oil storage and oil trucks, etc. In

addition, the use of substitution energy for electricity generation, including studies and researches regarding the use of least environmental impacts substitution energy are also encouraged.

Coastal Resource

The coastal resource constitutes the coastal sea, seashore and coastal zones, including mangrove, coral reefs and sea grass.

Coastal Sea

According to sea water quality measurement, the quality of sea water along the west coast of the Gulf of Thailand, and the Andaman Sea has generally been in a fair to good condition, except in large communities, industries and sea ports, which the sea water quality is lower than the standard level. These areas are the coastal zone and seashore from Chon Buri Province to Rayong Province.

Seashore and Coastal Areas

By 1995, the coastal area has greatly deteriorated. The major cause is human activities namely tourism expansion, sea port development, construction trespassing on the seashore or sea, extraction of sand from beaches, sea reclamation, oil spills, underground water extraction, and a general lack of environmental concern for the coastal zone. Since the beginning of 1995, there have been 7 times of oil spills taking place along the coastal area of Rayong Province to Chon Buri Province, especially around Maptaphut area. As a result, the government has formulated 2 action plans. These are the action plan for preventing and eliminating water pollution caused by oil and the action plan for prevention and solution to problems occurred by oil spills.

Mangrove

In 1995, there was only 1.0 million rai of mangrove remained in Thailand. The mangrove deterioration has been caused by the encroachment of the mangrove area for residential purposes, salt farms, shrimp farms and industrial operation. Furthermore, reforestation by the government agencies has been proven unsuccessful. In order to allow the regeneration of mangrove areas, the Ministry of Agriculture and Cooperatives terminated all forest concessions in the mangrove area. This action was approved by the Cabinet on the 19th November 1996.

Coral Reefs

In 1995, it was found that the situation of coral reefs had become worse due to a number of human activities. These included waste water and solid waste from coastal communities, extraction of sand from beach, sea reclamation, dynamic fishing, and fishing with destructive devices. Also tourism activities such as sea cruise anchoring along coastal areas, diving, coral reef and sub marine sight seeing, all cause damage. In order to overcome the problem of coral reefs deterioration, and to protect and preserve them, the government has introduced a project for coastal planning and management for the whole country. Raising public awareness regarding coral reefs conservation and coastal resource utilization is also promoted.

Seagrass

Sea grass has continuously declined due to the encroachment of fishing operations within the 3 kilometer coastal zone. Problems have become intensified by waste water from coastal aquaculture, mining operation and tourism activities. This deteriorating coastal resource has further impacts to the coastal ecological system. A lot of marine life has been destroyed and endangered, including dugongs, sea turtles and dolphins, etc. Therefore, the government has introduced legal measures to prohibit some types of fishing devices in the sea grass areas. Furthermore, a survey on the impact of the use of such devices in sea grass conversation area in a Marine National Park, in Trang Province, has been done. Additionally, highly destructive devices have been prohibited in the sea grass zone around Laem Sai to Lo Lo Island, Muk Island, Libong Island and Sukorn Islands, so that the sea grass resource can be preserved and thus aid in the rehabilitation of dugongs.

Marine Fishery Resource

There are 2 characteristics of marine fishery resource problems. Firstly, the deterioration of marine life in Thai Water Areas due to ecological changes and the resulting imbalance imposed by high rate of fishery which exceed the carrying capacity and the renewability of the resources. Secondly, the direct impact caused by the notification of exclusive economic zone of neighboring countries leading to the conflict of water area instrusion and the ambiguity of international laws, policies and practices of neighboring countries. In the past, the government has established Fishery Development Funds and the Thai Sea Recovery Project, including short term and long term measures to assist small scale fishermen by solving oil price problem, pardonning licenses for fishing devices and boats and participating in international meetings with neighboring countries in order to identify additional effective solutions.

1.2 Pollution

Air Pollution

According to air quality measurement in 1995, it was found that the quality of air alongside the road in Bangkok Metropolitan Area (BMA) was more polluted than in the residential areas. Dust is still the main problem. It is reported to exceed the standard level at all stations monitored. Other air pollutants recorded such as carbon monoxide and lead are still under the standard level in all monitoring stations. It is, however, reported that the quality of air in other provinces has not become a serious problem except in some areas like Saraburi Province where dust from rock extraction is a major problem.

Noise Pollution

In 1995, it is reported that the noise level along the roads at all monitoring sites in BMA does not show significantly different but it exceeds the standard level set by the United States Protection Agency (USPA). The noise level is considered to be dangerous for people living in BMA, especially those living in close proximity to transportation routes during traffic congestion, in the business and offices zone. The noise level along the canals is very high, particularly when boats are passing and at rush hour. In other provinces, noise level has occasionally exceeded the standard level in some residential areas and in some industrial areas of certain provinces.

Water Pollution

In 1995, the water quality of the main rivers measurement, namely the Chao Phraya, Tha Chine, Mae Klong, Bangpakong, and those in other regions, were found to be in a deteriorating state and all were below acceptable standards. The DO rate is still low as well as the BOD and the bacterial coliforms load are very high. When compared to the quality of water in the previous year, the trend has not significantly changed. However, the quality of water in the Chao Phraya River in general has become better due to the flood incidence in 1994, diluting the pollution.

Solid Waste and Night Soils

The amount of solid waste produced by communities nationwide in 1995 accounts for 34,000 tons per day, which increased to 36,000 tons per day in 1996. Solid waste produced in the BMA totaled 8,100 tons and the remaining waste is produced by communities within municipalities and sanitary districts nationwide. Almost 100% of the total solid waste produced in the BMA can be collected and disposed. In addition, the BMA has been successful in disposing of 1,000 ton per day by solid waste composting, while solid waste from municipalities

and sanitary districts are also able to be collected more. As a result, the amount of uncollected solid waste has reduced. However, most of the disposal methods are still not hygienic. Therefore, the government has a policy to decentralize administrative and management authority to the province and the local to deal with the solid waste problem by utilizing their own capacity with financial support from the government.

Hazardous Waste

In 1995, the amount of hazardous waste produced nationwide reached 1.5 million tons. Hazardous waste is generated from various sources namely 1.1 million tons from industry which accounts for 73.3% of all hazardous waste produced, 126,150 tons from the commercial and service sectors, 122,400 tons from nursing home and laboratories, 121,950 tons from ports and sea transports, 18,900 tons from households and 10,800 tons from agricultural activities. It is estimated that it has increased 13% from the previous year.

Toxic Substances

During 1995-1996, the amount and value of both organic and non-organic chemicals imported have increased and the tendency is doubling. Problems regarding toxic substances are seen in 2 aspects. The first is the direct impact of toxic substances to people's health. In 1995, more than 3 thousand people nationwide got affected by poisons from pesticides were admitted to state hospitals. Of which about 20-30 people are reported dead. The second is the residue of toxic chemicals in the environment. It is found that there are a lot of residual in many sources, particularly agricultural produces like rice, vegetables and fruit and in natural water resources both underground and surface waters.

1.3 Natural and Cultural Environment

Natural and cultural environment has been continuously destroyed by human activities. These human actions are severe and occurring rapidly when compared to natural destroyed which takes time and happens gradually.

Natural Environment

Chang Island, located at Laem Ngop, Trat Province, is a national park with great ecological value. It is composed of 47 small islands with many beautiful coral reefs and forms the habitat for various species of fish. However, it has currently been faced with the encroachment of shrimp farms, road construction, tourism, sand vacuuming and sea reclamation which all cause danger to the marine life, coral reefs and other ecosystem.

The discovery of dinosaur fossil at Phu Khum Khao, Kalasin Province and Phu Wieng, Khon Kaen Province are considered to be very valuable academic sites. However, the digging system, area management and museum construction for preserving and conserving those dinosaur remains are not yet systematic and to some extent are harmful to the geological evidence.

Petrified wood is a fossilized form of ancient plants. It is believed that the northeastern region is one of the largest sources of Petrified wood in Asia. However, it has been threatened by an illegal trade both for the domestic and international markets. The government has not yet introduced any preventive measures. However, the government of Nakhon Ratchasima Province has now initiated a petrified wood park project.

Cultural Environment

The construction of the five 13-floor buildings and two 7-floor buildings near the culturally sensitive Wat Sutat in Bangkok are generating a bad visual impact, and architectural conflict and greatly reduce the aesthetic value of

the Temple. Therefore, the height of these buildings has to be reduced, and their colors and structure is to be in line with those of the Temple.

The construction of a 2 floor concrete multipurpose building at Rakhang Khositaram Temple is to replace the old wooden building dating back 60 years. However, this action is believed to destroy the beauty and historical values of the temple.

The destruction of cultural heritage in an old town of Nakhon Sithammarat Province has resulted from changes in land use, namely residential construction, transportation infrastructure expansion, inappropriate city planning, and construction of new buildings without considering the design and architecture of those surrounding them. Such development has ruined the aesthetic and historical as well as archeological values of these places.

1.4 The Role of the Public Sector in Natural Resource and Environment Management

Newly Initiated Measures

Problems of environmental management and impacts have involved many relevant agencies from both the public and private sector. As for public management, the government has continuously initiated new measures to respond to changing society and the problem associated with these problems. In 1995, the Ministry of Science, Technology and Environment introduced a draft Announcement regarding the standard of waste water released from land, the pollution control zone announcement in Pathum Thani Province, Nondhaburi Province, Samut Prakarn Province and Nakhon Pathom Province, the establishment of a Committee to solve air pollution in Bangkok and communities in Thailand by the Cabinet, the formulation of an Environmental Quality Promotion and Preservation Policy and Plan 1997-2016. Other measures initiated include the announcement of regulations from the office of the Prime Minister regarding public participation through public hearing 1997, and finally the formulation of the 8th National Economic and Social Development Plan (1997-2001). All these measures are currently being initiated by the government.

International Agreements

As environmental issues become an international, regional and global issue, it is necessary to have international rules and regulations regarding the environment. Thailand, as one of the global members, has participated in many international agreements in order to protect the environment.

During 1995-1996, Thailand ratified the Montreal Protocol (Amendment) at Copenhagen on 1 December 1995 with enforcement to Thailand on 29 February 1995. This agreement aims to reduce and stop the use of CFC, halon and other chemicals which affect the ozone layer. Moreover, Thailand has prepared to ratify some other international agreements, namely Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal 1989, the Biological Diversity Convention 1992 in order to preserve biodiversity and its sustainable use, the Convention on Wetlands of International Importance especially as Waterfowl Habitat for conserving and maximizing use of wetland, and the International Convention on the Prevention of Pollution from Ships 1973/1978 in order to identify criteria and measures for controlling pollution from ships and marine vessels.

2.1 Urban and Rural Environment

Sor Por Kor 4-01 Land Document

The government implemented policy to promote forest conservation for economic and preservative purposes through the National Forest Conservation Act 1964. This act had a direct impact on local people who earned their living from the forest. These people have subsequently been accused of encroaching on national reserved forests as they did not obtain legal land titles and documents. With the Cabinet approval on 4 May 1993, land documents called Sor Por Kor 4-01 has been issued to landless farmers. However, the Ministry of Agriculture and Cooperatives indicated that some people are unqualified by the criteria utilized loopholes in the legislation to obtain such documents. This led to legal conflicts. The government therefore forwarded several cases to the Juridical Committee for legal interpretation on 24th March 1995. With one case which attracted much media attention due to political involvement was further investigated in Phuket Province. The evidence submitted proved that among 481 people who had newly obtained land documents, 18 people were found illegal and therefore had their land documents disqualified. Eventually the cabinet recognized that the land reform policy had not solved the problem of forest encroachment, canceled the policy on 22 August 1995.

Flood Situation 1995 and 1996

In late 1995 and early 1996, Thailand was affected by a spate of severe flooding. This flood crisis, caused numerous damage to people's lives and property. According to an initial survey, the value of this damage is accounted for 11,858.5 and 7,160.7 million baht during 1995 and 1996 respectively. The flood problem has two main causes. The first is derived from the natural environment itself such as monsoons, depressions, typhoons and land subsidence. The other results from inappropriate human management such as ineffective urban planning and development problems, excessive pumping of underground water and a lack of an efficient drainage system. In order to cope with future flood incidences, the government has implemented short and long term measures. Initially, the government has provided fundamental relief for those directly affected by the flood, including temporary dams to reduce water inflow and has introduced measures to increase the outflow to the sea. The long term measures which have been implemented by the government including the Kam Ling Royal Initiated Project. The project aims to increase water outflow at low tide and prevent water backflow at periods of high tide.

Traffic Congestion

Currently, the traffic congestion problem in BMA and several large cities has produced an air pollution. This leads to urban environmental deterioration and a reduction in the quality of peopleís life. One major cause is the continually increasing number of private motorcars. According to the report of the Department of Land Transport, the number of vehicles in 1996 reached 16.1 million, an increase of 2.0 million vehicles from 1995. The problem also arises from a lack of an efficient mass transit system which can cater for the increasing need of the population, lack of effective transportation network, a lack of driving principles and the rampant disregard of traffic rules. Consequently several public agencies have attempted to overcome traffic congestion. Much of this effort has been channeled into infrastructure improvement including the projects of expressway construction, a large mass transit system and road construction and improvement. Moreover the measures to reduce the use of the private motor car, measures to stagger the office hours among public agencies, schools and

commercial banks etc. have been promoted. Additional activities include HOV application, traffic route improvement and strong enforcement to those violating traffic rules.

Green Areas and Urbanization

In 1995, Bangkok with an area of 978,250 rai and 5,405,083 inhabitants, had a green area of 2,501 rai. This is accounted for only 0.25 percent of the total city area or 0.44 rai per 1,000 inhabitants. The rapid expansion of the urban area is achieved at the cost of agricultural land and green areas. There are no attempts to provide public parks in the urban area due to the lack of economic incentives. Therefore, the imbalance between urban expansion and green area provision has increased greatly. In summary the city of Bangkok lacks sufficient public parks for recreational purposes.

Fire Accident in Buildings

In the late 1995 to 1996, a lot of fires had occurred in big department stores, houses and industrial buildings. One particularly dangerous case was caused by the explosion of stored chemicals in an petrochemical plant in Rayong Province. These accidents caused multitude of negative direct and indirect impacts. The major causes for these incidents are the lack of management efficiency and effectiveness concerning civil engineering design, city planning, law and regulation enforcement and the lack of responsibility of all parties involved.

2.2 Public Participation

Elevated Train Project by Metropolitan Rapid Transit Authority (MRTA) and the Bangkok Transit System Cooperation (BTSC)

The development of Mass Transit Projects has resulted from an attempt to overcome traffic congestion. Only two projects are discussed in this report as they include people's participation. These are the Elevated Train project of the Metropolitan Rapid Transit Authority (MRTA) and the second is the Bangkok Transit System Cooperation(BTSC). The MRTA conducted a "public hearing" which ventured to include the requirements of affected people into the project. While the BTSC public participation process has been restricted to addressing problems and obstacles arising due to public protests because of the inaccess to information of the people before project commencement. As a result, non-governmental organizations and representatives of all parties involved, have acted in concert as a prosecutor and have sued the Bangkok Metropolitan Administration and the Bangkok Governor at the civil court. They were charged of not sufficiently declaring basic details and information of the project. As a result, the Bangkok Metropolitan Administration has revealed all the information to the public.

Ban Krua Intersection Expressway Project

The second Phase of Expressway Project is aimed at increasing the traffic carrying capacity of the first phase. One part of the second phase was recommended to include an entrance and an exit at Urupong-Ratjadamri Road, 2.8 kilometers of which would cover parts of the Ban Krua community. As this project was announced, the people in the community demonstrated because they considered Ban Krua as an ancient Islamic community which had situated for over 200 years. In response to the protest, the government initiated people's participation for all interested parties in order to draw up appropriate plans and provide solutions with the least impact to people in this community.

Waste Thermal Power Plant in Chiangmai Province

In 1995, waste produced by the city of Chiangmai has rapidly increased while the collection and disposal system has not been improved. Therefore a waste disposal problem has occurred. To overcome this problem, the Provincial Electricity Authority initiated the project of a 20 Megawatt waste incinerating Power Plant. This project plans to utilize the waste collected from the municipal area

as the main fuel and lignite from Lampoon Province as secondary fuel. The service charges for this project are to be incurred by those municipalities and sanitary districts as to the Polluter Pays Principle. Despite the double benefits of electricity generation and solid waste disposal, the project was strongly opposed by the local people in Hand Dong District, where the project would be located. They asked for more information concerning the project as they were scared of air pollution that the plant might produce. Due to this public opposition, this project was eventually canceled.

Hazardous Waste Treatment Plant in Rayong

As a result of the rapid industrial development in Thailand, there has been a dramatic increase in the amount of hazardous waste generated. In 1996, the volume of hazardous waste produced had reached 1.2 million tons. Most from small and medium scale industries which had no capability for storing or disposing of this waste. Nationwide, there are only two hazardous waste treatment plants, one at Samae Dam and the second in Ratchaburi Province. The Ministry of Industry in partnership with a private company decided to establish a hazardous waste treatment center in Rayong Province. This center was designed to handle hazardous waste generated from industries in the central and eastern regions. This was the first case of direct cooperation between the public and private sectors for a project which benefited the environment. Due to a total lack of dissemination of information to the communities in the area, since the beginning, conflicts have occurred. People of Pluag Daeng felt unconfident and insecure about the methods used and the ability of the company to handle and dispose of the waste safely. The developers, therefore, initiated people's participation in an attempt to waylay their concerns. Nevertheless the protests continued due to the inability of the company to provide clear and concise information and answers regarding the project. Consequently, the government decided to relocate the project to a new site in Mabtapud Industrial Estate, Rayong Province.

The 8th National Economic and Social Development Plan (1997-2001)

The innovative characteristic of the 8th national plan is the focus on human-centered development and the provision of public participation in the formulation of all government plans. This national plan was original in that public participation was involved in its creation. This included brainstorming session for various groups both living in Thailand and abroad, also 15 national seminars were arranged in order to collect opinions and recommendations from both the central and all regional levels. For interested parties who could not attend any of these meetings, they were encouraged to send in their recommendations by mail. This is the first time that people's participation has been involved in the national plan formulation process.

Environment and the Role of Non-Governmental Organizations and Private Sectors

Environment and Non-Governmental Organizations

The Enhancement and Conservation of National Environmental Quality Promotion Act B.E. 2535 recognizes the role of non-governmental organization (NGO) in natural resource and environmental management. This Act provides the right for NGOs directly involving with environmental matters to be eligible to register with the Ministry of Science, Technology and Environment (MOSTE) and therefore to qualify for government support. Up to 1996, there has been 65 registered NGOs. However barriers to the private sectors in dealing with environmental activities still exist. For example, small NGOs working at the grassroots level have not registered yet with the MOSTE, the Environmental Quality Promotion Department of MOSTE is amending the relating ministerial regulations to give them chances to be registered NGOs in order to receive government support.

Environment and the Private Sector

An influential role and great responsibility of the private sector, is the support and promotion of environmental quality by adopting environmentally friendly production processes. This has already been achieved in some ways such as campaigns for better consumer behavior, cooperation with the government sector to support art and cultural conservation, the improvement of production systems that utilize technology which reduces or removes the process impact upon the environment, the investment and installation of energy-saving products, the promotion of recycled products. Currently many private companies accept to take the in environmental factors into account of the production process. However, the investment in environmental business is a new matter which is necessary to create a new market for their products. This entails a certain risk and high cost of investment. Additionally the sector has to show sincerity and social responsibility when dealing with environmental issues rather than just utilizing environmental factors to boost sales via the promotion of a green image. In this respect the government should consider granting support to private sectors that have a true and proven record in environmental protection and conservation.

Environmental Education

Environmental Education is an important instrument in the Enhancement and conservation of the environment of the country. Environmental education is the key to promoting awareness of the ethics of sound and responsible environmental management. This education also enables people to participate in environmental management planning from an informed standpoint. Besides one of the key factors in sound environmental planning is the consideration and inclusion of human resources in the development process. For this reason, the Ministry of Education has incorporated environmental studies into the secondary level curriculum. This has been achieved by initiated new courses, such as; Population and Environment Subject, Energy and Environment Subject, etc. Environmental issues are also incorporated into other aspects of the curricula such as social studies, science subjects, and extra curricular activities. In addition, the Department of Environmental Quality Promotion and other related bodies have promoted environmental activities for environmental studies in schools.

2.3 The Conservation of Cultural Environment

Buddha-Buchar Road Project, Pra-Prathom Pagoda.

This project celebrates Her Majesty the Queen's 60th anniversary and was inaugurated in 1992. The proposal was to construct a road to link Petchakasem highway; the main route to southern Thailand, to the southern extension of Pra-Prathom Pagoda road. The principle objective of this project was overcome traffic congestion in the municipal area, and secondly to provide a new route to the Pra-Prathom Pagoda for sightseers. The project, however, was opposed by Buddhist monks, academics and local people, accusing that further development would be attracted to the area. Their fear was that this additional development would lead to the subsidence of the pagoda and also result in more traffic congestion, more volume of waste and more environmental pollution. Eventually this public opposition resulted in the projects cancellation.

The Improvement of Archaeological Sites : A Case of Pasak River Basin

While the Department of Royal Irrigation was undertaking surveys for a new dam on the Pasak river a large number of important archaeological sites of prehistoric ancient communities were discovered This discovery prompted archaeological work to be initiated by the Fine Arts Department to assess the value of the discoveries and to assess the effects of the dams construction on these sites. The report stated that

construction of the dam would flood the main sites and also lead to deterioration of 18 other historical sites in the vicinity due to raised groundwater levels. As a result of this report, the subcommittee for environmental development and improvement of the Pasak Basin Royal Project has requested the dam project team to develop a strategy which includes planning to preserve the archaeological sites in the Pasak River Basin. The first task of this subcommittee was to divide the survey team into 4 working teams, each team is responsible for different aspect; which are; archaeological sites, anthropology and cultural studies, museums and promotion.

Master Plan for Rattanakosin Area Conservation

A Master Plan for the conservation and development of the Rattanakosin Area focuses on guideline and approach for the conservation of old historic and environment buildings in the area. This project has divided the Rattanakosin area into 3 zones; the inner area, the outer area and the Thonburi area. The project has already developed land use policies for the project areas, including measures for building control, a conservation and development plan for historical and archaeological architecture, guidelines for the conservation and development of the Rattanakosin Area, traffic management plan, an infrastructure and facility management plan, and urban landscaping plan. All these sub-projects have now been initiated.

Old Historic Buildings in Phuket

Phuket town has a number of historic buildings aged at between 80 to 100 years old. Many of these buildings display architectural styles which preserve valuable art and cultural heritage. In addition many of these buildings are famous tourist attractions. The Tourism Authority of Thailand (T.A.T.) therefore has established the area as a cultural tourism site. The area which is located on Thalang road is promoted for building renovation, landscape and infrastructure maintenance, and architectural maintenance. The Fine Arts Department has attempted to have these buildings registered under the Historical Monuments, Antiquities, Fine Arts and Museums Act BE. 2504 and the amendment BE. 2535. However, this registration of the buildings is complicated by the fact that most buildings are under private ownership. Many of these owners are uncooperative and do not wish to have their buildings registered. The Ministry of Science, Technology and Environment (MOSTE) then designated Phuket island as an environmentally protected area, according to the Environmental Act BE 2535 and establish protection plans for their protection. This Ministerial regulations which was notified in 1995 has stated that in the architecturally environmental conservation area, the construction of buildings of more than 12 meters high is prohibited and for new construction sites, 30% of the area has to be provided as free space. Other measures to protect the historic city include the Phuket Ancient City conservation project a collaborative project between the municipality and several international organizations. This project covers the operation and coordination of project development and conservation in the ancient area of Phuket city. This project organization works in collaboration with other relevant organizations such as the administrative sub-committees. However these measures will only be effective if people are aware of the importance of art and the cultural environment and motivated to help in its preservation.

2.4 Invasion to Protected Areas

Khao Sam Roi Yot National Park, Prachuap Khiri Khan Province

Khao Sam Roi Yot National Park is recognized as an important habitat for species preservation and has a variety of intact ecological systems preserved there. One particularly important and fertile habitat preserved here is the near shore marine ecosystem. It is also important as a refuge for the Serow (Capricornis sumatraensis) an important endangered species still found here. To preserve this important biological heritage, the

Royal Forest Department established Khao Sam Roi Yot as the first coastal national park in BE 2509, and expanded the park as the result of a Royal Decree in BE 2525. However the park is threatened by conflict over land ownership and land claims within the park boundary by local people. In an attempt to solve this conflict, the government canceled all land ownership documents within the boundary of the national park. This action has not secured the park because additional problems, for example the encroachment of land for agriculture and shellfish farms, waste water release from communities and factories and basin agriculture. The government has attempted to resolve these problems by asking for cooperation with the surrounding communities and to create joint activities to improve the value of the park for the state and the local people. One important activity so far undertaken has been to clearly mark the national boundary.

Thale Noi Non Hunting Area, Phatthalung Province

Thale Noi is a part of the Songkla Lake. It is the largest bird reserve area in Thailand with at least 180 species of birds and other wildlife recorded. There is also a rich diversity of plants. This diversity indicates a complex and sensitive ecosystem. In 1975, the Royal Forest Department established Thale Noi as a wildlife-protected area. In spite of this designation many areas have suffered from encroachment. This situation has led to deforestation, soil erosion, and water contamination. At the present, there is a deficiency of oxygen in water in Thale Noi, which is resulting in the death of aquatic animals. Regarding the importance of migratory bird species visiting the lake to breed, these birds are often disturbed by local villagers and fishermen. In an attempt to overcome this problem, the government has established a special protected zone for migratory birds to nest within the protected area accompany with public awareness raising activities and training of local villagers as bird guides for tourists. There is also a tourism development plan to provide the local people with income and other environmentally sustainable activities. In addition, the government has improved education and understanding about bird conservation, the importance of natural resources and waste treatment for local people.

Thung-Yai-Naresuan Wildlife Sanctuary, Kanchanaburi Province

Thung-Yai-Narasuan Wildlife Sanctuary is an important refuge for many rare and endangered species found in Thailand. The wildlife sanctuary has a rich biodiversity due to the rich forest diversity which includes; Mixed Deciduous Forest, Tropical Rain Forest and Hill Evergreen Forest which all occur within the sanctuary. As a result of its global conservation importance, the UNESCO designated the wildlife sanctuary as a World Heritage site. As a result of this designation, the Royal Forest Department has set up a project to develop and manage the protected area. This project recommended the relocation of Karen villages which have existed in the forests here for more than 200 years. This action was protested by many academics and conservationists. The Royal Forest Department, therefore, reconsidered the project, particularly the issue of the relocation of the Karen by conducting research to examine the question, " Can human beings live in harmony with the forest ?". This issue is still being discussed. However, the project indicates that, for future forest conservation plans the local people have to be included in the management planning process. Consequently, the Royal Forest Department recognizes and accepts the role of Tambon Council and Tambon Organizations in forest protection.