環境行政・環境技術(水質保全)コース
集団研修帰国研修員に対する
巡回指導報告書

国際協力事業団
研修事業部

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はじめに

この報告書は，国際協力事業団が実施した集団研修「環境行政コース」と「環境技術（水質保全）コース」に参加した帰国研修員に対するフォローアップ事業の一環として，帰国研修員の所属機関等を訪問し，現地での諸問題に関する指導並びにニーズの調査等を行うため，昭和５６年１月２１日から２月９日までの２０日間，メキシコ，ブラジルの２ヶ国に派遣した巡回指導班の業務報告書である。

本報告書により，当該分野における各国の実情，帰国研修員の活動状況，彼らが抱えている諸問題及び研修に係る要望事項等について関係各位のさらに深い理解をいただき，今後の研修コースの改善に資すれば幸いである。

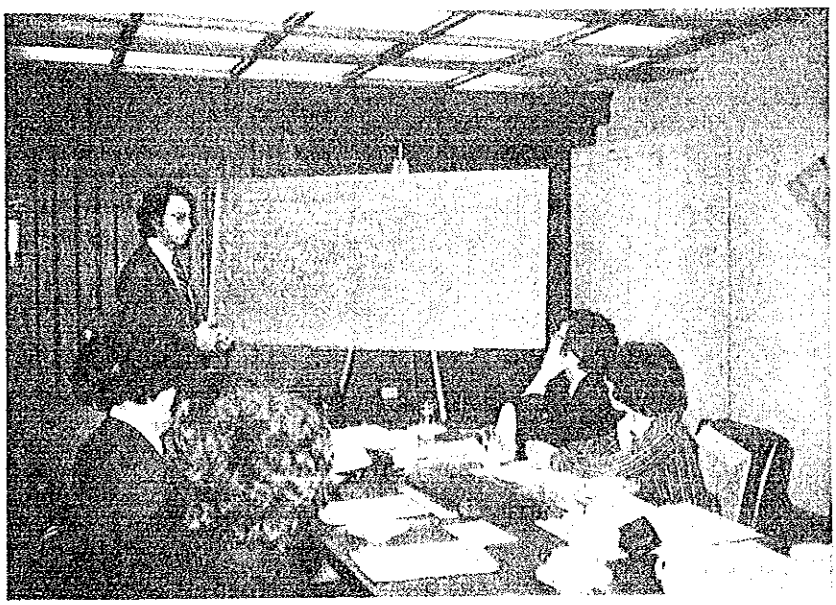
なお，本件の実施のために御協力を賜った外務省，環境庁並びに現地において数々のご指導とご協力を賜わった在外公館及び関係機関の皆様に深甚の謝意を表したい。

昭和５６年６月

研修事業部
部長　山村　寛

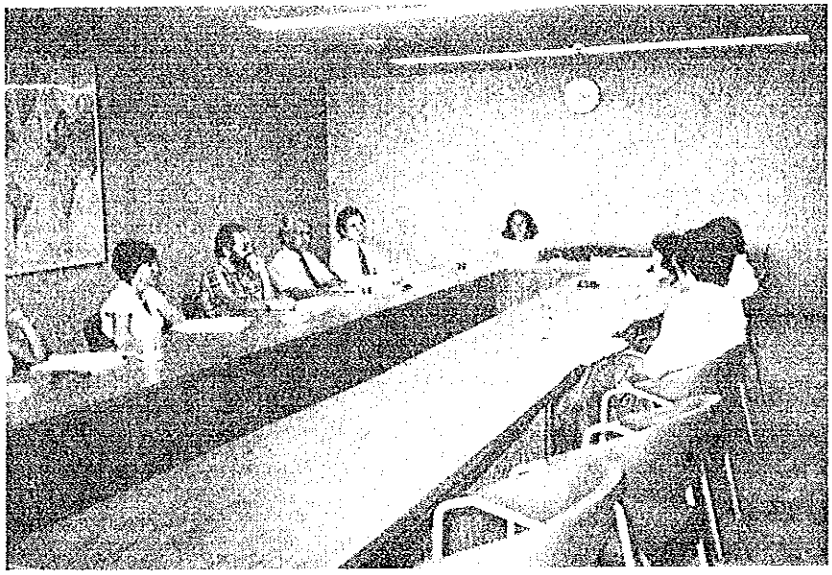
メキシコ国外務省にて
Mr. Jesús Hernandez Torres（文化事業局次長）と面談

メキシコ国厚生省にて
帰国研修員と面談



メキシコ国農業水資源省にて
Dr. Jorge Aguirre M.（保護規制局長）より説明を受ける

サンパウロ州公害防止管理公社（ＣＥＴＥＳＢ）にて係員より説明を受ける



在リオデジャネイロ総領事館におけるセミナー

ブラジル国商工省工業技術院にて

目　　次

Ⅰ　緒　　論

Ⅰ－1　概　　説

国際協力事業団は環境庁の協力を得て，開発途上国の人材育成に寄与するため環境行政コースを昭和４８年度より，環境技術（水質保全）コースを昭和５０年度より毎年１回ずつ開催している。

各研修コースは，開始当初よりアジア，中近東，アフリカ及び中南米地域を対象として，日本における環境行政と環境技術の紹介を中心に約１ヶ月半の研修コースとして続けて来た。

５５年度までに実施した研修は環境行政コースが８回，環境技術（水質保全）コースが６回を数え，受入れた研修員総数は１５０名以上となっている。

本巡回指導班はメキシコ，ブラジル２ヶ国を対象として，帰国研修員の所属する機関及び関連機関等を訪問し，我が国における環境行政，環境技術関係の最新情報の提供，研修員が我が国で習得した技術の現地における適用度の測定評価，帰国研修員が当面する諸問題についての意見交換，研修コースに対する要望調査，帰国研修員の動向調査を目的として派遣されたものである。

Ⅰ－2　期間および訪問国

昭和５６年１月２１日から同年２月９日まで

メキシコ及びブラジル

Ⅰ－3　メンバー

佐藤邦子	環境庁長官官房国際課
松井佳巳	環境庁水質保全局水質規制課
浜崎文彦	国際協力事業団研修事業部研修第二課

Ⅰ－4　日程表

月／日	曜日	訪問国	訪問機関	行動内容
1／21	水	メキシコ		東京発，メキシコシティ着
1／22	木	〃	日本大使館，ＪＩＣＡ事務所	表敬，日程打合せ

月／日	曜日	訪問国	訪問機関	行動内容
1／22	木	メキシコ	外務省	文化事業局次長と面談
1／23	金	〃	厚生省	環境改善局長表敬
				帰国研修員と面談
			メキシコ日産㈱	見学
			農業水資源省	保護規制局長表敬
				セミナー開催
1／24	土	〃		資料整理
				帰国研修員宅訪問
1／25	日	〃	休日	
1／26	月	〃	日本大使館，JICA事務所	メキシコでの行動，成果につき報告
				メキシコシティ発，マナウス着
1／27	火	ブラジル		マナウス発，ブラジリア着
1／28	水	〃	日本大使館，JICA事務所	表敬，日程打合せ
			内務省	特設環境局関係者と面談
			企画庁	国際技術協力局奨学関係担当者と面談
1／29	木	〃		ブラジリア発，サンパウロ着
			総領事館，JICA支部	表敬，日程打合せ
1／30	金	〃	公害防止管理公社（CETESB）	環境規制担当理事と面談
				施設見学，セミナー開催
			基礎衛生公社（SABESP）	総裁表敬
				開発計画技術部長と面談
1／31	土	〃		帰国研修員との懇談会
2／1	日	〃	休日	
2／2	月	〃	サンパウロ大学公衆衛生学部	関係者と面談，施設見学
			サンパウロ州公共事業環境保全局	長官表敬
2／3	火	〃		サンパウロ発，リオデジャネイロ着
			総領事館，JICA支部	表敬，日程打合せ
2／4	水	〃	環境工学財団（FEEMA）	総裁，帰国研修員及び公害規制部担当者と面談

月／日	曜日	訪問国	訪　問　機　関	行　動　内　容
2／ 4	水	ブラジル	リオデジャネイロ州公衆衛生局	長官表敬
2／ 5	木	〃	環境工学財団研究所	施設見学
			㈱ジョンソン	工場見学
			㈱エックスシェリング	〃
				総領事館にてセミナー開催
				帰国研修員との懇談会
2／ 6	金	〃	商工省工業技術院	院長，帰国研修員及び関係者と面談，施設見学
2／ 7	土	〃		リオデジャネイロ発
2／ 8	日			リマ，ロスアンジェルス経由
2／ 9	月			東京着

I－5　調　査　法　方

巡回指導班の派遣は短期間であったので，調査を能率的に行うため，ＪＩＣＡを通じて帰国研修員との連絡，視察希望先機関に対する在外公館及びＪＩＣＡ事務所よりの連絡を事前に行った。

対象帰国研修員については，事前に送付した質問表（参考資料２）に基づいて懇談及び意見交換を行った。また，〝Current Topics of Environmental Administration in Japan〟と題し各地でセミナーを開催し，下記の資料を各国関係機関に寄贈した。

- Quality of the Environment in Japan 1979
- Quality of the Environment in Japan 1980 (Summary)
- Journal Water Pollution Control Federation / May 1980, Vol. 52, No. 5

Ⅱ 調 査 結 果

Ⅱ－1 研修コースの評価（回収された１６の質問表による）

(1) 本事業に対する評価

帰国研修員は本研修に対し概して良い評価をしている。その内容として

- 日本での環境行政及び水質規制の全般的な構想を知りえた。
- 技術知識の範囲が拡げられ，新しい分野の研究・開発に役立った。
- 他の開発途上国での環境汚染規制の情報が得られた。
- 日本における民間部門による環境汚染防止の情報が得られた。

等の感想が寄せられている。

(2) 研修に対する要望

- 帰国研修員の日本での再研修の要望が強かった。また，自国での日本からの専門家による集中講義等の要望があった。
- 研修参加国の環境問題を考慮し，それに見合ったグループ分けをして欲しいという意見があった。
- 大気汚染関係の研修を開設して欲しいという要望があった。

(3) フォローアップ事業に対する要望

- 関連分野の書籍及び情報を定期的に送付して欲しいという要望が強かった。
- 専門分野におけるコンサルテーションを実施して欲しいという要望があった。

Ⅱ－2 環境問題の現況と対策

2－1 メ キ シ コ

(1) 環境行政組織

大気汚染，騒音，水質汚濁などの環境問題を所管する機関として，１９７２年１月Ministry of Health and Welfare にUndersecretariat of Improvement of the Environment が設置された。水質の保全についてはMinistry of Agriculture and Water Resources も関与しており，国のレベルにあっては各省がそれぞれの所管分野における環境問題を個々に扱っている。１９７８年には各省間の調整機関として厚生大臣を議長とする関係１１省の次官から成るIntersecretarial Commission for Environmental Sanitation が設けられた。（図－１）

(2) 環境の現況と対策

ア. 大気汚染

① 現　　況

指導班が訪れた1月末は気候的な条件が良く，「これ程空気の良い日はめったにない。」とのことであったが，それでも悪臭，目の痛み等を体験し，また，メインストリートには街路樹の枯死がみられた。したがって，メキシコ市では大気汚染が深刻な問題であり，適切な対策を講ずることが急務であると思われた。

この大気汚染の第一の原因は自動車の排気ガスである。人口1,500万人のメキシコ市では街に車があふれており，1台当たりの排出ガスも相当な量である。また，市内の工場（特に石油関連産業）からの汚染もかなりあるらしいが詳しいことは把握できなかった。

これらの発生源からの負荷は，メキシコ市の地理的，気候的条件（盆地状の地形等による低い拡散性，強い紫外線による光化学オキシダントの発生等）から一層深刻な問題となっている。

② 対　　策

自動車については，まず代替交通システムの整備による使用量の抑制が肝要であり，地下鉄の建設が進められていた。また，排出ガス対策として新車に対する厳しい規則を近く実施するとともに自動車検査システムの確立を図っているが，既存の自動車に対する規制は困難であるとのことであった。また，工場に対しては燃料転換と郊外への移転計画を進めている。

イ. 水質汚濁

① 現　　況

メキシコ市内の河川はまさに「都市下水路」であり，相当汚濁している。しかし乾燥地であるため，自然の湖沼は少なく，水産業は発達していない。また，上水道は郊外からの導水又は地下水の汲上げによっており，しかも一般には飲料用に供していないため水質汚濁はあまり問題となっていないように思われた。

② 対　　策

(1)で述べたように水質汚濁については農業水資源省が所掌しているが厚生省にも担当部局があり，両者の役割分担が明確でなかった。水質汚濁防止法は施行されているが，我が国のいわゆる一律基準に相当するものはなく，公害防止協定に当たる規制が行われているようだ。

ウ. そ の 他

自動車交通，ビル等の建設に伴う騒音と振動はかなり問題となっているように思われた。また，旧市街地はかつて湖であったところを埋立てて成立した軟弱な地盤に加えて地下水汲上げによる地盤沈下が起きている。

2－2 ブ ラ ジ ル

(1) 環境行政組織

ア. 連 邦 政 府

連邦政府レベルでは1973年に内務省内に特設環境局（SEMA, Special Secretariat for the Environment）が設置されている。SEMAは環境汚染の規制，環境のモニタリング，動植物の保護などを主な任務としている。SEMAのほかには，ブラジル森林開発院（森林保全），鉱山動力局（水資源，エネルギー），商工省工業技術局（工場排水，大気汚染などの規制）などが環境保全行政に係っている。連邦レベルの諮問機関として内務大臣を議長とする環境問題審議会（CNMA, National Environmental Pollution Council）がある。（図2）

イ. 州 政 府

① サンパウロ州

サンパウロ州における環境保全行政の実施機関である公害防止管理公社（CETESB, State Company of Environmental Sanitation Technology）は，1975年5月，それまであったCETESB（水質汚濁防止担当）とSUSUM（大気汚染防止担当）が合併して，同州公共事業環境保全局（SOMA, Department of Public Works and Environmental Protection）長官の下に設立された。1980年12月31日現在2,132名の職員がおり，大気，水質，土壌及び騒音などの環境問題に関する規制，調査研究，技術開発を行っているほか，技術者養成のための訓練，研修，上下水道用資材の品質管理なども行っている。（図3）

② リオデジャネイロ州

リオデジャネイロ州における環境保全行政の実施機関である環境工学財団（FEEMA, State Foundation for Environmental Engineering）は州の公共事業局の監督下にある財団で，1973年に設立された。FEEMAは州の企画局，保健局等の関係機関の代表者を委員とし，FEEMA総裁を議長とする環境規制委員会（CECA, State Commission on Environmental Control）の実施機関で，大気汚染，水質汚濁及び自

然保護に関する規制，調査研究，研修等を行っている。（図４）

③ 他　　州

ブラジルは全部で２２の州（他に１連邦区，４連邦直轄地がある）からなる連邦国家であるがサンパウロ州，リオデジャネイロ州以外の主たる州政府における環境保全の実施機関は表１のとおりである。

(2) 環境の現況と対策

ア. 大気汚染

① 現　　況

ブラジルにおける大気汚染はサンパウロ市において最も深刻な問題となっているが，その状況はメキシコ市の場合とよく似ている。すなわち，人口集中，大規模な工業地帯の存在により自動車及び工場から多量の負荷が発生している。しかも内陸部に立地しているため汚染物質の拡散が悪い。指導班が訪れた２月初旬は気候条件が良く，大気汚染はあまり気にならなかったが，冬期には気温の逆転層が生成するため，汚染が進行するとのことであった。

リオデジャネイロ市は海岸部に立地しているため，一般にそれほど問題はないように思われるが，採石場からの粉じん等が一部で問題となっている。また，その他の地域では貿易港であるサントスで石油精製業による汚染が問題となっている。

なお，ブラジルの特殊な問題としてアルデヒドによる大気汚染がある。ブラジルは資源大国であるが，石油の生産量は少ない。このため，政府はガソリンの代替品としてアルコールの使用を奨励し，１００％アルコール車が既に相当数走っている。ところが，アルコールでは不完全燃焼によりアルデヒドが発生し，新たな（先進国で未経験の）大気汚染を起こしている。

② 対　　策

環境基準が制定され，大気汚染の防止に向けて種々の努力が払われつつある。特にサンパウロ州では，固定発生源に対して住民の苦情等に基づき施設の改善を図るとともにディーゼルエンジン車の燃焼不良に対する規制を行っている。また気象条件の悪い冬期（５～８月）には，汚染物質のレベルが一定限度を超えた場合に，発生源に対して排出の抑制を求めることができる特別の計画を施行している。

なお，アルコールの不完全燃焼に伴うアルデヒドの問題については，連邦政府をはじめとする種々の機関で，積極的な調査研究が行われている。

イ. 水 質 汚 濁

(1) 現　　況

i. サンパウロ州

サンパウロ市内を流れるTiete Riverには多量の生活排水等が流入し，相当汚染されている。また郊外には天然又は人工の湖沼があり，水道水源として利用されているが，徐々に汚染が進行している。

ii. リオデジャネイロ州

Paraiba do Sul River はリオデジャネイロ州における全用水の９０％をまかなう重要な河川であるが，上流のサンパウロ州において既に汚染されており，更にリオデジャネイロ州においても有数の工業地帯を貫流するため，その汚染による各種利水上の被害が生じている。また，Guanabara Bayはその湾口部にリオデジャネイロ市の中心部が立地する閉鎖性水域で，人口及び産業の集中に伴う汚水の流入により，水質は悪化し，マングローブ林の消滅，漁業生産の極端な減少が起きている。

また，有名なCopacabana BeachはGuanabara Bay 湾口部の大西洋に面した海岸であるが，近年，水の汚れにより海水浴場としての地位が低下している。

iii. そ の 他

サンパウロとリオデジャネイロ以外の都市（例えばレシーフェ，ベロオリゾンテ，ポルトアレグレ）においても生活排水，産業排水による水質汚濁が問題となっている。

また，ガソリンの代替品として脚光をあびているアルコールはさとうきび等を原料として発酵工業により製造されている。ところが，１ℓのアルコールを生産するために１２ℓの濃厚な有機物の廃液が副生し，新たな水質汚濁問題を起こしている。

(2) 対　　策

連邦レベルでの水質汚濁防止法令は既に施行されている。この法令によれば河川及び湖沼はその利水目的によって４段階に区分され，各区分毎にその流域の事業場に対する排水基準が設定されている。この法令を受けて各州では地域区分を設定し，排水規制を進めているところである。

なお，リオデジャネイロ州では独特の制度として，事業者に対して排水水質の測定及び報告を義務付けるとともにParaiba do Sul Riverにおいて自浄作用を考慮し，汚染物質の許容量を設定する水質管理計画を検討中である。

ウ．そ　の　他

現在，アマゾン流域をはじめとする未開の地域では農林業及び鉱工業の開発が行われ，自然の生態系の破壊が進んでいる。このため自然保護に対する関心が連邦政府においても高まっている。

Ⅱ－3　ま　と　め

メキシコ，ブラジルの両国が抱えている問題についてその程度を表2にまとめた。

なお，指導班の得た情報には不十分かつ不正確な点があり，また，自ら体験した事項も短期間の滞在に基づく断片的なものであることをひとことおことわりしたい。

表1　州の環境保全実施機関

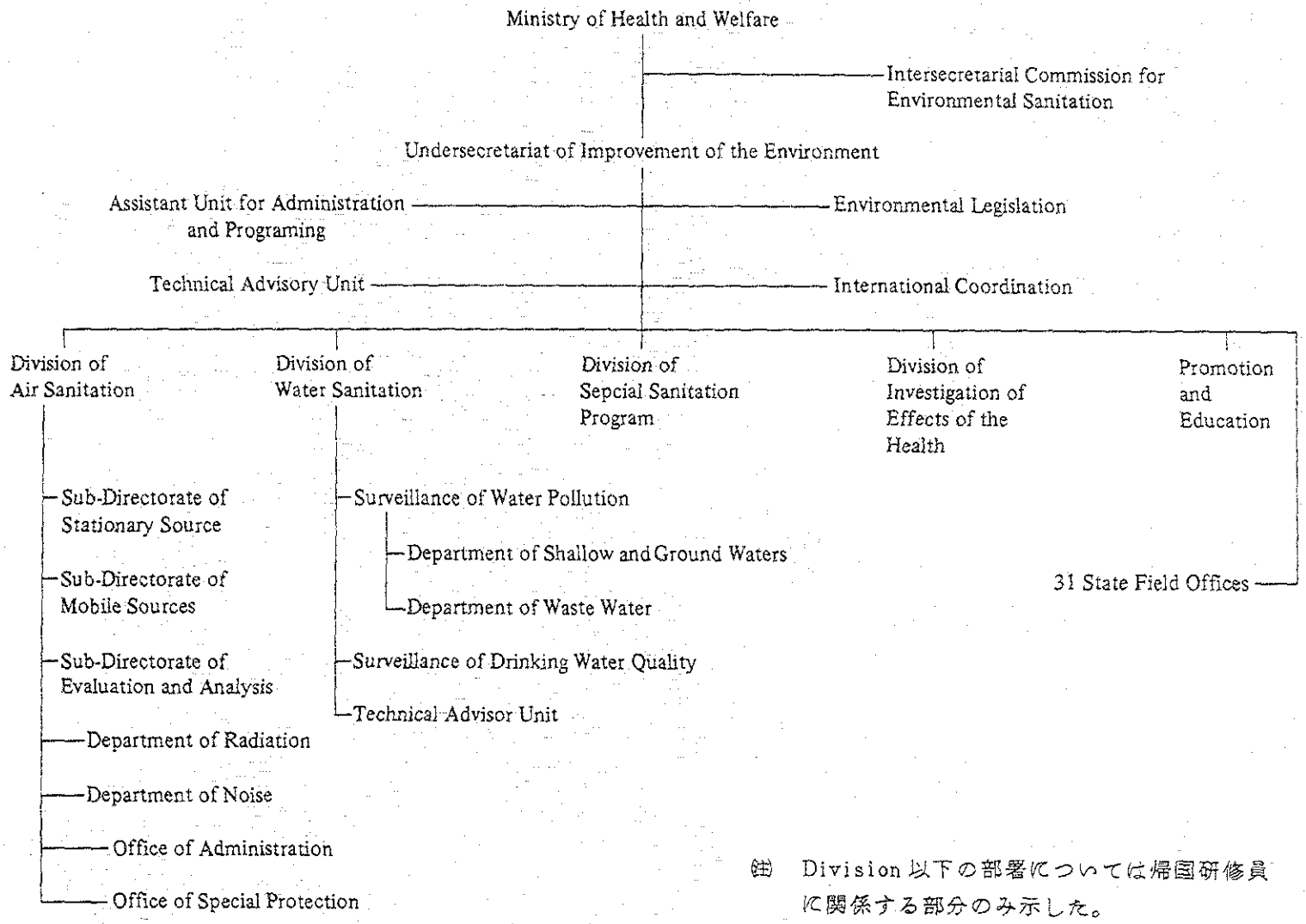
州	機　関
サンタカタリーナ	FATMA, Technology and Environment Supporting Foundation
バイア	CEPED, Research and Development Center
パラナ	ARH, Water Resources Administration
ペルナンブコ	CECPA, State Commission of Water Pollution Control
リオグランデドスル	DMA-SS-RS, State Department of Public Health and Environment

表2　メキシコ，ブラジルの環境問題（まとめ）

公　害	メキシコ（メキシコ市）	ブラジル（全体）	サンパウロ市	リオデジャネイロ市
大気汚染	◎	○	◎	○
水質汚濁	△	○	○	◎
土壌汚染				
騒　音	△		△	△
振　動	△		△	
地盤沈下	△			
悪　臭	△			
自然保護		○		

◎：深刻な問題となっているもの　○：問題となっているもの　△：やや問題と思われるもの

図１　メキシコ厚生省環境改善副省



註　Division以下の部署については帰国研修員に関係する部分のみ示した。

図２　ブラジル内務省特設環境局（ＳＥＭＡ）

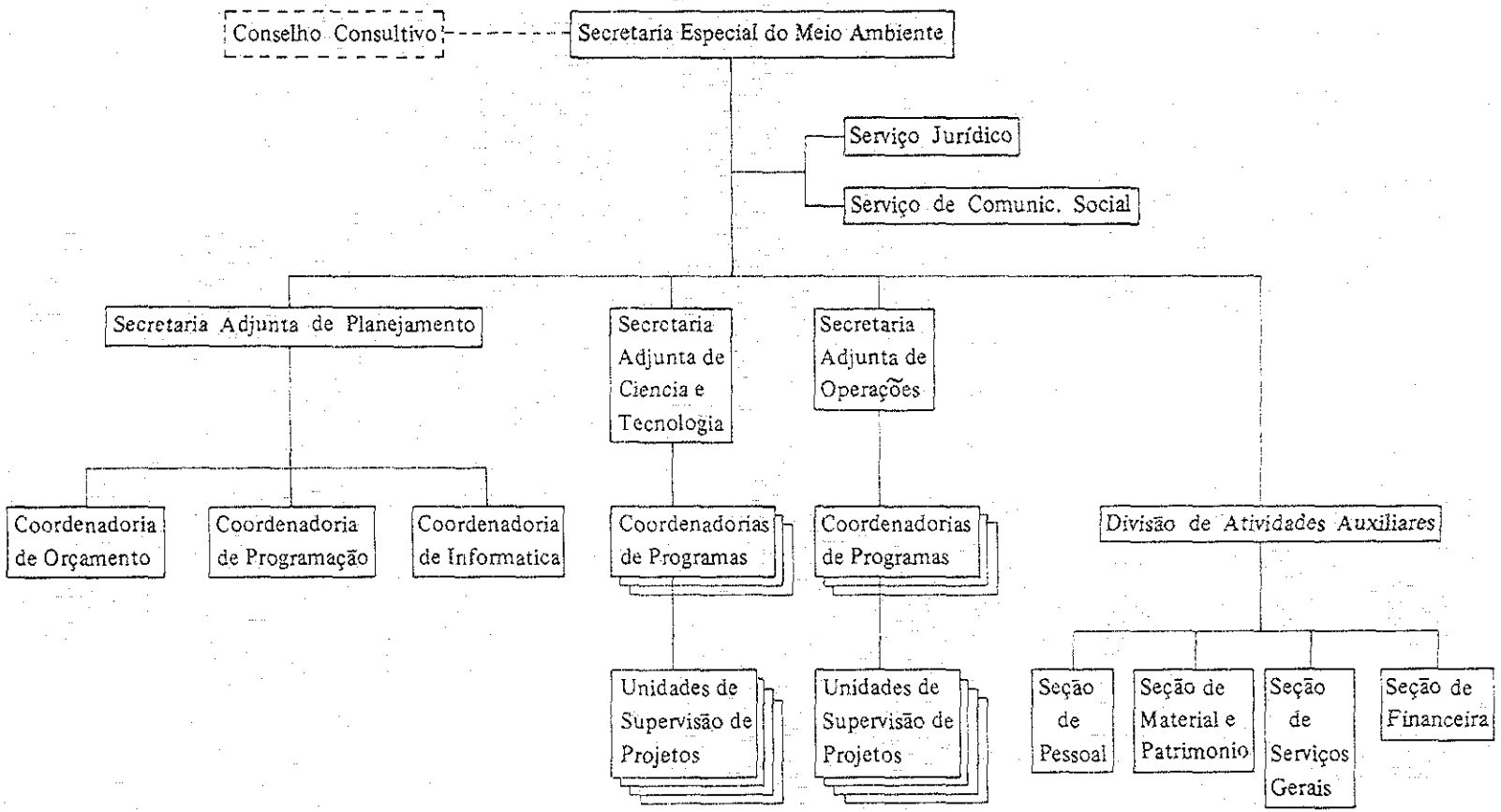


図３　サンパウロ州公害防止管理公社（SETESB）

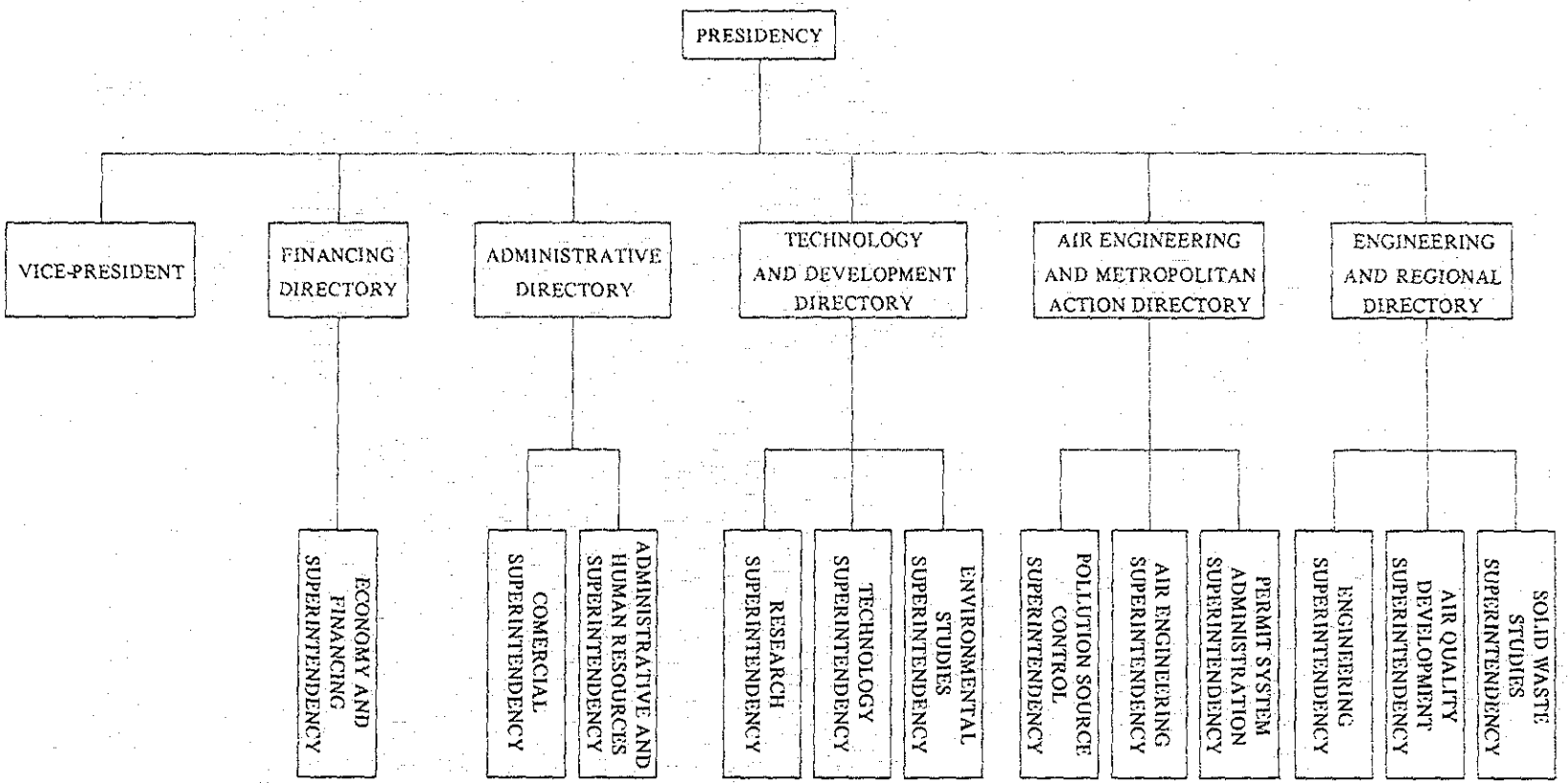


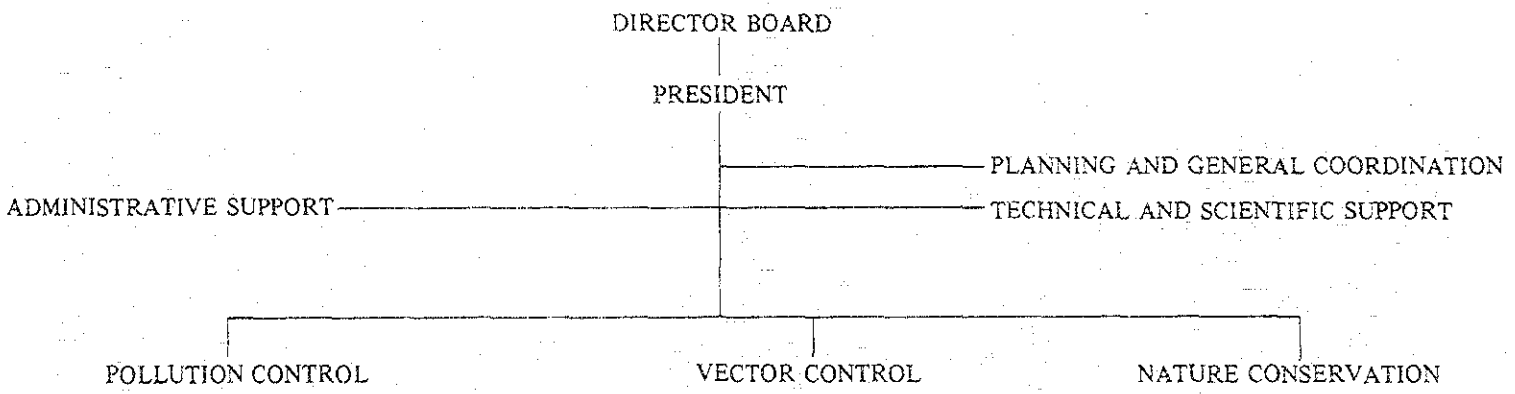
図-4　リオデジャネイロ州環境規制委員会（CECA）及び州環境工学財団（FEEMA）

CECA (STATE COMMISSION ON ENVIRONMENTAL CONTROL)

REPRESENTATIVES FROM

- STATE SECRETARIAT OF HEALTH
- STATE SECRETARIAT OF AGRICULTURE
- STATE SECRETARIAT OF PLANNING
- STATE SECRETARIAT OF INDUSTRY, TRADE AND TOURISM
- SEMA (SPECIAL SECRETARIAT FOR THE ENVIRONMENT) (invited)
- STATE SECRETARIAT OF PUBLIC WORKS
- STATE WATER AND SEWAGE COMPANY
- STATE SUPERINTENDENCY OF RIVERS AND LAKES
- FEEMA (STATE FOUNDATION FOR ENVIRONMENTAL ENGINEERING)

FEEMA



Ⅲ　結　　論

巡回指導班は昭和５６年１月２１日から２月９日まで２０日間にわたりメキシコ，ブラジルにおいて，①帰国研修員の所属機関の訪問と帰国研修員等との懇談，②関係機関の訪問と関係者との面談，③我が国の環境行政における最近の動きを紹介するセミナーの開催等を行った。

Ⅲ－１　帰国研修員の動向と研修の成果

帰国研修員２９名（メキシコ１０名，ブラジル１９名）のうち帰国後の動向が明らかになった２２名（メキシコ８名，ブラジル１４名）についてみると，２０名が研修後も同一の機関で環境保全行政に携わっており，転職した者はわずか２名（メキシコ，ブラジル各１名）であった。また，帰国後昇任した者もいた。

研修の成果について帰国研修員は，自国と日本とは社会的，経済的条件など多くの点で異なるため日本の経験をそのまま自国にあてはめることは困難であるとしながらも，汚染物質の規制の方法等（たとえば硫黄酸化物の総量規制，自動車排ガス規制との関連で自動車検査制度）などは自国での環境保全対策を進展していくうえで多いに参考となったとしている。この一例として，リオデジャネイロ市では市内に散在する金属メッキ工場からの排水をタンクローリーで回収し，FEEMAが設置，運転する施設で処理する事業が帰国研修員が中心となって進められている。

Ⅲ－２　研修に対するニーズ

メキシコ，ブラジルの両国は豊かな天然資源を背景に意欲的に経済開発を推進しており，開発に伴う環境破壊，急速な都市化，工業化に伴う大気汚染，水質汚濁をはじめとする種々の公害問題が進行している。

これらの問題に対処するための技術水準については，帰国研修員に限って言えば，かなりの水準にあるということができる。しかしながら全体的にみた場合は必ずしもそうとは言い切れないようである。帰国研修員のひとりが言っていたように，たとえ高度な排水処理施設を建設したとしても，それを適切に運転，管理できる技術者が不足しているため，せっかくの施設を十分使い切れないというのが現状ではないか。環境保全を基盤から支えるこういった技術者（必ずしも高度な技術水準が要求されるわけではない。）の養成が環境保全行政推進上の課題のひとつとなっている。

指導班が訪れたメキシコ市，サンパウロ市，リオデジャネイロ市はいずれもそれぞれの国の

産業，経済活動の中心であり，前記II－2で述べた如く，これらの都市は先進工業諸国の都市が直面しているのと同様な環境問題を抱えている。とくに大気汚染は予想以上に深刻であり，大気汚染防止に関する研修コースに対する要望はかなり高いものがあった。

III－3　フォローアップ事業に対するニーズ

帰国研修員は「公害先進国」である我が国の汚染防止技術に多いに注目しており，環境汚染防止技術に関する研究報告書など技術関連資料の入手に非常に強い希望を有している。

自己の関心分野につき短期間（2～3週間）の再研修を受けたいとの要望も多数出されていた。

III－4　今後の検討課題

(1)　大気コースの新設

(2)　和文技術資料の翻訳，送付等恒常的な情報提供のための体制の整備

(3)　海外でのセミナーの開催

研修参加国はさまざまの発展段階にあるのでその環境問題も多様である。このため，研修コースでとりあげる分野は広範囲にわたり，研修プログラムは最大公約数的にならざるを得ず，全ての研修参加国のニーズに十分に対応することは難しい。そこで，専門家を派遣しその国特有の環境問題に焦点をあてた集中セミナーを開催することは研修のフォローアップ事業としても有意義であろう。

参考資料１　帰国研修員リスト

◎……面談し質問表を回収できた研修員

○……セミナー等で面談できた研修員

×……面談できなかつた研修員

List of Participants of Group Training Courses in Environmental Administration and Environmental Engineering – Water Pollution Control – (Mexico)

	Course		Name		Post and Office Address*	Home Address
1.	FY 1975	Adm.	Mr. Rodrigo Montane	×	Advisor Undersecretariat for the Improvement of the Enviroment Av. Chapultepec #284-14, México 7, D.F.	Av. Insurgentes Sur 4411 Edif. 18-403 México 22, D.F.
2.		Adm.	Mrs. Maria Dolores Miranda de Mitani	◎	Jefe de Laboratorio Direccion de Laboratories y Efectos de Mejoramiento de la Salud Subsecretaría de Mejoranmiento del Ambiente Av. Chapultepec 284-5º Piso Col. Roma, México 7, D.F.	Córdora No. 113-104 Col. Roma, México 7, D.F.
3.		Eng.	Mr. Riva-Palacio Chiang Enrique	×	Assistant of the Undersecretariate for the Improvement of the Environment	
4.	FY 1977	Eng.	Mr. Carlos Menendez Martines	×（転職）	Director del Area de Ingeniería Ambiental A C E Ingenieros y Constructores, S.A.	Rincón de las Flores #38 México 23, D.F.

(Contd. Mexico)

Course		Name		Post and Office Address*	Home Address
				Insurgentes Sur #1877 4° Piso México 20, D.F.	
5. FY 1978	Adm.	Mr. Mario Leopoldo Turrent Anton	◎	Jefe del Departamento Desarrollo Tecnológico Subsecretaría de Mejoramiento del Ambiente Secretaría de Salubridad y Asistencia Av. Chapultepec #284 1er. Piso México, D.F.	Chichen Itza #330-2 Col. del Valle México 12, D.F.
6.	Eng.	Mr. Carlos Hernandez Chavez	× (海外出張中)	Trainer, Research and Training Center for Water Quality, Water Resources Ministry Av. San Bernabé, No. 549, México Pollution Teacher, National University of México Iztacala, Edo. de México	Av. Insurgentes Sur No. 1772 Mexico, D.F.
7. FY 1979	Adm.	Mr. Gilberto Mateo Sada y Ramos	◎	Jefe del Departamento de Reuso del Agua Subsecretaría de Planeación Dirección General de Protección y Ordenación Ecológica Secretaría de Agricultura y Recursos Hidráulicos Av. San Bernabé #549 Col. San Jerónimo Lidice México 21, D.F.	Retorno 21 de Lic. Genaro García No. 8 Int. 1 Col. Jardín Balbuena México 9, D.F.
8.	Adm.	Mr. José Ramón Pérez Contreras	◎	Jefe del Departamento de Evaluación y Dictamen Subdirección de Impacto Ambiental Secretaría de Agricultura y Recursos Hidráulicos Paseo de la Reforma #107	Concepción Beistegui No. 2103 C-4 Col. del Valle México 13, D.F.

(Contd. Mexico)

	Course		Name		Post and Office Address*	Home Address
					México 1, D.F.	
9.	FY 1980	Eng.	Miss Elsa Maria Aguilar González	× (遠隔地の為)	Jefe del Laboratorio Dirección General de Protección y Ordenación Ecológica Secretaría de Agricultura y Recursos Hidráulicos Av. Constitución y Churubusco Monterrey, Nuevo León	P. Cordillera #3105 Col. Cumbres Monterrey, N.L.
10.	FY 1980	Eng.	Mr. Carlos González Guzmán	○	Jefe del Departamento de Aguas Residuales Subsecretaría de Mejoramiento del Ambiente Secretaría de Salubridad y Asistencia Av. Chapultepec #284 6° Piso México, D. F.	Dakota #395-5 Col. Nápoles México 18, D.F.

面談した研修員数５名／１０名
質問表回収数　　４名／１０名

他に１９７９年度水質汚濁・下水道コースに参加した Mr. Octavio Catellanos の質問表も回収した。

＊面談できた研修員は面談時の，その他の研修員は研修参加時のものを記した。

◎……面談し質問表を回収できた研修員
○……セミナー等で面談できた研修員
×……面談できなかつた研修員

List of Participants of Group Training Courses
in
Environmental Administration and Environmental Engineering – Water Pollution Control –
(Brazil)

	Course		Name		Post and Office Address*	Home Address
1.	FY 1974	Adm.	Mr. Armando Luiz de Sourza Mesquita	◎	Superintendente, Superintendência de Controle de Fontes de Poluição Ambiental Companhia de Tecnologia de Saneamento Ambiental - CETESB Av. Prof. Frederico Hermann Jr., 345 São Paulo CEP 05459 - SP	Rua Ana Karlik, 46 Santo Amaro São Paulo
2.	FY 1975	Adm.	Mr. Pedro Ferreira Batista	×	Head, Research and Projects Div. Sergipe State Pollution Control Dept. Rua Campo de Briton n° 371 Aracaju–Sergipe	Pç. Almirante Tamandaré 30 - 1° andar Aracaju – Sergipe
3.	FY 1976	Adm.	Mr. Ernesto Ronchini Lima	◎	Installation Permit Manager CETESB	Rua Dr. Rento Paes de Barros n° 295 Apt 74, São Paulo - CEP 04530 - SP
4.		Adm.	Dr. Paulo Cesar Delayti Motta	◎	Senior Planning Technician Secretaria de Coordinação e Planejamento Rua Sete de Setembro 666, 9° andar	Av. Wenceslau Escobar 3407 90.000 Porto Alegre – RS

(Contd. Brazil)

	Course		Name		Post and Office Address*	Home Address
					90.000 Porto Alegre – RS Executive Director Instituto de Administração e Tecnologia Campus Universitario, Caixa Postal 1352 95100 Caxias do Sul – RS	
5.	FY 1976	Eng.	Mr. José Carlos Derisio	◎	Gerente, Gêrencia de Licenças de Funcionamento, CETESB	Rua Monte Alegre, 791 apt. 164–São Paulo
6.	FY 1977	Adm.	Ms. Maria Regina Monteiro de Barros da Fonseca	◎	Assistant to the Director of the Pollution Control Department Fundaçao Estadual de Engenharia do Meio Ambiente - FEEMA Rua Fonseca Teles 121 – 15º andar Rio de Janeiro – RJ	Rua Otávio Carneiro, 33/1701 – Niterói – RJ
7.		Adm.	Mr. Paulo Tetuia Hasegawa	◎	Assistente de Diretoria de Engenharia do Ar e Ação Metropolitana, CETESB	Alameda dos Araés, nº 1339 São Paulo – SP CEP 04066
8.		Eng.	Ms. Stael Starling Moreira dos Santos	◎	Expert Adviser Instituto Nacional de Tecnologia Ministério da Indústria e do Comércio - MIC Av. Venezuela 82, 8º andar 20.081 – Rio de Janeiro – RJ	628/703 Rua Barata Riberiro Copacabana, Rio de Janeiro
9.		Eng.	Mr. Paulo Pinho Filho	◎	Head, Water Pollution Control Div. Pollution Control Dept., FEEMA	Rua Sacopã 511/502 – Lagoa CEP 22471, Rio de Janeiro – RJ

(Contd. Brazil)

	Course		Name		Post and Office Address*	Home Address
10.	FY 1978	Adm.	Mr. Osvaldo Vitorino Oliveira	×	General Director, Public Health Dept. of Santa Catarina Felipe Schmidt 117 – Florianópolis – SC – CEP 88.000	Jardim Santa Mónica Rua Ricardo P. Goulart 04 – Florianópolis – SC CEP 88.000
11.		Adm.	Mr. Paulo Roberto Solon Ribeiro	×	Coordinator of the Strategic Planning Support Group, Planning and Control Dept. FEEMA Campo de São Cristovao, 348 – 2º andar São Cristóvao – Caixa Postal 11-ZC-08 Rio de Janeiro – CEP 20921	Rua Uruguai, 134-CO-1 Tijuca-Rio de Janeiro 20510 – RJ
12.		Eng.	Mr. Sergio de Moraes	◎	Auditoria de Controle da Qualidade Analítica Superintendência de Tecnologia CETESB	Rua da União 431 – Aclimção 04107-São Paulo – SP
13.		Eng.	Mr. Antonio Miguel Borges	×	Manager of the Environmental Protection Program Centro de Pesquisas e Desenvolviment - CEPED C.P. 1606 Salvador, Bahia 40.000	Rua Itabuna, 16 Rio Vermelho Salvador Bahia 40.000
14.	FY 1979	Adm.	Mr. Silvio Souza Esteves	◎	Gerente, Gerência de Apoio às Operações Corretivas Superintendência de Controle das Fontes de Poluição Ambiental CETESB	Rua Nabuco de Araújo, 393 Santos – SP CEP 11.100

(Contd. Brazil)

	Course		Name		Post and Office Address*	Home Address
15.	FY 1979	Adm.	Mr. Victor Monteiro Barbosa Coelho	◎	Member of Director's Board of FEEMA Director of Pollution Control Dept. FEEMA	Av. Visconde de Albuquerque, 694 apt. 902 Leblon – Rio de Janeiro
16.		Eng.	Mr. Ivens Benedito Bloch Telles Alves	×	Chief, Pollution Control Section of CETESB Regional Department at Ribeiro Preto Rua Amador Bueno, 1294 – São Paulo	701, Carlos Lucas Evangelista St. 14100 Ribeirao Preto – SP
17.		Eng.	Mrs. Lucia Barbosa Rodrigues Ribeiro	◎	Head of Evaluation of Pollutant Loads Sector Water Pollution Control Div. FEEMA	Rua Humberto de Campos 555/203 – Leblon 22430 – Rio de Janeiro
18.	FY 1980	Eng.	Mr. Marcelo Bezerra Cabral	×	Head of General Sanitation Div. Local Development Dept. Superintendencia do Desenvolvimento do Nordeste (SUDENE) Praça Superintendente João Gonçalves de Souza Edificio SUDENE Sala 632 50.000 – Recife – Pernambuco	Rua do Funturo 123/701 Aflitos 50.000 Recife – PE
19.		Eng.	Mr. Mario Marmo Farias Peirano	×	Water Pollution Control Project Administrator Environmental Municipal Secretariat of Porto Alegre City Av. Borges de Medeiros 2244-7° andar-Porto Alegre-CEP 90.000 – RS	Rua Cristiano Fischer, 346 Porto Alegre – CEP 90.000 – RS

面談した研修員数　１２名／１９名

質問表回収数　　１２名／１９名

他に1979年度の個別研修員Mr. José Arnaldo Sales(都市空気汚染)とMrs. Victória Valli Braile（大気汚染コントロール）両名の質問表も回収できた。

* 面談できた研修員は面談時の，その他の研修員は研修参加時のものを記した。

参考資料2　　質　　問　　表

Questionnaire

(Please print or type in English)

Name of the course:

Year of participation:

I. General Questions

1. Name:

2. Home address:

3. Present or most recent post

(a) Office name:

(b) Type of organization (Please tick off the appropriate item.)

[ ] governmental [ ] semigovernmental [ ] private

(c) Office address:

(d) Your position:

(e) Please describe your work indicating your personal responsibility.

II. Questions on the course you attended*

* As for the questions 3 and 4 below, answers which reflect your experiences after your returning home are expected.

1. In which way has the course benefited you?
(Please tick off the aapropriate item(s).)

[ ] To expand the scope of your technical knowledge

[ ] To get general concept of environmental administration/ water pollution control in Japan

[ ] To get information on environmental pollution control measures taken by private sector in Japan

[ ] To have opportunities to exchange information on environmental pollution control in other developing countries

[ ] To contact with Japanese culture

[ ] Others, if any.

2. Was the course useful to your work after your returning home? If so, please enumerate the subject(s) and describe in what way it was useful.

3. On what area(s) should more emphasis be placed? (Please tick off the appropriate item(s).)

[ ] General orientation presented by JICA (i.e. introduction of Japanese culture, economy, etc.)

Lectures on [ ] administrative organization and leagal system for environmental pollution control in Japan

[ ] environmental laws and regulations and the means in Japan

[ ] [ ]latest/[ ]fundamental techniques for environmental pollution control

[ ] research and development for environmental pollution control

[ ] measures taken by industries to prevent environmental pollution

[ ] Field visits

[ ] Japanese language class

[ ] Others, if any.

4. To improve the future program of the course, your suggestions on the followings are eagerly welcomed.

(a) Duration of the course:

(b) Lectures:

(c) Field visits:

(d) Accomodation:

(e) Others, if any.

IV. Questions on the follow-up activities

What kind of follow-up activities of the course do you request? (Please tick off the appropriate item(s).)

[ ] Sending literature and information

[ ] Professional consultation

[ ] Re-training

[ ] Others, if any.

Date: _____ Signature: _____

参考資料３

面談者リスト

No.	氏　　名	役　　職
(Mexico)		
1.	Mr. Jesús Hernández Torres	Subdirector de Becas, Dirección General de Asuntos Culturales, Secretaría de Relaciones Exteriores
2.	Mr. Enrique Tolivia Meléndez	Director General de Saneamiento Atmosférico, Subsecretaría de Mejoramiento del Ambiente, Secretaría de Salubridad y Asistencia
3.	Dr. Jorge Aguirre M.	Director General, Dirección General de Protección y Ordenación Ecológica, Secretaría de Agricultura y Recursos Hidráulicos
(Brazil)		
4.	Dr. Estanislau Monteiro de Oliveira	Secretário de Planejamento da Secretaria Especial do Meio Ambiente–SEMA, Ministério do Interior
5.	Dra. Chisue Kawashima de Sousa	Assessora Especializada, Setor de Bolsa de Estudo, Secretaria de Cooperação Econômica e Técnica Internacional–SUBIN, Secretaría de Planejamento da Presidência da República
6.	Dr. Nelson Nefussi	Diretor de Engenharia do Ar e de Ação Metropolitana, Companhia de Tecnologia de Saneamento Ambiental – CETESB
7.	Dr. Oscar Souza Telles	Diretor Presidente, Companhia de Saneament Básico de Estado de São Paulo – SABESP
8.	Dr. Walter Engracia de Oliveira	Professor Catedráfico de Saneamento do Meio e de Resíduos Sólidos e Limpeza Pública, Chefe do Departamento de Saúde Ambiental, Faculdade de Saúde Pública, Universidade de São Paulo
9.	Dr. Walter Antunes Coronado	Secretário do Estado, Secretaria de Estado de Obras e Meio Ambiente, Estado de São Paulo
10.	Dr. Evandro Rodrigues de Britto	Presidente, Fundação Estadual de Engenharia do Meio Ambiente – FEEMA
11.	Dr. Emílio Ibrahim	Secretário de Estado, Secretaria de Estado de Obras e Serviços Públicos, Estado de Rio de Janeiro
12.	Dr. Haroldo Mattos Lemos	Diretor-Geral, Instituto Nacional de Tecnologia, Ministério da Indústria e do Comércio

参考資料４－１（目次のみ）

Quality of the Environment in Japan 1980
(Summary)

Contents

参考資料４－２

Current Topics of Environmental Administration in Japan

January 1981

This paper was prepared for the Follow-up Team for Ex-participants of Group Training Courses in Environmental Administration and Engineering by Yoshimi Matsui and Kunkio Sato of the Environment Agency.

Contents

I. Environmental Impact Assessment

1. Efforts to Improve the Environmental Impact Assessment System

It is generally recognized today that there is a need for proper assessment of environmental impact in order to ensure that appropriate attention is given to pollution control and conservation of the natural environment when a project that is liable to have a marked impact on the environment is about to be undertaken.

There is thus strong public interest in the establishment of a system of environmental impact assessment.

The Third National Comprehensive Development Plan, drawn up in November 1977, states, "In the detailed planning of works to be executed under this plan, appropriate environmental impact assessments shall be conducted, and the wishes of residents shall be reflected. At the same time as the development of techniques and procedures of environmental impact assessment is continuing, these is also a need to consolidate an adequate framework in which to conduct such assessments effectively."

In addition, the New Economic and Social Seven-year Plan adopted by Cabinet in August 1979 contains a statement along similar lines.

Some efforts to improve the framework and systems of environmental impact assessment have been made by the government and local public bodies. These are examined briefly below.

The government provided a legal framework in 1973 through the amendment of the Port and Harbor Law, the Public Water Areas Reclamation Law and the Factory Location Law, and the enactment of the Interim Law for the Conservation of the Environment of the Seto Inland Sea (amended in 1978 as the Law concerning Special Measures for Conservation of the Environment of the Seto Inland Sea). For exampl, by amendment to the Port and Harbor Law, prior assessment of the impact on the environment became required when designing port plans for important ports and harbors. Under the amendment to the Public Water Area Reclamation Law, moreover, environmental impact assessment became compulsory in the case of reclamation of public water bodies, consideration for environmental conservation being explicitly stated

as one of the standards for the granting of a reclamation license.

In addition to assessment under laws such as these, assessment has also been carried out by such means as administrative guidance.

Since 1965 comprehensive prior surveys on industrial pollution have been carried out in areas where large-scale industrial development projects have been scheduled. However, in June 1972 the Cabinet approved a report titled "On Environmental Conservation Measures Relating to Public Works" which required that for public works under the jurisdiction of governmental administrative agencies, those agencies should instruct the operator in charge of the works to "conduct prior surveys and investigations as necessary, covering the nature and degree of environmental impact and comparative studies of measures and alternative plans to prevent environmental degradation", and to take whatever measures are necessary based on the results thereof. Local public bodies were also required to take similar steps.

As an example of large-scale development projects for which environmental impact assessment has been carried out, the effect on the environment of the Second Basic Plan of the Mutsu-Ogawara Development was assessed according to guidelines indicated by the Environment Agency in September 1976. Similarly, the environmental impact of work on the bridge between Kojima and Sakaide linking the islands of Honshu and Shikoku was assessed according to basic guidelines indicated by the Environment Agency and technical guidelines indicated by the Ministry of Transport and the Ministry of Construction in July 1977.

On the basis of the findings of these surveys, environmental impact assessment has been implemented for public works projects since July 1978 under a notice from the Administrative Vice Minister of Construction entitled "On the Policy for Interim Measures Concerning Environmental Impact Assessment Projects under the Ministry of Construction Jurisdiction." Moreover, from January 1979 the Japanese National Railways and the Japan Railway Construction Corporation became required to conduct assessments of the environmental impact of the five new Shinkansen railways currently being constructed under a notice from the Minister of Transport titled "On the Implementation of Environmental Impact Assessment for the Construction of Five Shinkansen Lines."

Even in the case of non-public projects, the principle of environmental assessment has been applied. For example, with respect to the siting of power stations the Ministry of International Trade and Industry (MITI) adopted a report titled "On the Strengthening of Environmental Impact Assessment and Environmental Review for the Siting of Power Plants," which sought to strengthen environmental impact surveys by utilities and environmental examinations by MITI. Following on from this, in June 1979 the Director of MITI's Agency of Natural Resources and Energy issued a notice titled "On the Implementation of Environment Surveys and Environmental Review for the Siting of Power Plants" which prescribed an "Outline of Measures to Inform Local Residents, etc. in Conducting Environmental Impact Assessment and Environmental Reviews." Thus, detailed administrative guidance came to be conducted with respect to environmental assessment in the siting of power stations.

Meanwhile local public bodies have also been drawing up independent outlines relating to environmental impact assessment. In October 1976, Kawasaki promulgated an Ordinance relating to Environmental Impact Assessment in Kawasaki City, followed in July 1978 by Hokkaido with its Hokkaido Environment Assessment Ordinance. As of January 1980, Miyagi, Tochigi, Mie, Hyogo, Okayama, Yamaguchi and Okinawa Prefectures, and the cities of Yokohama, Nagoya, Kobe and Amagasaki have also drawn up their own outlines.

Thus a framework for environmental assessment came to be instituted in accordance with the Cabinet resolution noted earlier. However, since the Cabinet resolution does not specify details such as the scope of the work subject to assessment, survey methods or procedures for having the wishes of residents reflected, different measures have in fact been adopted according to the kind of project or the area involved. For this reason, evaluation procedures are not yet adequate from an institutional viewpoint.

2. Establishment of Environmental Impact Assessment System

Given this situation, the Ministry of Construction drew up a draft of Technical Guidelines for Environmental Impact Assessment in Projects under Ministry of Construction Jurisdiction, in July 1978, and in January 1979, after consultations and adjustments with the Environment Agency,

Ministry of Transport drew up Guidelines for Environmental Impact Assessment relating to the Five Shinkansen Railways under Construction. In June 1979, moreover, MITI formulated Guidelines for Environment Assessment for the Siting of Power Plants, while in February that year the Environment Agency made a draft collation of Technical Matters relating to Environmental Impact Assessment. By these means, provision of, and improvements to, the technical methods of assessment were promoted. On the institutional side, the Subcommittee on Environmental Impact Assessment of the Central Council for Environmental Pollution Control, after more than three years of careful examination and deliberation of the subject beginning in December 1975, presented its report to the Director General of the Environment Agency in April 1979.

The gist of the report is as follows.

a) Japan has had some experience in environmental impact assessment, while other advanced countries have been establishing systems best suited to their own situations. Now, it is also necessary for Japan to promptly establish an environmental impact assessment system which sets out uniform guidelines.

b) The environmental impact assessment system should mainly provide for procedures for enabling those in charge of the work to conduct a survey, prediction and evaluation of environmental impacts of their projects once such are proposed, and on the basis of their results ask the administrative agencies and residents for opinions on environmental preservation.

c) The basic philosophy behind the techniques for making environmental impact assessments should be that surveys, predictions and evaluations should be carried out as objectively as possible on the basis of all the scientific information available at that time.

d) Participation of residents concerned when an environmental impact assessment is being made is an important factor in the system, but such participation should not be such a form as taking votes for or against the project concerned, but rather intended to reflect opinions about environmental preservation on the outcome of the project.

e) The role of local governments in this system is to supplement and complete the details of surveys, predictions and evaluations conducted by those in charge of work by assisting them in procedures of

various sorts, providing materials and expressing opinions.

f) The statements in the report are based on current results and experience in Japan and are considered to be feasible. Therefore, a legal system for environmental impact assessments should be established promptly.

An Environmental Impact Asssessment Bill has consequently been given serious study by the government. At the meeting of the ministers concerned on March 28, 1980, an outline of the bill was approved and is now being subjected to further study.

II. Traffic Pollution Control

1. History of the Problem of Traffic Pollution

a. Emergency of the Problem of Traffic Pollution

The development of traffic systems in Japan started in the modernizing periods called Meiji and Taisho, and made rapid progress during the post-war economic restoration period and subsequent rapid economic growth. In 1961, jet passenger planes started to fly on domestic routes. In 1964, the Shinkansen railway opened and further in 1969, the Tomei (Tokyo-Nagoya) and Meishin (Nagoya-Kobe) Express Ways were completed. In this way, main traffic trunks have been constructed successively.

While such have brought about much social benefit, the advanced and varied development of traffic systems in this way has widely invited problems of traffic pollution in many parts of Japan because they have been rapidly promoted in an over populated society and also because of unsatisfactory living conditions in Japan. Furthermore, as large portions of the population have rapidly become concentrated in cities, leading to the construction of labyrinths of traffic lanes, the proper utilization of land was not always sufficient from the viewpoint of pollution prevention. And this has made the problems of traffic pollution more difficult to solve.

b. Main Development of Measures for Traffic Pollution

In order to cope with traffic pollution, necessary measures have been taken by each type of traffic system outlined below:

i) Countermeasures for automobile traffic pollution

As administrative targets in promoting measures for air pollution and noise, including automotive exhaust gases and automotive noise, "Environmental Quality Standards for Carbon Monoxide" were established in 1970, "Environmental Quality Standards for Noise" in 1971 and "Environmental Quality Standards for Air Pollution" in respect of nitrogen dioxide and photochemical oxidants, etc. in 1973, under the provisions of Article 9 of the Basic Law for Environmental Pollution Control.

Also in 1978, the Air Pollution Control Law was enacted for

preventing air pollution including countermeasures for controlling automotive exhaust gases. The control of automotive exhaust gases started with the regulation of emission concentrations of carbon monoxide in 1966. This control has been successively built up to incorporate the control of diesel smoke, such as blow-by-gas and fuel vaporization gases.

Furthermore, a 3-substance control, which controls carbon monoxide, hydrocarbon and nitrogen oxides started in 1973 for automobiles using gasoline and in 1974 for cars using diesel oil. Thereafter, this control has been gradually strengthened covering passenger cars in 1978 and trucks, etc. in 1979. Also, coverage of light- and midium-weight automobiles using gasoline to start in 1981 was announced in August 1979.

Back in 1970, the Noise Regulation Law was revised to enable maximum permissible limits of automotive noise to be determined under its provisions. Consequently, maximum permissible limits of automotive noise were established in 1971 for acceleration noise, which forms the largest noise percentage of automobiles driving in city areas, in addition to already covered cruising noise and exhaust noise. Subsequently, about noise in accelerated driving, the maximum permissible limit was strengthened emphatically for large-sized vehicles and large-exhaust two-wheeled vehicles in 1976 and 1977 further in 1979. Back in 1970, the Road Traffic Law was revised so that rules for traffic regulation were provided to prevent traffic pollutions.

Thereafter, related laws have been provided including the Vibration Regulation Law enacted in 1976, which contains the provisions about procedures for requests concerning road traffic vibration.

In addition, the ministries and agencies concerned have promoted necessary countermeasures including the regulation of the flow and volume of traffic, improvement of road structures and rearrangement of the environment along roads.

ii) Countermeasures for aircraft noise

In order to cope with the problem of aircraft noise, countermeasures of aircraft noise source and appropriate measures in the neighborhood of airports have been practiced to achieve and maintain the "Environmental Quality Standards for Aircraft Noise" established in 1973.

For public airports, the Law concerning Prevention, etc., of Disturbance caused by Aircraft Noise in the Vicinity of Public Aerodromes was enacted in 1967, under which sound-proof construction work has been

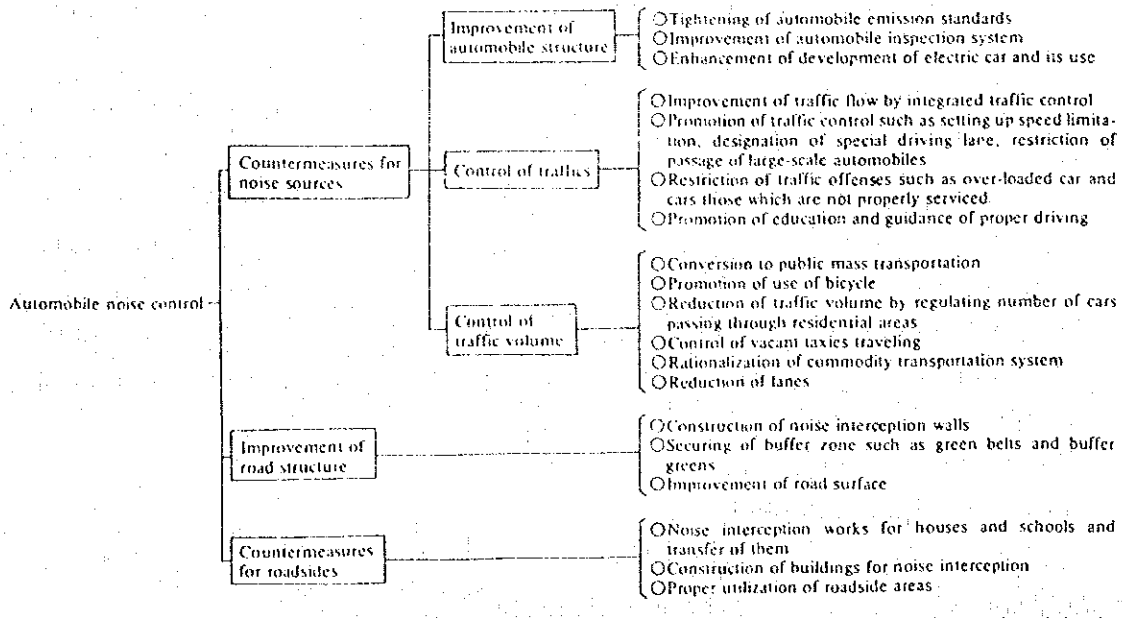
carried out in schools, etc. In order to promote control of noise further, the law was revised in 1974, under which sound-proof work on private houses has been subsidized and rearrangement plans for the vicinities of airports have been designed. Again, a partial revision in the Air Navigation Law in October 1975 established a scheme of "the certification of conformity to noise standards" under which the flight of jet planes has a rule been restricted unless their noise is below specified levels. Furthermore, in order to establish a system for land use including restrictions on building of dwellings in the vicinity of airports, the Law relating to Special Arrangements for Countermeasures against Aircraft Noise around Specified Airports was enacted in 1978. In addition, for noise from aircraft of the Self-Defence Force, measures have been promoted under the Law relating to Improving of the Living Environment in the Vicinities of Air Defense Facilities.

iii) Countermeasures against Shinkansen Railway Noise and Vibration

To cope with Shinkansen railway noise pollution, the "Environmental Quality Standards relating to Shinkansen Railway Noise" were established in 1975.

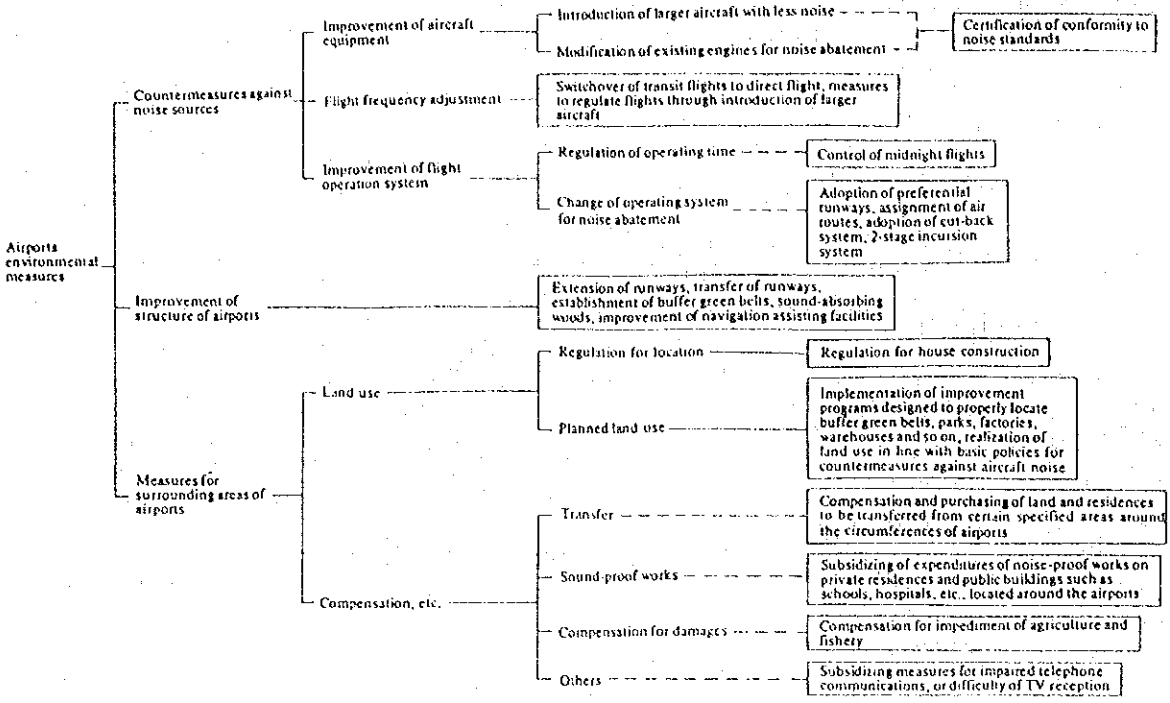
To achieve the environmental quality standards, "General Principles for Countermeasures against Shinkansen Railway Noise", which were prepared to provide for measures against noise sources and preventive measures against damage, were approved by the Cabinet in 1976 and under them appropriate measures have been taken together with vibration controls.

Control Scheme for Automobile Noise Pollution



Note: Other measures initiated are: 1) strengthening of monitoring and surveillance, 2) promotion of research and development of noise abatement technology, 3) development of new traffic system and 4) specialization of road function by constructing ring road and by-pass.

Systems of Environmental Countermeasures
for the Area surrounding Airports



2. Comprehensive Promotion of Countermeasures for Traffic Pollution

Efforts are being made to take measures against the sources of pollution and their surroundings, while paying attention to the causes of noise, vibration and air pollutants for individual types of traffic systems. Yet, they do not seem to be sufficiently effective.

In the future, it will be necessary to promote comprehensive countermeasures for traffic pollution by reviewing desirable traffic systems and city structures from the viewpoints of environmental preservation in addition to improving and building up measures being currently taken, while carrying out current measures against the sources of pollution. Further, to protect their surroundings effectively and efficiently with the increasing cooperation of related organizations in areas heavily subjected to traffic pollution.

Here, considering the situation of local areas which greatly differ in nature and level of traffic pollution, it will be necessary to apply

methods which are likely to meet the needs of local residents and different environmental conditions resulting from the features of a local nature and society, instead of only relying on nationally uniform measures. And in this respect, more importance should be given to the role of local public bodies.

III. Areawide Total Pollution Load Control System for Water Quality

1. Environmental Water Quality Standards

National water quality standards were adopted at the cabinet meeting in April 1970 in accordance with the provisions of the Basic Law for Environmental Pollution Control. The standards are divided into two categories: quality standards for the protection of human health (Table 1) and standards for conservation of the living environment (Table 2).

Standards concerning human health are specified for nine substances. The standards are applicable to all public waters and must be met at all times.

Standards for the living environment are specified on the basis of the type of waters, and take into consideration the standard values and uses separately for rivers, lakes (including reservoirs and marshes), and coastal waters.

2. Current Effluents Control System

The Water Pollution Control Law was enacted at the extra session of the diet (so-called "Diet Session for Pollution Control") in 1970. Under the law, effluent standards are applicable to all public waters, whether polluted or not.

Effluents discharged from industrial plants or other places of business that are designated by cabinet order as "Specified Facilities," must conform with the effluent standards. Specified facilities include almost all facilities likely to pollute public waters.

Specified Factories are those that have specified facilities.

Effluent standards for harmful substances, such as cadmium, are applicable to all specified factories whatever the quantities of their effluent.

Effluent standards for preservation of the living environment are applicable to specified factories that discharge an average of 50 m^3/d or more of effluent.

All public waters are covered by the law, and uniform effluent standards have been set at a national minimum level. The substances

and items regulated under the law are listed in Table 3.

Because the national uniform effluent standards do not take into consideration special conditions of local communities, such as population density and the location of industrial plants, it is difficult to meet water quality standards in some areas. In these areas more stringent effluent standards are expected to be set by prefectural ordinances.

3. Current State of Water Pollution

In general, water quality in Japan has been improving in recent years, reflecting the vigorous enforcement and strengthening of effluent control measures.

As regards toxic or harmful substances related to human health such as cadmium and mercury, the environmental water quality standards have almost completely been met (Table 4).

With respect to the items relating for living environment such as BOD in rivers, a general trend toward improvement may again be noted (Table 5).

However, in the so-called "enclosed" water areas where a large amount of pollutants is discharged, it is still difficult to achieve the environment water quality standards relating for living environment.

4. Areawide Total Pollution Load Control System

To improve water quality in the large enclosed waters it is necessary to reduce the total pollution load in the water drainage areas.

However, the current effluents control system cannot effectively cope with:

(1) Pollution load generated in the inner parts of basins such as upper-stream prefectures
(2) Household effluent, which constitutes a large part of pollution load
(3) Increased pollution load caused by the installation of new facilities
(4) Conformation to the standards by diluting effluents

In order to cope with the problems the areawide total pollution load control system was established in the form of a partial amendment to the Water Pollution Control Law.

The system is enforced as follows:

(1) Specified Water Area

A large-scale stagnant body of water is designated as "Specified Water Area" by cabinet order.

(2) Specified Region

The river basin of the Specified Water Area is designated as "Specified Region."

(3) Fundamental Policy for Reduction of Total Pollution Load

The Prime Minister shall establish the "Fundamental Policy for Reduction of Total Pollution Load" for the Specified Region. The Fundamental Policy stipulates the reduction target, the target year and methods for reduction.

(4) Plans for Reduction of Total Pollution Load

Based on the Fundamental Policy, the prefectural governors concerned shall present the "Plans for Reduction of Total Pollution Load." The Plans form the basis of the measures to be taken by prefectural governors for reduction of pollution loads.

(5) Total Pollution Load Regulation Standards

According to the Plan the prefectural governors shall apply total pollution regulation standards to factories and other workshops in the Specified Region. The standards set the tolerable amount of daily pollution load discharged by specified factories. The standards for COD_{Mn} are calculated by the following equation.

$$L = C \cdot Q \cdot 10^{-3}$$

Where: L = tolerable daily pollution load (kg/day)

C = COD_{Mn} concentration determined by the prefectural governor (mg/l)

Q = volume of the specified effluents (m^3/day)

Notes: 1. The values of C are set in the ranges which are designated by the Notification of the Environment Agency.

2. The specified effluents mean those from industrial or domestic sources, excluding the water used for cooling, decompression or other processes which does not increase its pollution load during the process.

It is also provided that the prefectural governors may establish the special total pollution load regulation standards for newly installed facilities. If noncompliance with the standards is anticipated, regulatory measures such as order for improvement will be applied.

(6) Measurement and Record of the Pollution Load

Owners of specified factories have the responsibility for measuring and recording the pollution load of the effluents.

This amendment was put into effect on June 12, 1979. On the basis of this legislative action, it has been determined to apply the areawide total pollution load control system for water quality control of Tokyo Bay, Ise Bay and Seto Inland Sea.

Table 1 Environmental Water Quality Standards relating to Human Health (Dec. 28, 1971)

Item	Standard values[1]
Cadmium	0.01 ppm or less
Cyanide	Not detectable
Organic phosphorus[2]	Not detectable
Lead	0.1 ppm or less
Chromium (sexivalent)	0.05 ppm or less
Arsenic	0.05 ppm or less
Total mercury	0.0005 ppm or less
Alkyl mercury	Not detectable
PCB	Not detectable

Notes: 1. Maximum values. But with regard to total mercury, standard value is based on the yearly average value.
2. Organic phosphorus includes parathion, methyl parathion, methyl demeton and E.P.N.

Table 2 Environmental Water Quality Standards relating to the Living Environment (Dec. 28, 1971)

Rivers

Category	Use	Standard Values[a] pH	Biochemical Oxygen Demand (BOD)	Suspended Solids (SS)	Dissolved Oxygen (DO)	Number of Coliform Groups
AA	Water supply class 1; conservation of natural environment, and uses listed in A–E	6.5–8.5	1 mg/l or less	25 mg/l or less	7.5 mg/l or more	50 MPN/100l or less
A	Water supply class 2; fishery, class 1; bathing and uses listed in B–E	6.5–8.5	2 mg/l or less	25 mg/l or less	7.5 mg/l or more	1 000 MPN/100 ml or less
B	Water supply class 3; fishery class 2, and uses listed in C–E	6.5–8.5	3 mg/l or less	25 mg/l or less	5 mg/l or more	5 000 MPN/100 ml or less
C	Fishery class 3; industrial water class 1, and uses listed in D–E	6.5–8.5	5 mg/l or less	50 mg/l or less	5 mg/l or more	—
D	Industrial water class 2; agricultural water,[b] and uses listed in E	6.0–8.5	8 mg/l or less	100 mg/l or less	2 mg/l or more	—
E	Industrial water class 3; conservation of environment	6.0–8.5	10 mg/l or less	Floating matter such as garbage should not be visible.	2 mg/l or more	—

ıble 2 continued)

ces (natural lakes, reservoirs, marshes and artificial lakes more than 10^7 m^3 water)

tegory	Use	Standard Values[a] pH	Chemical Oxygen Demand (COD^{Mn})	Suspended Solids (SS)	Dissolved Oxygen (DO)	Number of Coliform Groups
AA	Water supply class 1; fishery class 1; conservation of natural environment, and uses listed in A–C	6.5–8.5	1 mg/l or less	1 mg/l or less	7.5 mg/l or more	50 MPN/100l or less
A	Water supply classes 2 and 3; fishery class 2; bathing, and uses listed in B–C	6.5–8.5	3 mg/l or less	5 mg/l or less	7.5 mg/l or more	1 000 MPN/100 ml or less
B	Fishery class 3; industrial water class 1; agricultural water,[b] and uses listed in C	6.5–8.5	5 mg/l or less	15 mg/l or less	5 mg/l or more	—
C	Industrial water class 2; conservation of environment	6.0–8.5	8 mg/l or less	Floating matter such as garbage should not be visible	2 mg/l or more	—

ıstal waters

ategory	Use	Standard Values[d] pH	Chemical Oxygen Demand (COD^{Mn})	Dissolved Oxygen (DO)	Number of Coliform Groups[d]	N-hexane Extracts
A	Fishery class 1;[e] bathing; conservation of natural environment, and uses listed in B–C	7.8–8.3	2 mg/l or less	7.5 mg/l or more	1 000 MPN/100 ml or less	Not detectable
B	Fishery class 2;[f] industrial water, and uses listed in C	7.8–8.3	3 mg/l or less	5 mg/l or more	—	Not detectable
C	Conservation of environment	7.0–8.3	8 mg/l or less	2 mg/l or more	—	—

[a] The standard values are based on the daily average values. (The same applies to standard values for lakes and coastal waters.)
[b] At the inlet of agricultural water, pH shall be between 6.0 and 7.5 and dissolved oxygen shall not be less than 5 mg/l. (The same applies standard values for lakes.)
[c] With regard to fisheries, classes 1, 2, and 3, the standard values for suspended solids shall not be applicable for the time being.
[d] With regard to the quality of fisheries, class 1 for planting oysters, the number of coliform groups shall be less than 70 MPN/100 mℓ.
[e] Fishery class 1: Aquatic life such as red sea-bream, yellow tail, seaweed.
[f] Fishery class 2: Aquatic life such as gray mullet, laver, etc.

Notes: Conservation of natural environment: of scenic spots and other natural resources. Water supply class 1: Water that requires mple cleaning treatment such as filtration. Water supply class 2: Water that requires normal cleaning treatment such as sedimentation and tration. Water supply class 3: Water that requires highly sophisticated cleaning treatment including pretreatment. Fishery class 1: For ıh such as trout and bull trout in oligosaprobic waters, and those of fisheries class 2 and class 3. Fishery class 2: For fish such as fish of ıe salmon family and sweetfish in oligosaprobic waters and those of fisheries class 3. Fishery class 3: for fish such as carp and silver ırp in β-mesosaprobic water. Industrial water class 1: Water should be given normal cleaning treatment such as sedimentation. Industrial ater class 2: Water should be given sophisticated treatment by chemicals. Industrial water class 3: Water should be given special clean- g treatment. Conservation of environment: Up to the limits at which no nuisance is caused to people in daily life (including walking by ıe riverside, shore, and so on).

Table 3 National Uniform Effluent Standards (June 21, 1971)

Substances relating to human health

Toxic Substances	Permissible Limits mg/l
Cadmium and its compounds	0.1
Cyanide compounds	1
Organic phosphorus compounds (parathion, methyl parathion, methyl demeton and EPN only)	1
Lead and its compounds	1
Chromium (VI) compounds	0.5
Arsenic and its compounds	0.5
Total mercury	0.005
Alkyl mercury compounds	Not detectable [a]
PCB	0.003

Items relating to living environment

Item	Permissible Limits
pH	5.8-8.6 for effluent discharged into public water areas other than coastal waters, and 5.0-9.0 for effluent discharged into coastal waters
BOD, COD^{Mn}	160 mg/l (daily average 120 mg/l)
SS	200 mg/l (daily average 150 mg/l)
N-hexane extracts	5 mg/l (mineral oil) 30 mg/l (animal and vegetable fats)
Phenols	5 mg/l
Copper	3 mg/l
Zinc	5 mg/l
Dissolved iron	10 mg/l
Dissolved manganese	10 mg/l
Chromium	2 mg/l
Fluorine	15 mg/l
No. of coliform groups (per cc)	3 000 (daily average)

[a] By the term "not detectable" is meant that the substance is below the level detectable by the method designated by the director general of the Environment Agency.

NOTES: The effluent standards in this table are applicable to effluents from industrial plants or other business places whose volume of effluents per day is 50 m^3 or more. The effluent standards for BOD are applied to public waters other than coastal waters and lakes, whereas the standards for COD^{Mn} are applied only to effluents discharged into coastal waters and lakes.

Table 4 Ratio of Samples Exceeding Water Quality Standards for the Protection of Human Health

Substances	Water Quality Standards	1970	1975	1979
Cadmium	0.01 mg/l	2.8	0.31	0.13
Cyanide	Not Detectable*	1.5	0.02	0.01
Organic P	Not Detectable*	0.2	0	0
Lead	0.1 mg/l	2.7	0.32	0.00
Cromium (VI)	0.05 mg/l	0.8	0.02	0.01
Arsenic	0.05 mg/l	1.0	0.24	0.16
Total Mercury	0.0005 mg/l**	1.0	0***	0***
Alkylmercury	Not Detectable*	0	0	0
PCBs	Not Detectable*	-	0.38	0.05

Notes: * By the term "Not Detectable" is meant that the substance is below the level detectable by the method designated by the Director General of the Environment Agency

** Annual averages

*** In number of sampling sites

Table 5 Ratio of Samples Exceeding Water Quality Standards for BOD in Rivers

Water Quality Categories	Water Quality Standards for BOD	1971 (%)	1975 (%)	1979 (%)
AA	1 mg/l	36.7	31.4	23.9
A	2 "	30.9	24.4	21.5
B	3 "	35.6	27.4	28.1
C	5 "	39.9	42.6	43.4
D	8 "	52.8	37.8	36.5
E	10 "	70.2	49.7	43.5
Total	-	43.1	30.5	28.2

Table 6 General Features of Tokyo Bay, Ise Bay and Seto Inland Sea Regions

	Tokyo Bay	Ise Bay	Seto Inland Sea
Surface Area of Water Body (km^2)	1,400	2,300	23,000
Volume of Water Body (100 million m^3)	540	460	7,300
Population in 1976 (x 1,000)	22,200	9,090	28,130
Manufactured Goods in 1976 (trillion yen)	32.2	18.4	44.5
(billion U.S. dollar*)	(107)	(61)	(148)

* Caluculated as 1 U.S. dollar equivalent to 300 yen.

Table 7 Target Pollution Load of Tokyo Bay, Ise Bay and Seto Inland Sea Regions (COD_{Mn} Load in 1984)

(ton/day)

	Tokyo Bay	Ise Bay	Seto Inland Sea
Total	660 (91.4)	426 (90.8)	1,283 (92.6)
Domestic Sources	386 (90.2)	179 (90.4)	517 (90.9)
Industrial Sources	180 (90.0)	208 (92.4)	666 (93.9)
Others	94 (100)	39 (84.8)	100 (92.6)

Note: Figures in parentheses indicate the percentage of the target load to the load in 1970.

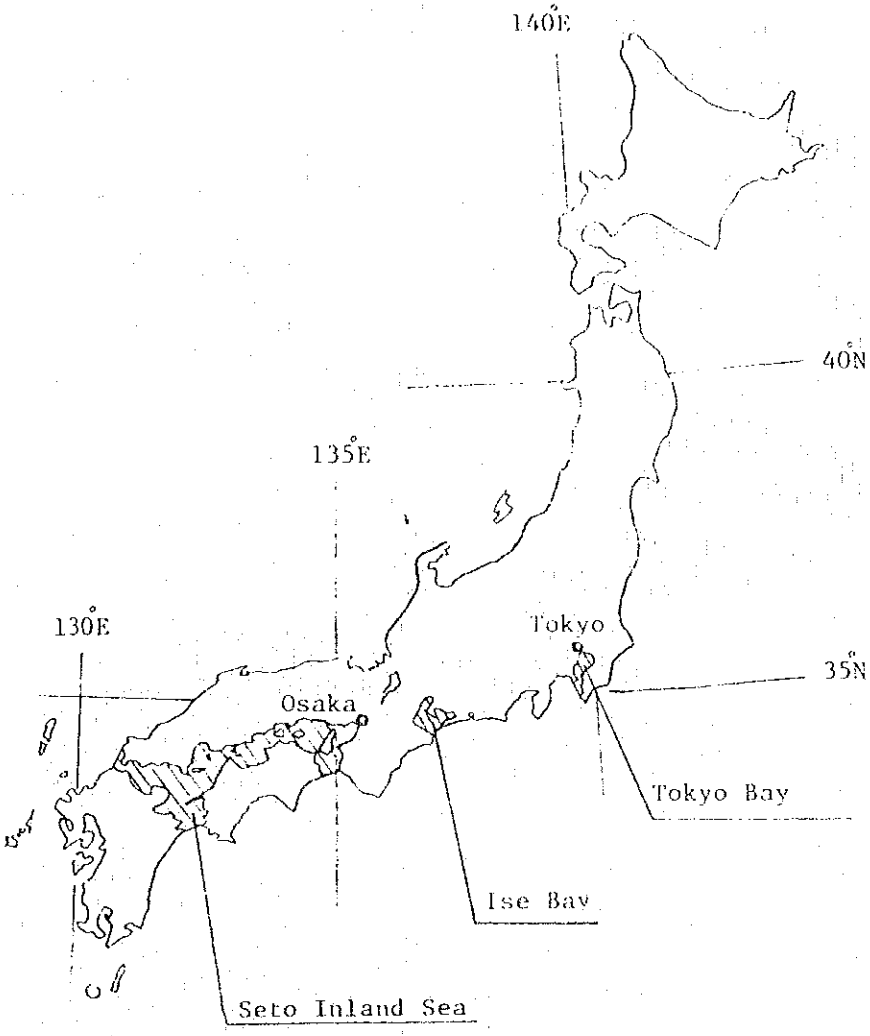


Fig. 1 Specified Water Areas of Tokyo Bay, Ise Bay and Seto Inland Sea

Supplement

Calculation of Pollution Load

1. Preparation of Basic Data

In order to calculate the pollution load, it is necessary to prepare the basic data regarding to the Specified Region. The basic data are listed in Table I. Actual data for present condition (newest available) and predictive data for future condition (target year) are necessary. These data are chiefly collected and reported by prefectural governments. It is inevitable to consult with ministries and agencies concerned about the predictive data.

Table I List of Basic Data for Calculating the Pollution Load

Classification	Item
Population	Total population Population served by public sewerage Population using night soil purification tanks[1)] Population treated by night soil treatment facilities Others
Land	Total area Agricultural Area (rice field, etc.) Forest land Others (city area, etc.)
Livestock Raising	Cattle Horse Hog
Specified Factories	Classification[2), 3)] Volume of effluent[2)] COD_{Mn} concentration of effluent[2)]
Factories except Specified Factories	Total Volume of effluent[4)] Average COD_{Mn} concentration of effluent[4)]

Notes: 1) These population are devided further by the type of tanks;
a. large purification tanks which treat night soil and sewage*
b. little purification tanks which treat night soil and sewage
c. large purification tanks which treat night soil only*
d. little purification tanks which treat night soil only.
* These tanks are designated as specified factories.
2) Data concerning each specified factory are necessary.
3) Classification of specified factories are sewage treatment plant, large purification tank, night soil treatment facility, large livestock raising farm, industry plant etc. Industry plants are further classified by the type of industry.
4) Classified by the type of industry.

. Classification of the Pollution Load by the Sources of Effluent

The pollution load is classified and summed by the sources of effluent.

1) Domestic effluent

Night soil and waste water from kitchens and bathrooms are main pollutant. The effluent discharged by sewage treatment plants, night soil purification tanks and night soil treatment facilities are comprised in this category.

2) Industrial effluent

Industrial effluent is the waste water discharged by factories as the result of industrial activities.

3) Others

Sources except 1) and 2) is classified in this category. The effluent of livestock raising and run-off from agricultural area are main sources.

. Calculation of Pollution Load

There are two ways of calculating pollution load.

1) Pollution load of specified factories

The pollution load of effluent discharged by specified factories is calculated by the following equation.

$$L = C \cdot Q \cdot 10^{-3}$$

where L = pollution load (kg/day)

C = COD_{Mn} concentration of effluent (mg/l)

Q = volume of effluent (m^3/day)

2) Pollution load except that of specified factories

The pollution load except that of specified factories is calculated by the following equation.

$$L = N \cdot U \cdot 10^{-3}$$

where L = pollution load (kg/day)

N = number/quantity of population, area, domestic animals, effluent

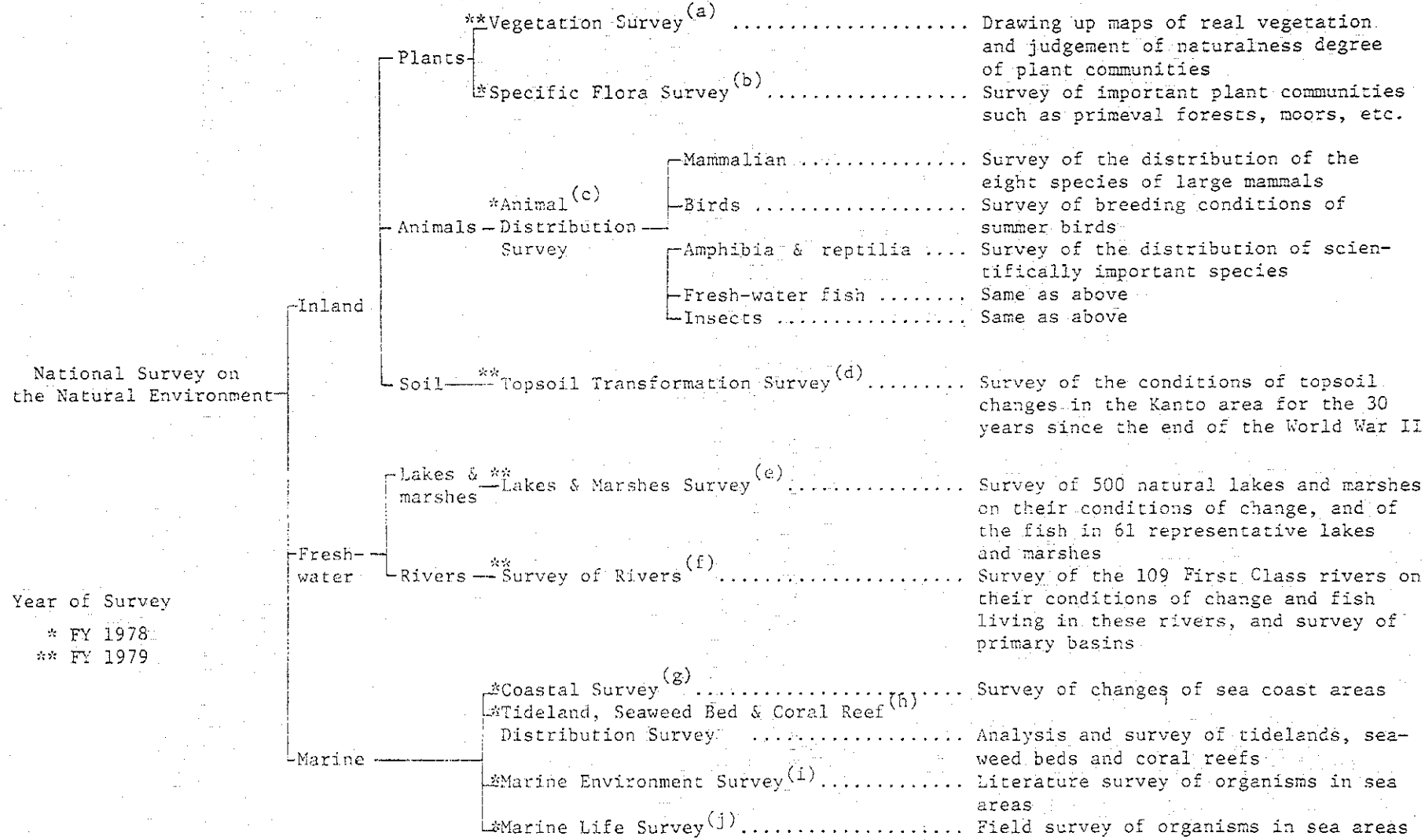
U = unit for calculating COD_{Mn} load (g/person, km^2, animal, m^3)

IV. National Survey on the Natural Environment

The natural environment of sea areas, sea coasts, rivers, lakes, marshes and so on, as well as their fauna and flora, which cover the nation's land, have been changing recently at a remarkable accelerated rate. The first thing to do in order to properly conserve this so rapidly changing natural environment, is to grasp precisely the present state of the natural environment, so as to form a clear view of the future direction of its change.

For this reason, the first National Survery on the Natural Environment was carried out in 1973, based on Article 5 of the Nature Conservation Law. The National Survey on the Natural Environment, which is generally called the "Census of Greenery", is conducted about once every five years, in order to comprehensively and scientifically grasp the situation of the natural environment of our country. Next to the first survey, the second survey was initiated in 1978, backed up by a carefully worked-out plan. First of all, the Review Committee, consisting of men of learning and experience, started discussing survey items, survey methodology and so on in 1976, and, a general plan for the survey was determined at the end of 1977, the outlines of which are shown in figure below. Of all the outlines, surveys on six items, namely, specified plant communities, the geographical distribution of animals (mammalian, birds, amphibia, reptilia, fresh-water fish and insects), sea coasts, the distribution of tidelands, seaweed bed and coral reefs, marine environment and marine life, were conducted in 1978, with a budget of 402.28 million yen. Reports on these surveys except for the geographical distribution of animal (birds) and the coastal survey, compiled separately by prefecture, were publicly announced in July 1979, and furthermore, prompt reports of the classified totals of the survey on the geographical distribution of animals were officially issued in June 1979 and January 1980, respectively.

Also, in 1979 with a budget of 403.52 million yen, surveys on the four items, namely, vegetation, topsoil transformation, lakes and marshes, and rivers, were conducted, as well as the work for the totalization and compilation of the survey results for the geographical distribution of animals (mammalian and birds) and the coastal survey among all the other surveys conducted in 1978. Nationwide totalization, com-


National Survey on the Natural Environment
Inland
Plants
**Vegetation Survey(a) ..... Drawing up maps of real vegetation and judgement of naturalness degree of plant communities
*Specific Flora Survey(b) ..... Survey of important plant communities such as primeval forests, moors, etc.
Animals
*Animal Distribution Survey(c)
Mammalian ..... Survey of the distribution of the eight species of large mammals
Birds ..... Survey of breeding conditions of summer birds
Amphibia & reptilia .... Survey of the distribution of scientifically important species
Fresh-water fish ..... Same as above
Insects ..... Same as above
Soil
**Topsoil Transformation Survey(d) ..... Survey of the conditions of topsoil changes in the Kanto area for the 30 years since the end of the World War II
Fresh-water
Lakes & marshes
**Lakes & Marshes Survey(e) ..... Survey of 500 natural lakes and marshes on their conditions of change, and of the fish in 61 representative lakes and marshes
Rivers
**Survey of Rivers(f) ..... Survey of the 109 First Class rivers on their conditions of change and fish living in these rivers, and survey of primary basins
Marine
*Coastal Survey(g) ..... Survey of changes of sea coast areas
*Tideland, Seaweed Bed & Coral Reef Distribution Survey(h) ..... Analysis and survey of tidelands, seaweed beds and coral reefs
*Marine Environment Survey(i) ..... Literature survey of organisms in sea areas
*Marine Life Survey(j) ..... Field survey of organisms in sea areas
Year of Survey
* FY 1978
** FY 1979

pilation and consideration of survey results are expected to be carried out in 1980, and, drawing up maps, such as maps of the distribution of animals, real vegetation maps, etc., in 1980 and 1981, respectively.

(a) Vegetation Survey

As a part of the program to grasp in detail the present state of vegetation all over the country, and to provide nationwide systematic maps of real vegetation which will enable execution of plans at a regional level, a vegetation survey, covering about one half of national land, was carried out, and, real vegetation maps on a scale of 1 to 50,000 are drawn up.

(b) Specific Flora Survey

From plant communities found throughout the country, more than 4,000 were selected as scientifically important and needing protection by surveying their growth — those floras representing local landscapes such as wild forests, moorland vegetation, alpine vegetation, shrine and temple groves and Musashino coppices.

(c) Animal Distribution Survey

As the first step toward the understanding of the life characteristics of faunas inhabiting Japan, a survey was made of the distribution of the following animal-types: mammalian, birds, amphibia and reptilia, fresh-water fish and insects.

(d) Topsoil Transformation Survey

The topsoil conditions in three separate time periods, around in 1945, 1960 and 1975, were investigated in the Kanto district, consisting of one metropolis and six prefectures (excluding islands), by employing the methodology such as the decipherment of aerial photos, etc., and actual conditions of topsoil changes were surveyed by a time series and quantitatively.

(e) Lakes and Marshes Survey

A survey of about 500 natural lakes and marshes existing all over the country was conducted to find out their topographies, their geographical features, outlines of organisms, water such as the degree of transparency, etc., and change conditions of lake fronts. A survey of fresh-water fauna in 61 representative lakes and marshes such as Lake Biwa was also carried out.

(f) Survey of Rivers

A survey of selected 109 First Class Rivers and the Urauchi river in Okinawa Prefecture, was conducted to clarify the conditions of the

fish living in these rivers, and to study riverbank changes. All the rivers were also surveyed with the aim to extract those whose drainage basins remain in primeval condition (wild river basins).

(g) Coasts Survey

Along about 30,000 km of Japanese coastline, data was collected on natural conditions of sand beaches, rocks, cliffs and the like, their transformation by such means as coast protection and their pollution by garbage and waste oil, and a survey was made of the condition of coastal lands for various purposes including land use, recreation and so on.

(h) Tideland, Seaweed Bed and Coral Reef Distribution Survey

Data was collected concerning their size and location and general pollution by sand accumulation, while a survey was made of the disappearance of such regions.

(i) Marine Environment Survey

With a view to understanding the present state of coastal waters with respect to wildlife, existing data was collected and reviewed on the incidence of plankton, benthos, attached creatures, colon bacilli and occurrence of red tides, individually for 91 different sea areas.

(j) Marine Life Survey

In order to clarify the state and the environment of the marine life in coastal waters that have particularly highly biological production, a survey was made of the kinds and wet weights of creatures inhabiting supralittoral zones (splash zones) and intertidal zones. The survey covered 102 points throughout the country and was conducted twice — in spring and summer — a year.