

カントリー・レポート

開発途上国の環境対策の現状と課題

METROPOLITAN AREA OF SAO PAULO

by MR. EDUARDO ANTONIO LICCO

1. Introduction

It is axiomatic that the more advanced a civilization becomes, the more complex are the problems related to man's environment, namely, congestion, crime, housing, traffic, noise, pollution etc. Of recent years, it has become increasingly obvious that the improper disposal of solid, liquid and gaseous wastes is creating a growing problem of environmental pollution. The resulting alteration of man's natural environment has reached the point where the environment is now beginning to exert untoward effects on man. This fact happens in any modern city, and is specially true for the developing country cities.

Brazil, for instance, has nowadays many metropolitan areas with environmental problems affecting their populations. Among them, Sao Paulo's shows the most concerning situation. In addition to severe vehicle related pollution, Sao Paulo's high degree of industrialization, size and population give rise to other social and environmental problems, worsened by the economical crisis the country copes with.

Even being the leading car of the Brazilian economy, due to the national revenue distribution systematics adopted by the central government, Sao Paulo also depends on Federal appropriations to implement its improvement programs. Notwithstanding, Sao Paulo has shown a satisfactory progress in many of its governmental programs, specially in those concerning to environmental pollution control.

To help people to better understand and protect the ecosystems they live in, programs on environmental education have also been developed and implemented in Sao Paulo. Thanks to these programs, the relationship between government and industry has improved, reducing the traditional inertia shown by industries during the implementation of mandatory pollution control measures. Also the public participation on environment related questions has augmented with the people's increased awareness on the theme.

2. The Environmental Situation in Sao Paulo

2.1 Air Pollution

Despite some air pollution benefits due to the introduction of ethanol as automotive fuel, most of the air quality problems in the Brazilian metropolis are basically vehicle related, with very few exceptions due to bad located air pollution point sources.

Sao Paulo however, clearly differs from that pattern, mainly because its quite peculiar industrialization and population size. With a 4.2 million vehicle fleet and a highly diversified industry, Sao Paulo's 15 million inhabitants suffer with the effects of a highly polluted atmosphere, contaminated by industrial, vehicular and non-conventional source emissions.

In spite of the successful industrial control programs for Smoke, TSP and SO₂, Sao Paulo's air pollutant concentrations still exceed the air quality standards, showing peak values as high as 38 ppm (8 hr. avg.) for CO, 584 ppb (1 hr. avg.) for O₃ or even 715 Hg/m³ (24 hr. avg.) for TSP. These values make clear the strong influence vehicular emissions have on city's air quality and justify all the efforts spent in their control.

60 Kms far from Sao Paulo is Cubatao, state's second industrial pole, with a quite different air quality situation. There, air quality is exclusively affected by industrial sources, in special by those responsible for particulate emissions. Thanks to the pollution control program implemented in 1983, more than 70% of Cubatao's industrial emissions are under control, changing its negative image of "valley of the death".

Regarding air pollution control as a state aim, permanent programs for mobile and stationary sources are on course, showing by now, quite satisfactory results. For mobile sources, improvements on the air quality are expected only around 1997, when PROCONVE, the national control program for vehicular emissions will be completely implemented. Concerning to stationary sources, sharp reductions were obtained on SO₂, particulate and smoke emissions, showing positive reflexes in the air quality. Besides those permanent programs, Sao Paulo also counts on Contingency Control Programs, developed to protect public health against damages caused by severe air pollution episodes. One of these programs were tested on August 13, 1986 when downtown Sao Paulo was closed to all vehicles in a 9 hour simulation of a CO air pollution episode.

To support all air quality control programs, Sao Paulo Metropolitan Area counts on a 23 sampling site automatic air quality surveillance network.

Installed in the very beginning of the 80's, it is quite scant for present Sao Paulo's needs.

2.2 Water Pollution

For the last decades, many Brazilian cities have been living exposed to the water pollution caused by the generalized disposal of untreated wastewater into the nearby water bodies.

In Sao Paulo Metropolitan Area not only domestic sewage but also industrial effluents have been discharged untreated into the rivers, putting under risk life and welfare of millions of people. The increasing public dissatisfaction with the water pollution problem have led the state government to decide for recovering the water quality of the rivers crossing the area. To do that, the implemented multi million dollar project establishes an integrated solution to industrial effluents and domestic sewage. Industrial effluents must be selected and pre-treated at the source before of being sent for complementary treatment in macro wastewater treatment plants, strategically installed along the city's main river. The collected domestic sewage also goes to those plants, as part of the projected co-treatment process.

Due to the shortage of financial resources, the macro treatment plants and sewage collection network were not completely implemented yet. The system works today with about 30% of its nominal capacity. Regarding industrial effluent treatment, it has been enforced in all protected water basins.

2.3 Hazardous Waste Pollution

Even though the hazardous wastes represent only a small fraction of all wastes generated, it is beyond dispute they cause detrimental impacts on human health and on life supporting systems. Lately, industrial and hazardous wastes management has become the focal point of the environmental problems, not only in industrialized nations, but also in third world countries.

Specially in developing countries, industrialization without adequate knowhow on waste management has helped augment the magnitude of the problem. Hence, it's imperative for all developing nations, to incorporate proper industrial and hazardous waste management practices in their development projects, in order to avoid any further environmental degradation.

Aware to the problem, Brazil is up to promulgate its first federal act on hazardous wastes, setting rules and regulations for handling, transportation

and disposal of such materials. On its turn, Sao Paulo that already shows serious problems of water contamination caused by improper waste disposal, started last July, a 5 year program, in order to identify generators, transporters and disposal sites, classify wastes, implement adequate disposal methods and reclaim degraded areas.

Due to the novelty of the subject, some difficulties have been faced not only by the industries to implement the program, but also by the government to enforce it.

3. Topics for International Cooperation

3.1 Considering the age and extension of the Sao Paulo's present air quality surveillance network, it would be of great importance international cooperation to

- a) extend it
- b) increase the number of pollutants measured in each station
- c) improve data processing systems
- d) modelling in air quality.

3.2 Considering the already unsolved problem of wastewater disposal into the rivers crossing the city, it would be of great importance international cooperation to

- a) study alternative solutions
- b) go ahead with the partially implemented solution
- c) modelling in water quality
- d) monitoring water quality
- e) help field analysis of industrial effluents

3.3 Considering the relentless growing in the urban noise, it would be of great importance international cooperation to

- a) better evaluate the urban noise
- b) propose short, medium and long term solutions
- c) help implementing the proposed solutions
- d) exchange experience on the matter

It would be of great importance too, to approach questions related to vibration caused by industrial and or mineral extraction activities.

3.4 Considering the difficulties faced by industry and government to implement hazardous waste control programs, it would be of great importance international cooperation to

- a) technical training on optimum disposal sites determination
- b) technical training on treatment and disposal methodologies
- c) exchange experience on legal aspects
- d) evaluate hazardous waste (field and laboratory analysis)

It would be of great importance too, to approach the household waste disposal matter.

3.5 Considering the nuisance problem caused by countless number of urban odor sources, it would be of great importance international cooperation to

- a) approach the problem
- b) quantity and quality order emissions
- c) control odor sources
- d) discuss laws and regulations
- e) technical training on the matter

3.6 Considering the implantation of the national control program for vehicular emissions, it would be of great importance international cooperation to

- a) exchange experience in control technologies
- b) implement inspection and maintenance programs

A N N E X

A. % of time air pollutants exceed air quality standards in Sao Paulo (1988)

Fig. A.1. TSP ($240 \mu\text{g}/\text{m}^3$ - 24 hr. avg.)

Fig. A.2. SO_2 ($365 \mu\text{g}/\text{m}^3$ - 24 hr. avg.)

Fig. A.3. O_3 ($160 \mu\text{g}/\text{m}^3$ - 1 hr. avg.)

Fig. A.4. CO (9 ppm - 8 hr. avg.)

B. Water Quality in Sao Paulo's rivers

blue - excellent

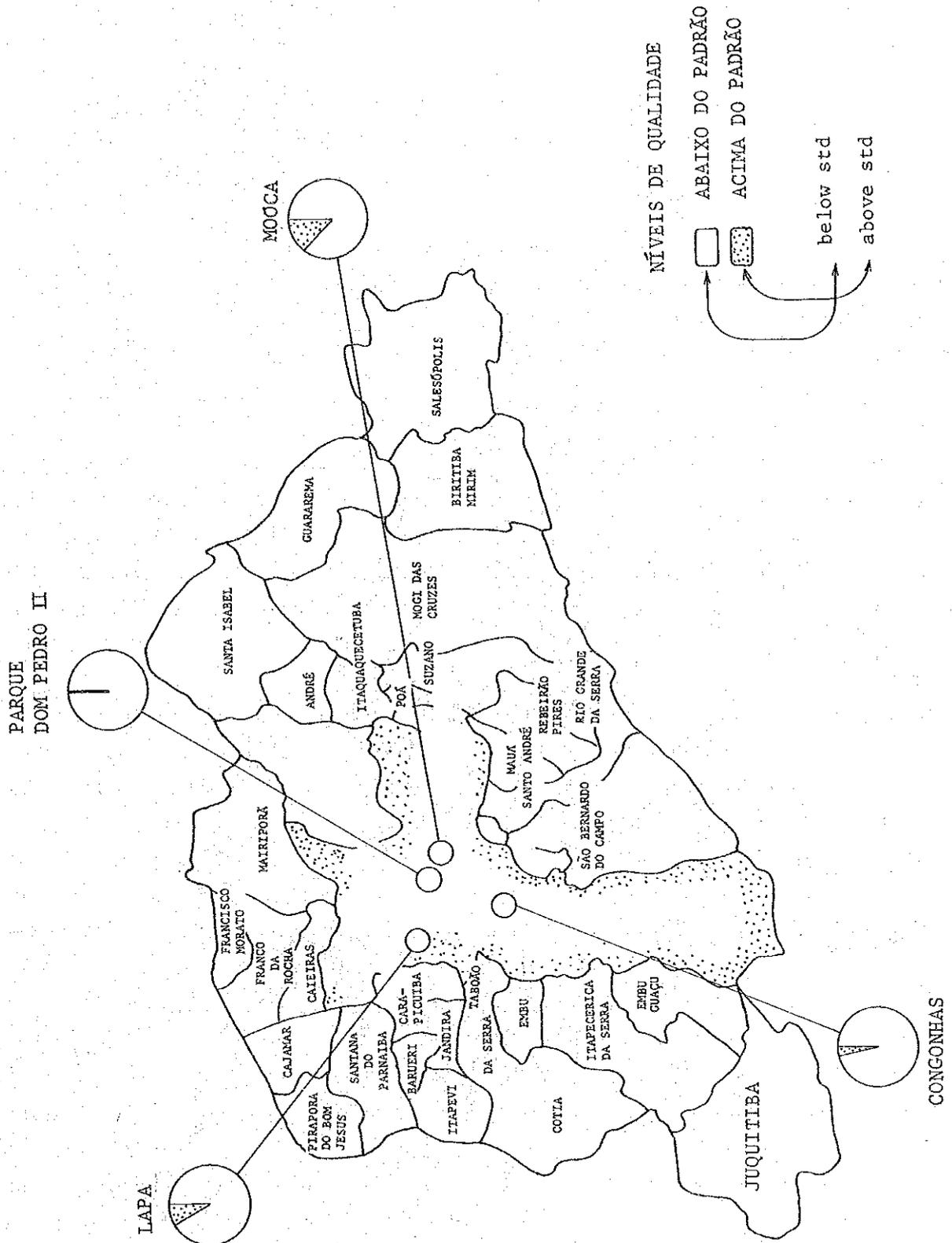
green - good

yellow - fair

red - poor

black - improper

Figura A.3.- Ozonã - Porcentagem do Tempo em que o Padrão de Qualidade (160 ug/m³ - ih) foi excedido, em 1988, na RMSp.



NOTAS SOBRE PROBLEMAS AMBIENTAIS NO BRASIL

by MR. DANTE MARIUTTI

1. Preliminarmente, seja-nos lícito agradecer penhoradamente a honra insigne que nos fez o governo e o Povo Japonês, ao convidar-nos para expressar o ponto de vista da indústria de São Paulo perante este seletó auditório.
2. Isso tanto mais nos dignifica e desvanece, quando se trata de falar a uma audiência Japonêsa, sendo o Japão um país altamente admirado no Brasil pela capacidade de trabalho de seu povo, seu poder de recuperação, seu senso ingênito de seu destino, sua habilidade em realizar planos, em concretizar sonhos, em construir uma esplêndida realidade nacional.
3. Graças a esse espírito de luta, essa rara competência para combater o bom combate, o Japão, partindo do quase nada em 1945, chegou a ser o gigante que é hoje: uma das maiores economias do mundo, que com o vigor, a coragem, o denodo, o arrojo e a visão de seus dirigentes e de Seu Povo, avança sobre todos os mercados do planeta, em todos eles conseguindo uma faixa ponderável da economia de cada um deles.
4. O Brasil não inveja o Japão, mas não pode deixar de admirar a obra hercúlea, que Seu Povo realizou neste último meio século - obra que causa espanto tanto nos países sub-desenvolvidos como nos em desenvolvimento, assim como nos plenamente industrializados, o Japão é, em suma, um exemplo para o mundo, e todos os povos gostariam de ter feito uma parcela que fosse do que o Japão, fez, e fez bem, colocando-se na primeira plana no congresso das nações. Povo único, obra soberba. Pudesse o Brasil realizar uma parcela do que o Japão conseguiu, e já poderia considerar-se feliz.
5. No Brasil, como em todo o resto do mundo, hoje é crescente a preocupação com o meio ambiente e sua preservação. Mesmo países estranhos, industrializados, ou não, tem os olhos voltados para o Brasil e sua ecologia, do que faz prova a reportagem da capa da revista "TIME" de 18 de Setembro de 1989, que enfocou, especialmente, o problema da queimada da floresta amazônica, apontando todos os riscos internacionais daí decorrentes.
6. Se os outros países se preocupam, a tal ponto, com os problemas ambientais Brasileiros - por suas dimensões continentais - o Brasil, em particular, não poderia deixar de estar atento a tais problemas.

7. Os problemas de poluição e de conservação do ambiente preocupam de tal forma a consciência nacional, que a própria constituição federal de 1988 contempla, em alguns dispositivos, normas supralegais de controle da poluição e de preservação do sistema ecológico. Talvez seja a única constituição do planeta, a dedicar artigos de seu texto a tais questões.

8. O Brasil é uma república federativa, como tal, tem um governo federal, numerosos governos estaduais, e um enorme contingente de governos municipais. Pois bem, como consequência, há leis federais, estaduais e municipais, que regem a matéria de que tratamos: ecologia, e sua proteção, diante da poluição. Muitas vezes, não é fácil a aplicação de tantas legislações superpostas, provenientes desde a união até o menor município do país. O relacionamento entre as três ordens de pessoas jurídicas de direito interno (união, estados, municípios), não se faz sem alguma dificuldade, pois todas elas têm suas normas internas e uma burocracia particular para aplicá-las, o que não deixa de perturbar as atividades industriais, que tem de se submeter a três ordens diversas de leis, no mesmo país. Ademais, herdamos de nossos ancestrais peninsulares uma burocracia rígida, inflexível que é incapaz de amoldar-se às novas situações, às novas contingências, à evolução das necessidades.

9. Entre as três ordens de pessoas jurídicas de direito público interno, as empresas não podem deixar de sofrer, para submeter-se a Três Ordens de Lei, a três fiscalizações diversas e superpostas, sujeitas a três tipos de sanções e penalidades, a três espécies de processos administrativos ou judiciais, e toda espécie de problemas daí decorrentes.

10. A mistura de legislação avançada (até constitucional), com um país gigantesco e desigual, com todo gênero de diversidades regionais, acrescido do sistema federal - com as três esferas de governos, praticamente autônomas - aliada a uma burocracia de caráter mais fiscalizador e primitivo, do que orientador, e se tem uma idéia do tipo de dificuldades que as indústrias enfrentam.

11. A uniformização das normas, a mudança da mentalidade burocrática da "Nomenklatura", e a transformação do espírito dos órgãos competentes (que devem ter olhos voltados para a orientação antes do que para a punição) são elementos indispensáveis ao bom e racional desenvolvimento econômico do país. Hoje, esses elementos inexistem; e o progresso econômico-industrial da nação está emperrado e sufocado.

12. Ademais, a ponderável maioria da legislação de controle da poluição e preservação do meio ambiente é concebida por técnicos cheios de teoria e vazios de prática, em gabinetes fechados, verdadeiras "Torres de Marfim" completamente afastados da realidade nacional, das limitações impostas pela pobreza regional, e das possibilidades da indústria brasileira, esta, raríssimas vezes é consultada previamente, de ante-mão, e na maioria das vezes só toma conhecimento das novas disposições legais quando vem a fiscalização, para punir, para multar, para iniciar processos.

13. Não é que tais técnicos sejam hostis à indústria ou interessados em coarctá-la, mas são técnicos de gabinete, que não convivem com os problemas diários da indústria, não têm os pés firmemente plantados no chão, mas, ao contrário, têm a cabeça nas nuvens, recheada de teorias exóticas, que podem funcionar na Suíça, na Suécia, na Alemanha, ou no Japão, mas não se adaptam às condições Brasileiras, de atraso econômico, político e social. Nossa realidade não se ajusta a tais teorias, nem pode. A teoria é que deveria atender às nossas condições, evidentemente, mas não é isso o que acontece. Há regiões do país que ainda não viram uma bicicleta, mas os técnicos nefelibatas - os ecomaniacos - querem impor-lhes legislação referente a aviões a jato, a veículos motorizados, a química fina, a computadores de 4a. geração.

14. Em suma, há um sério descompasso entre a lei (altamente técnica e evoluída) e a realidade nacional, de pobreza, doenças, endemias, fome e outros flagelos existentes em certas regiões do país. É a aplicação da lei Suíça à bafra, simplesmente, não funciona.

15. De que adiantam leis aviadíssimas (feitas sem a participação da comunidade), se nossos homens do campo só conhecem a "Queimada" como meio de ocupar o solo amazônico? O mundo vê, horrorizado, a devastação da selva amazônica. Estamos de acordo, é um espetáculo deplorável como bem frisou a revista "TIME" (de 18 de Setembro de 1989). Mas que se há de fazer? O roceiro não ouviu nem falar de processos de aproveitamento sustentado da floresta, nem sabe que isso existe. Por isso, queima florestas de 3.000 anos para plantar feijão, arroz e milho. É a ignorância e a pobreza que o conduzem a isso. Muitas, processo, prisão, nada disso vai esclarecê-lo, educá-lo, torná-lo civilizado. Morrerá fazendo o que sempre fez: desmatando com fogo, para plantar sua roça de subsistência.

16. Precisamos de uma legislação mais simples, mais condizente com a modéstia de nossos meios e a rudimentaridade de nossa técnica, legislação feita de comum acordo com o 'Legislado' com aqueles que devem sofrer-lhes os efeitos; uma burocracia que oriente, aconselhe, mostre os caminhos, a via a seguir, não fiscais que ameacem, entrem, paralitem; técnicos que cooperem para obter soluções possíveis, não que imponham regras copiadas do exterior, de cumprimento impossível; de uma ação federal, estadual, municipal conjunta, comum, acessível, de cooperação, não de oposição sistemática.

17. É indispensável que os governos ajam junto com as empresas, para que, juntos e de comum acordo, enfrentemos os problemas existentes e busquemos soluções práticas, factíveis, conformes ao atual estágio de desenvolvimento do país. Quando o governo concordou em optar por essa via, convocando as empresas privadas e os técnicos da administração, mesmo com recursos limitados e técnica limitada - governo e indústria liquidaram o problema de cubatão, capital mundial da poluição e vergonha para o mundo. Lá havia poluição do ar, das águas, do solo, desmatamento da serra do mar, problemas de saúde pública e outros mais. O eixo governo-indústria, solidários, conseguiu resultados que se aproximam do milagroso, e cubatão, hoje, tem vida normal, com 90% de seus problemas solucionados, tudo graças a uma ação conjunta, comum, entre governo e iniciativa privada, que deveria ser adotada como modelo para o Brasil todo. Mas, infelizmente, esse é um exemplo magnífico, que ficou isolado qual naufrago na proverbial ilha deserta. É pena, mas é a realidade cruel, da qual se não pode fugir. A força, em cubatão, adveio da união; o que prevalece, contudo, é a desunião sistemática, institucionalizada.

18. Outra falha do Brasil, no ataque à poluição e apoio aos ecossistemas, é a posição exacerbada, radical e ilógica, adotada por certos ecologistas desvairados, que não conseguem conceber a compatibilidade do desenvolvimento econômico-industrial com a preservação do ambiente, para esses fanáticos, e uma coisa, ou outra, ou há desenvolvimento econômico, ou há preservação do ambiente, não conhecem a conciliação. Ignoram a coexistência, para eles, são impossíveis o progresso do país e da sua população e a preservação da natureza, não concebem o desenvolvimento com a manutenção de excelentes condições de vida, e, lamentavelmente, muitas vezes são esses os ouvidos nos conselhos de controle da poluição.

19. Essa é a verdade, que não podemos, nem queremos, ocultar: muitas vezes são levados em conta, como se fossem criaturas dotadas de razão, homens desse calibre, que preferem a estagnação total, ao progresso bem ordenado, e não adianta tentar dissuadi-los: A ignorancia tem remedio; a estupidez é irremediavel.

20. É preciso que haja uma atitude mais conciliatória, o desenvolvimento não é incompatível com a preservação do ambiente, afinal, se bem pensarmos, veremos que não há nenhuma atividade humana física que não interfira no ambiente, até quando respira, o homem introduz gás carbônico na atmosfera, se toda atividade física interfere no ambiente, a solução é conciliar, compatibilizar o desenvolvimento econômico-industrial com medidas prudentes de preservação do ambiente, é a única maneira de elevar o padrao de vida da comunidade. Sem desenvolvimento econômico, só resta estagnar, ou, até mesmo, retrocedir, e isso ninguém deseja, todos almejam o progresso, e melhoria das condições de vida; é o que se consegue com o desenvolvimento economicamente sustentado, racional, correto, aliado à preservação do ambiente, esse convívio é possível, desejável, factível.

21. O Brasil - país pobre e endividado - só pode ver, com bons olhos e de bom coração, qualquer auxílio externo que nos seja estendido por países desenvolvidos, seja o auxílio material, financeiro, seja ele técnico, através de transferencia de tecnologia, envio de especialistas que nos ajudem, ou recebimento de nossos estudiosos para aperfeiçoamento.

22. Ao Brasil falta o dinheiro e falta a técnica, o dinheiro pode ser de qualquer cor, a técnica tem de ser apropriada as nossas condições atuais, reais, incadas de problemas e deficiências.

23. Esperemos seja esta reunião mais um passo entre muitos que Japão e Brasil deem juntos no sentido de cooperação entre países amigos para solução dos problemas do mais necessitado, o Japão, especialmente nestes últimos anos, tem sido notório pela ajuda técnica e econômica que vem concedendo à países do terceiro mundo, e até mesmo de países com menos aperturas, como a república popular da China, por exemplo.

24. Não seria de esperar-se menos de um país generoso como o Japão, que hoje nos abriga e acolhe, como entre amigos costumeiramente se faz.

Muito obrigado

ブラジルの環境問題についてのノート

(ダンテ・マリウッチ氏カントリーレポート要点)

まず始めに、このような重要な会議において、サンパウロ工業界の見解を述べさせて頂く名誉を得ましたことを、日本国政府、日本国国民に厚く感謝します。

1989年9月18日号のTIMEの表紙でアマゾン原生林の焼き払いが大々的に報道されましたが、大陸規模の環境問題であるがゆえに世界中が憂慮しており、ブラジルも無関心ではられません。

ブラジル1988年制定連邦憲法は、汚染防止、環境保全の大枠を決めている条項を持ち、このような憲法は世界でも多分唯一のものと思われませんが、このような憲法を持っている国として、環境汚染と環境保全の問題は大きな心配の種となっております。

ブラジルは連邦国家であり、従って、連邦政府、数多くの州政府、そして膨大な数の市町村があり、環境に関し重複する法律規制を持ち、その遵守は容易ではなく、産業活動を混乱させずにはおりません。というのも、3つの異なる法律に従い、しかもそれぞれのレベルの政府がイペリア半島の先祖達より受け継いだ硬直的な官僚主義に満ちており、新しい状況に対応できないためであります。

先進的な（先進国の法制をそのままコピーしたという意味がありそう＝訳者註）法制度の混合体（憲法に至るまで、環境を含め先進的）、巨大で不均質な国土、連邦政府制度に基づく3レベルのしかも実質的にはそれぞれオートノマスの政府の存在、アドバイザーというよりは監督者的態度をとる官僚制度、等々を考えると、産業界が直面する問題がご理解頂きましょう。

規制の統一、官僚主義思考様式の変更、罰する前にまず誘導しようという精神の確立が国家の健全な経済開発には不可欠であります。今日、ブラジルにはこのような要素は存在せず、経済社会は窒息状態にあります。

加えて、過半の環境汚染規制法、環境保全法は理論のみで実践の伴わない技術者が、閉じたオフィスの中で、“象牙の塔”の中で、国の現実から全く遊離し、地域的な貧困から生ずる制約やブラジルの産業の能力を無視して制定したものであります。そして法制定に際し、産業界に事前に相談がなされることはまれであり、殆どの場合には監督し、罰し、違反金を課するようになってはじめて新しい規制が出来たことが知られる有様です。

現実から離れ、雲の上に住み、外国の理論で頭が一杯で、スウェーデンやドイツ、日本でなら役に立つでしょうが、経済的、政治的、社会的に立ち遅れたブラジルの現実には適応していないオフィスに住む技術者、それが政府の技術者であります。われわれの現実、そのような理論には合いません。理論は我々の条件に従うべきですが、そのようにはなっておりません。ブラジルの中には自転車すらない地方もあるのに、彼らは航空機に関する法律等々を適用しようとしております。

要するに法（極めて技術的で進んでいる）と国の現実、貧困、疫病等々、国の一部にまだ存在する問題との間に深刻な乖離があります。これはスイスの法律をピアフラに適用するようなもので、

機能しないことは明快であります。

もし、我々の農民がアマゾンの土地を占有する方法として唯一“焼畑”しか知らないとしたら、住民の参加なしに制定されたこのように極めて先進的な法律は一体何のためなのでしょう。世界はアマゾンの密林の破壊をおぞましさに震えながら見ております。我々もおぞましいと思います。しかし何かなされるべきなのでしょう。アマゾンの農民は森林の持続可能な開発を知らないが故に3000年の森林をフェジョン豆、米、とうもろこしを栽培するため焼いているのでありまして、無知と貧困がこの事態を生んでいるのであります。従いまして、罰金も投獄も、彼らを教育し文明化することにはつながりません。彼らは今まで通り、火で森を焼き、生きる為の農業を続けるであります。

我々に必要なのは、もっと簡単で、我々が持ち合わせているささやかな手段、初歩的な技術に依拠し、影響を受ける人々との合意に基づいて制定された法律であり、脅かしたり産業活動を麻痺させたりするような監督者的技術者でなく、進べき道をアドバイスするような技術者、可能な方法をみつけるのに協力してくれるような技術者、外国からコピーした実施が不可能な規則を押しつけたりしないような技術者、そして連邦・州・市町村一体となつての協力的な活動などであります。

政府と企業が一体となつて、共通の理解に基づいて問題に取り組み、現実的で、実施可能で、国の開発の状況に適合した解決策をみつけることが必要であります。政府がこの道をとることを選び、私企業と行政府の技術者、ささやかな資源と技術とを総動員することに合意したことで、政府と産業界は汚染の面で世界の首都、世界の恥ともいべきクバトンの問題を解決しました。

クバトンでは、大気、水質、土壌が汚染され、環境衛生上の問題が極めて深刻でありました。政府と企業が連帯してことにあつた結果、奇跡的な結果が生まれ、今日クバトンでは90%の問題が解決され人々は正常な生活を送っております。この官民一体となつての取り組みはブラジル全土のモデルとされるべきものであります。

残念なことに、クバトンの事例は孤立しており、ブラジルで見られるのは組織的制度的な行政と企業の間非協力的な関係です。

環境汚染を克服する上でのブラジルのあと1つの過ちは、生態系に対する過激で非論理的な一部狂信的エコロジストの取り組みであり、経済・産業の発展と環境の保全との間の調和を考えないこれら狂信者は妥協、共存ということを知りません。

これが我々の現実であり、隠そうとも思いませんし、隠せるとも思いません。彼らは秩序ある進歩よりも全くの停滞の方を選んでおります。

もっと妥協的な姿勢が必要です。開発は環境の保全と両立しないということはありません。慎重な環境保全の方法をとることにより、開発と環境を調和させることこそが、生活水準を向上させる唯一の方法であります。開発がなければ停滞、或いは後退があるのみであり、これは誰も欲しません。持続的で、合理的で、環境保全と結び付いた経済開発は可能であり望ましいものであります。

ブラジルは貧しい国、借金にあえいでいる国であり、先進国から差し伸べられる協力は資材面で

の協力であれ、資金協力であれ、技術協力であれ大歓迎します。

ブラジルには資金も技術も不足しています。資金についてはどんな色のお金も（緑色でなくても）歓迎です。提供される技術についていえば、それは我々の現実に即したものであることが必要です。

近年日本はその技術協力、経済協力のゆえに第三世界諸国に広くその名を知られるようになっていきます。この会議が、ブラジルと日本の友好的協力関係を一層増加させる上での一歩前進となり、問題の解決に役立つよう期待しております。

ご静聴ありがとうございました。

ENVIRONMENTAL POLLUTION IN EGYPT

by MR. MOHAMED FAROUK BEDEWI

The Egyptian Environment Affairs Agency (EEAA), have been established in 1982 belonging to the Cabinet of Ministers to coordinate between the highest executive authority and all agencies and ministries concerned with the environment. It studies and prepares the topic dealing with the environmental protection plans and contacts with other authorities when conducting their activities. The action have been planned and related to: water and air pollution together with monitoring network, natural reserves, solid waste disposal, coastal zones protection, protection of agricultural land, national parks, radiation hazards . . . etc.

1. Air Pollution Control :

- The Agency is supporting the monitoring network all over Egypt in 11 provinces for continuous monitoring of air pollutants. In the present time SO₂, smoke and suspended solids are determined all over the republic, while CO & Nx are determined in large cities of heavy traffic. The permissible amount of pollutants are SO₂, 200 microgram per cu.m., suspended solids lies between 150-230 mgm/m³. The allowed smoke is 150 mgm/cu.m. These usually exceed these limits in big cities, industrial areas.

Several efforts are done in the field of air pollution control

- Prototype local dust filters for cement industry
The EEAA has adopted the manufacture of an electrofilter for cement dust which consitute 5-8% of the total cement production.
- Vehicle exhaust specifications:

A great deal of work was done on benzine and deisel engine motors to determine the most adequate parameter for CO, HC for benzine engine and smoke density for diesel motors. It is suggest to be intially 6% by volume CO, 1000 ppm HC for benzine motors and 60 HU smoke for diesel engine at sudden acceleration.

2. The water pollution control is directed to the Nile and the water ways through the standards specified by the law 48 (1982). This is achieved

by implementation of the industrial waste treatment project.

The project acts now on the first phase of 25 treatment processes in 19 governmental factories which are the most dangerous plants costing 70 million LE. A Steering Committee for the project was established in October 1985 formed of highly experienced officials from all interested authorities.

The following policy was established for the treatment of projects:

- a. Disposal of waste according to the Law 48 (1982)
- b. Recycle of water after treatment in the plant to economize water and energy. This will save 300 Min. m³ annually for the first phase.
- c. Recovery of valuable materials for the sake of clean technology.
- d. Disposal of solid waste - if present - to sanitary landfilling or incineration.
- e. Reducing the volume of liquid waste disposed to the sewerage system.

Pollutants:

Usually waste water contains polluting elements according to the specific industrial sector, Metallurgical, Chemical, Food Industry. The quality of treated water is to comply with the parameters indicated by the Law 48 (1984).

Cases studied

1. The Iron and Steel work in Tebbin

The flow of the waste water is 10.000 m³/day has the following analysis in mg/l:

P.H.	Catt	T.D.S.	T.S.M.	Cl
9.8	16	940	2500	177

The treatment process will consist of classification and chemical coagulation of the iron particles of 38% Fe, which is recycled to the sintering plant while clear water is reused in the different parts of the plant. The plant is under construction.

2. The Chemical Industries

(A) El Nasr Coke Co.

Treatment of the phenolic water 350 m³/hr of the following analysis mg/l

P.H.	B.O.D.	C.O.D.	D.S.	Cl-	So ₄	NH ₃	Oils
8	940	2000	1000	380	200	120	900

The treatment plant - now under construction - consists of buffer tanks, oil separation and biological treatment. The effluent quality will lie within the parameters of the Law 48 (1982). It will be recycled in the plant and partly for irrigation.

(B) El Masr Fertilizer Talkha

(i) The pollution in the region of the plant is due to sewerage system for the community and the plant and also due to ammonia, oils and suspended matter which are drained to Tawella drain at a rate 150 m³/hr. It has the following analysis:

P.H.	B.O.D.	C.O.D.	S.S	NH ₃	No ₃	Oils
8-10	500	1500	600	120	100	100

The sewerage treatment will consist of nitrification followed by denitrification, activated sludge treatment and oil separation.

(ii) The industrial water, 350 m³/hr flows also to drain Tawella contains ammonia and nitrates.

Local efforts are made in the plant to erect absorption towers to recover 30 tons ammonia daily and use the water in a closed circuit in the plant. It has the following average analysis:

P.H.	B.O.D.	C.O.D.	S.S.	NH ₃	Oils
8-10	28	190	100	110	25

3. Food Industries

(A) Sugar and Distillation Co.

(i) Sugar cane plant:

Seven plants of the company discharge 130,000 m³/day to the Nile containing brown mud of the following analysis (mg/L) :

P.H.	B.O.D.	C.O.D.	T.S.S.	T.D.S.	Cl	Oils
6	1075	1450	330	300	38	120

The EEAA is adopting a treatment project consisting of filtration and transporting the brown mud to reclaim the cultivable land for cane crops. This is implemented in 2 plants in Idfu and Abu Korkas as an experimental model.

(ii) Sugar Refining at Hawamdia

The plant discharges the slopes - fermentation products of moullass - at a rate 1300 m³/hr to the Nile containing 5-7% solids and a high C.O.D. from 17000 - 35000 mg/L.

Some Alternatives were studied to use the slopes in producing biogas or as a constituent of kettle feed after being concentrated, thus preventing discharge into the Nile.

4. Oil and Soap Plants

14 plants discharge 10.000 m³/day waste water of the following analysis (mg/L):

B.O.D.	C.O.D.	T.S.S	T.D.S.
518	694	769	3015

The treatment of the effluent will consist of acid neutralisation, gravity oil separation, clarifiers, filtration.

5. Misr Spinning & Weaving Co. El Mahalla Al Kobra

The waste water flows to the water drain No.5 at a rate of 1500 m³/hr. It has the following analysis (mg/L):

B.O.D.	C.O.D.	T.S.S.	T.D.S.	Oils
130	550	130	1120	14

The treatment plant is being erected consisting of equalization, biological treatment followed by chemical treatment and sludge facilities where the treated water is used in irrigation.

6. Paper Factories

The "Varta" paper factories at Alexandria and Kafr El Zayat drain 1000 m³/day waste water of high biological and chemical oxygen demand 4100 & 4860 mg/L respectively. The treatment will consist of oil separation, neutralization, and chemical treatment.

The human sewage in Kafr El Zayat plant will be treated by the activated sludge method.

7. Super Phosphate Fertilizer Plants

The Super phosphate fertilizer plants in Kafr El Zayat and Assiut has 2500 m³/day waste water of high acid and suspended solids content. The treatment plant will have two stages.

The first stage consists of recovery of fluorosilicic acid in absorption towers followed by concentration.

The next stage will be neutralization with lime followed by clarifying to separate the suspended matter.

Sewerage of Riverine Fleet

The riverine fleet is used to transport goods, raw materials, coal, phosphate, etc. from Alexandria to Aswan. 750 units are working on the Nile belonging to 3 companies. These were supplied with special appliances to collect the human sewage.

In the meanwhile 6 pumping stations are under construction the River bank in Alexandria, Cairo, Al Minya, Assiut, Suhag and Aswan. Each station is 100m length has two pumping stations for two fleet units in series.

The sewage is then pumped to the general sewage system of each nominal place. Aswan station will be supplied with a compact unit where as the treated products are used for cultivation in Wadi Kom Ombo.

4. A national project for the sewage systems in villages and cities is also discussed to meet with local requirements: simple design, low cost of maintenance . . . etc.

The cooperation with Japan may be achieved through new models in monitoring systems; Japanese practices in the field of industrial waste water; modern and simple technology for sewage treatment plants . . . etc.

ENVIRONMENTAL PROBLEMS & POLLUTION IN EGYPT

by MR. AHAMED HASSAN ABDEL RAHMAN

1. Introduction:

The issue of environment, its protection and preservation from the various forms of pollution, has become one of the most important issues of our times. It represents a vital issue for the future survival of the human race, as well as a principal dimension of the challenges facing the developing countries. Planning for comprehensive development, in the light of the experiences of the advanced countries indicates intricate ecological problems will be encountered. Solutions must be planned and implemented, before pollution accumulations destroy any possibility of a successful remedy. The considerations of development, in spite of their utmost importance are no longer an excuse for ignoring the importance of preservation of environment, or neglecting to take efficient measures to fight pollution.

At the national level in Egypt, realizing the importance of Environmental Pollution Control, a central Agency for Environmental Affairs was created in 1982. While the director of the agency reports directly to the cabinet, the day-to-day functions are the coordination with respective ministries, authorities, and local units. Since its creation in 1982, the agency mandate covers the following areas:

- a. Air Pollution Control. Project includes: Green Belt, Tree Plantation, Vehicle Exhaust control, etc.
- b. Water Quality Control. Projects included: River Nile Industrial and waste water Pollution Control, Upgrading of Sewerage Treatment Plants, etc.
- c. Land Protection and Preservation. Projects included: Sea Front Protection, Preservation of Agricultural Land, Sand Dunes Control, protection of Red Sea Islands, Natural Lake Protection, etc.
- d. Policy and Legislation.
- e. Public Information and Educational Campaigns.

2. Greater Cairo Region:

The city of Cairo, the capital of the Arab Republic of Egypt, is one of the largest cities of the Universe and the biggest governorate nation wide in terms of population size that amounts to 9.2 million in the region of the Greater Cairo. The city has a much larger daytime population, taking into consideration 2 million daily frequenters from other governorates. It occupies an area of 246 square kilometers and is administratively divided into 17 districts. The city ranks first in terms of population density, the average of which stands at 28,000 persons per square kilometer with minimum and maximum of 13 and 116 thousands respectively. Thus, it is considered one of the highest densely populated cities world wide. The number of households is about 1.7 million.

Our efforts in Cairo through the legislative and executive bodies confirmed the importance of the ecological dimension of development planning, and the necessity to give due attention to comprehensive scientific approach, in the face of present ecological problems.

There are special key areas that I will use as an example to our environmental control effort in Cairo. These are Solid Waste Management, Air Pollution, Sewage Problems, Green Space Development, and Green Belts.

2.1 Solid Waste Management:

In Cairo, solid waste generated from man's domestic, social and industrial activities is increasing in quantity and variety. The rapid increase in population, the extension of residential areas, the development of industry, the lack of technical and financial resources combined with shortage of private sector of solid waste collectors are the main causes of insufficient solid waste management.

There are three methods for solid waste collection. These are:

- (i) Individual household collectors as part of an old manual collection system.
- (ii) Franchised Private Sector for household collection and
- (iii) Cairo Cleaning and Beautification Authority, responsible for street cleaning and disposal

As for the disposal part, two methods are currently used in Cairo, these are:

- (i) Compost Plants (100-160 ton daily capacity)
- (ii) Sanitary land fills (1000 tons per/day)

Most of the industrial waste in Cairo is also carried and disposed of along with the household solid waste, yet under separate private sector contracts.

2.2 Air Pollution

The sources of air pollution in Greater Cairo could be summarized as follows:

- (a) Industrial Zones: particularly polluting industries or iron, cement, chemicals and fertilizers. (Helwan, and North Cairo).
- (b) Urban Zones: these are of high residential concentration. The most important pollutants are: vehicles, workshops, small scale industries.

The concentration of air pollutants in Cairo are: dust fall, smoke, sulphur dioxide, lead, carbon monoxide, nitrogen oxides.

Realizing the national dimension of air pollution, our effort in Cairo is to co-ordinate with the respective ministries and authorities along the following control measurement/project:

- Plantation of streets and parks as a major effort for increasing green spaces.
- Industrial filtering (cement).
- Monitor of vehicle exhaust along with establishing of vehicle inspection centers.
- participation in the regional network for pollution monitoring.

2.3 Sewage Problems:

Cairo faces a serious handicap due to the inadequacy of the actual sewage network dating from 1915 and built to cover one million inhabitants. The network does not extend to many parts of present day Cairo, besides becoming obsolete.

The problem began to appear in the sixties, whereupon the government

implemented an urgent project to save Cairo from this grave pollution. However, due to the circumstances facing the country and wars it has gone through, the network reached a critically dangerous situation. This promoted the government to cope drastically with the problem in order to protect public health, tourism and transportation services. The solution was two fold:

1. Urgent solutions for the renewal of the network and old stations to raise their capacity.
2. Implementing two main projects, one for Cairo and Kaliobiya Governorates and the second for Giza governorate to absorb and treat and future discharges until the year 2000.

2.4 Green Space Development:

Cairo is a large city with gardens and parks scattered all over its suburbs. The most important garden are:

1. Andalus Garden:

It is a geometrical garden, consisting of two sections: the Andalusian and the Pharaonic. It includes many palm groups as well as other valuable trees.

2. The Japanese Garden:

It lies at Helwan district and is considered among the oldest gardens there. It includes a music cottage (cave) and some wooden pergulas as well as umbrellas made on the Japanese style and design, in addition to an artificial lake and green lawns or parks.

3. The International Festival Garden at Nasr City:

A new addition to Cairo city. The garden occupies an area of 55 feddans. It is characterized by variation of its topography and elevations, with the presence of three plateaus controlling the site.

The International Garden is divided into three main sections or pavilions. One for the European and Asian countries, one for Islamic countries and the last for Egypt's Governorates and Authorities.

The governorate is encouraging community action and public participation in its effort to improve environmental quality and living conditions,

largely depending on the co-operation between local district officials and community - based groups for civic action. This includes establishing locally-based waste collection and street cleaning activities, as well as establishing local public parks and gardens for residents of low income areas.

In order to increase the green areas in Cairo, many garden establishment projects and afforestation programs were implemented.

In the past five years, many district-gardens, were established to create new lungs through which district population could breath.

The most important of these gardens are:

1. Agha Khan garden
2. Dar Eluom garden
3. Arab el Mohammady garden
4. El Wayli garden
5. El Doeika garden
6. Ain El Seira garden
7. Square gardens

Originally, some of the above mentioned gardens (2,3,4,5,6) were either deteriorated housing blocks or slums and informal housing areas lacking adequate and efficient utilities and services. With the full-fledged support of all citizens, those sites are turned into green areas as a step towards renovating the city's surroundings.

In addition, the wheel of afforestation of public roads had been at its maximum speed during the same period. Thousands of trees were implanted to add to the beauty of the city and as an outstanding contribution to bettering human surroundings.

2.5 Green Belts:

Egyptian deserts represent 96% of the entire surface area. Thus, the environment is subjected to movements of wind blowing from the Sahara, or from the sea causing considerable damage. Therefore, the green belts play a major role in protecting urban and rural communities.

The first phase of the Greater Cairo Green Belt is already under implementation. The total length of the Green Belt, parallel to the ring road, is about 34 km.

3. Conclusion:

Today's world policies are determined by the advanced production of industrial capabilities. Realizing at the outset the impact of technology on the path of development and values, the know-how explosion and the ability to apply technology determines that the aim of science to day is to expect the day after through linking results, phenomena and trends. These are linked by electronic systems for day-to-day monitoring and control. Our Academy of Scientific research centers are gathering their collective efforts in order to propose non-traditional solutions for environmental protection. These solutions should be adaptable to Egypt's actual economical, technical, and ecological conditions. The great work of Japan and other industrial nations in environmental protection can be the subject of more cooperation with us in Egypt. That is what we are looking forward for.

ENVIRONMENTAL POLLUTION CONTROL IN GREATER BOMBAY, INDIA

by MR. VENKAT CHARY

1. Greater Bombay enjoys a unique position throughout India as the Urbs Prima in Indes. Prior to the year 1950, the city of Bombay extended from Colaba in the South to Mahim and Sion in the North, covering an area of about 69 Sq.Kms. Since then, the city boundaries were extended upto Dahisar and Mulund, i.e., Suburbs and Extended Suburbs, thus bringing the total area of the city to 438 Sq.Kms.

2. Greater Bombay is one of the most thickly populated cities of the World. The growth of population of Bombay has been showing a tremendously increasing trend. The population of Bombay in 1950 was only 1.4 million. The censused population in 1981 was 8.2 million and, today, the same is placed at around 10.4 million.

3. The pollution in the environment is inter-alia dependent upon the size and density of the population, consumption per head and the environmental impact of industries involved in production. In Greater Bombay, both population and consumption per head as well as industrial activities have increased at a very fast pace, consequently giving rise to increasing pollution problems.

4. The geography of the Island of Bombay imposes severe limitations on the development of the island of Bombay, as the same is surrounded by the sea on three sides, with the result that the entire development of the city has been and is in the North-South direction. This, in turn, creates typical conditions for Auto Exhaust Pollution, as peak traffic movements are in the North-South direction in the morning and in the South-North direction in the evenings. This is a major ground level pollution source. To minimise this problem, various traffic engineering measures such as construction of fly over bridges and synchronising signalling systems are being taken to ensure free flow of traffic. Vehicles are also statutorily required to ensure that the emissions do not exceed the permissible standards.

5. The other major polluting source in Greater Bombay is the Industries. The problems of industries in developing countries is about the resource allocation between demands on the production cost vis-a-vis cost of pollution

prevention measures. Even though pollution prevention and control is always given top priority by the enforcing agencies, resource-constraints, especially in case of sick industries (viz., old cotton textile mills in Bombay), prevent the enforcing agencies from rigorously enforcing pollution prevention measures. The situation has to be viewed from the angle of the difficulties that will have to be faced, if the sick industries are required to close down due to financial constraints, causing serious unemployment problems. This may, in turn, lead to social problems. In case of such industries, it is felt prudent that resource allocation to production should get priority over pollution prevention measures.

6. Large influx of population into Greater Bombay, due to the job opportunities available, also put severe strain on the civic services such as supply of pure water and disposal of solid, liquid and gaseous wastes. The Municipal Corporation of Greater Bombay, with the aid of the World Bank, has undertaken a massive integrated project for supply of pure water and disposal of waste water in a scientific manner (Bombay will receive about 600 million gallons/day of water by 1992). It is expected that waste water treatment units including marine outfalls and aerated lagoons will be commissioned by 1995 ensuring pollution-free conditions in the receiving waters, viz. the sea, creek and water-courses surrounding the city.

7. At present, Greater Bombay generates about 5,000 tonnes of solid waste (refuse and debris) per day. The Municipal Corporation of Greater Bombay has an independent department under the Chief Engineer, Solid Waste Management, which manages the solid waste disposal in a scientific manner. The problem of solid waste disposal in Bombay is peculiar in as much as Bombay has heavy rain-fall during the period from June to September, every year. Organic matter forms a major part of the solid waste. This creates a problem of putrefaction of organic solid waste at the refuse collection sites. Since Bombay is the hub of industrial activities, some of the obnoxious solid wastes from the industries are, at times, thrown on the road sides without suitable treatment. This causes its own pollution problems on the road sides. Stringent measures are taken against the offenders.

8. At present, Solid Waste disposal mainly comprises of land fill at different places designated as dumping grounds. It is anticipated that the existing landfill sites will reach saturation points over the next decade. Alternative

methods of garbage disposal by pelletisation, incineration, etc. are being planned from right now. Various methods are being studied such as recycling, converting garbage into energy or manure, etc.

Enforcement of Pollution Prevention Measures

9. The Municipal Corporation of Greater Bombay has established an independent specialised Department which deals with the subject matter. The activities of this Department comprise of advising the various regulating agencies of the Municipal Corporation of Greater Bombay about the steps that should be taken against polluting industries causing pollution in any form, viz., solid, liquid, gaseous or nuisance of noise, vibration, heat, etc.

10. The state Govt. of Maharashtra has also established an independent, statutory authority known as the Maharashtra Pollution Control Board. This authority is in overall charge of control of pollution in the State of Maharashtra, which includes the city of Bombay. Thus, this authority has jurisdiction over the city of Bombay on the subject of pollution prevention.

11. The Municipal Corporation of Greater Bombay runs well-equipped Air Quality Monitoring and Research Laboratory situated at Khar. This laboratory is considered as a "Centre of Excellence" by the W.H.O. (World Health Organisation) and other organisations. Regular monitoring of primary pollutants such as SO₂, NO₂ and Suspended Particulate Matter and further detailed analyses of S.P.M. for Carcinogens, heavy metals, sulphates, nitrates, etc., is being done. Twenty-two receptor oriented air monitoring stations have been set up at different locations throughout the city of Bombay. Air samples collected at these sites are analysed and the ambient air quality is studied with respect to prevailing meteorological conditions. The Air Quality data is collected with the help of Standard High Volume Sampler, Anderson size fractionator, Dichotomous Sampler, etc. The laboratory is well-equipped with the latest generation instruments such as Gas Chromatograph, Atomic Absorption Spectrophotometer, Automatic Chemistry Analyser, Spectrophotometer SP-800, Microvideomat, Cahn Balance, etc.

12. The data collected is evaluated to judge the status of Air Quality. The trend in S.P.M., SO₂ & NO₂ levels over the last 10 years shows that:

1. The annual levels of SPM range from $156 \mu\text{g}/\text{m}^3$ to $303 \mu\text{g}/\text{m}^3$ and are increasing over 10 years. The levels are higher in the Eastern Suburbs, the Petrochemical Complex & Central Bombay.
 2. Annual levels of SO_2 range from 7 to $93 \mu\text{g}/\text{m}^3$ and are decreasing, in general, over the last 10 years. The levels are higher in Central Bombay, Eastern Suburbs and South Bombay.
 3. The annual levels of NO_2 range from $5 \mu\text{g}/\text{m}^3$ to $63 \mu\text{g}/\text{m}^3$ and are increasing over the last 10 years in Bombay and the Central Bombay Zone has recorded higher levels.
 4. The annual levels of lead range from $0.1 \mu\text{g}/\text{m}^3$ to $3.6 \mu\text{g}/\text{m}^3$. The levels are higher in Central Bombay and Eastern Suburbs. The levels show an increasing trend during the last 10 years.
 5. The annual levels of sulphate range from $1.9 \mu\text{g}/\text{m}^3$ to $22.7 \mu\text{g}/\text{m}^3$. The levels are comparatively higher in Eastern Suburbs, Central Bombay and the Petrochemical Complex areas.
 6. The annual levels of B (α) P range from $1.4 \mu\text{g}/1,000\text{m}^3$ to $9.7 \mu\text{g}/1,000\text{m}^3$. High levels are recorded at Central Bombay and the Petrochemical Complex.
 7. The levels of carbon-monoxide range 8-58 ppm.
13. In addition to routine monitoring, special case studies and spot monitoring, based on complaints received from various Municipal divisions and the citizens are carried out. Research project studies are also conducted to assess the personal exposures to indoor and source specific pollutants. Air Quality at traffic junctions is also being monitored to assess the impact of auto exhaust pollution.
14. The Municipal Corporation of Greater Bombay has also a programme to have an Inventory of Emission of pollutants from various sources and to prepare statistical data to establish co-relation of Air Quality as observed by the Air Quality Monitoring and Research Laboratory vis-a-vis the quality of emissions from the Industries in the area.

15. The Environmental Sanitation & Projects Department of the Municipal Corporation of Greater Bombay also has the facilities to measure the other pollutants and nuisances caused by the industries so far as noise, thermal, vibration, etc., are concerned. Effective action is taken against these establishments to ensure that the pollution and nuisance caused are minimised.

16. To cope with the rapid development that is taking place and for keeping abreast of the latest technologies, an ambitious future programme on Environmental Pollution Control has been envisaged. The details of the future programme are as below:

- (a) Automatic continuous monitoring network to monitor air pollutants, viz., SO_2 , NO_2 , CO_2 , hydro-carbons and particulate matter will be installed, when funds permit.
- (b) Strengthening of the public training activities through communication media, viz., Radio, Television, Newspapers, etc., and arranging Seminars so as to make the citizens fully aware about the consequences, disastrous effects of pollution, pollution abatement measures and the authorities to ensure pollution prevention, etc.
- (c) The ambient air quality data will be fed to the on-line computer along with data on emissions from the industries. A multiple source receptor method would be developed to forecast the air quality levels of the various pollutants. In case of emergency, the concerned industry will be constrained to bring down the quantity of emissions.
- (d) Effects of air pollution on vegetation and the role of vegetation as scavenger of air pollutants will be studied along with effects of air pollution on material, damage to the properties and damage to marine life.

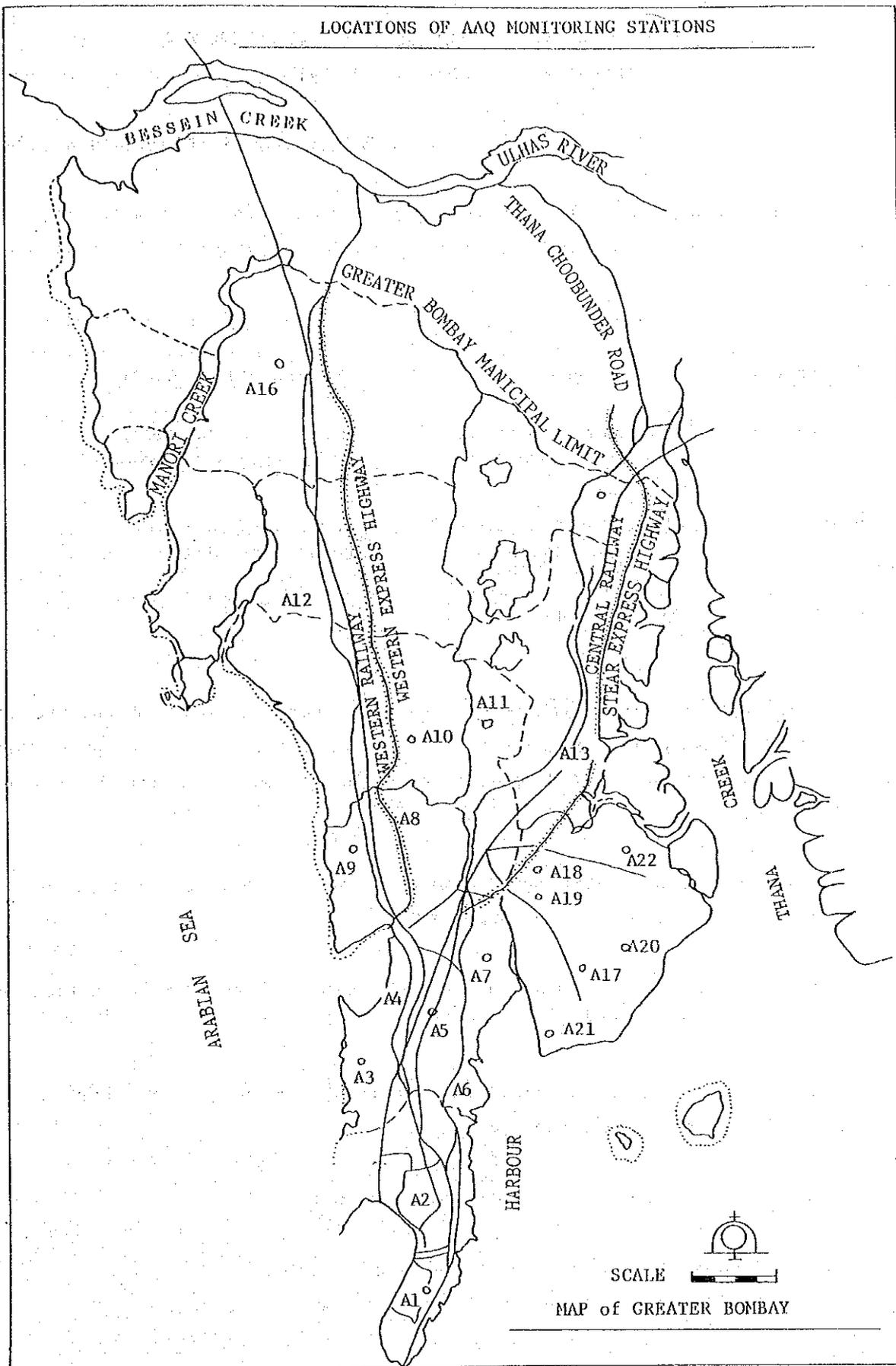
17. The Air Quality Data Collected and analysed by the Environmental Sanitation Department of the Municipal Corporation of Greater Bombay is very useful from the point of:

- (a) Industrial Location Policy.
- (b) Housing Policy.
- (c) Transportation measures (to attain optimum speed).
- (d) Revision of Development Plan of the City.
- (e) Shifting of wholesale trade with a view to decongesting.
- (f) Task Force on quarrying.
- (g) Projects for reducing domestic ground level pollution (like Rehabilitation of Potters' Colony at Dharavi, Remodelling of Mahalaxmi Dhobighat, etc.)
- (h) Formulation of Air Quality standards.

18. The Municipal Corporation of Greater Bombay brings out a "Civic Journal", a monthly publication, which informs the citizens of Bombay of the various activities of the Corporation and about vital civic matters. It plays a major role in educating the public.

19. To summarise, the Municipal Corporation of Greater Bombay takes all necessary steps on all the fronts to endeavour to abate environmental pollution and has allocated substantial resources for this activity.

LOCATIONS OF AAQ MONITORING STATIONS



MALAYSIA'S COUNTRY REPORT

ENVIRONMENTAL POLLUTION SITUATION, PROBLEMS
AND CONTROL AND IN MALAYSIA

by MR. ZAINAL ABIDIN BIN DATO HAJI SALLEH

Malaysia has a three-Lier System of Government. The positions of Local Government and the collaborating agency for pollution control in the Government are as follows;

<u>Government</u>	<u>Agency</u>	<u>Collaborating Agency</u>
1. Federal	Ministry of Housing and Local Government	Ministry of Science, Technology & Environmental
2. State	Executive Committee on Local Government	Regional Office of the Department of Environment.
3. Local	Municipality	

Malaysia has gradually transformed from its rural agro-based culture and resource-based economy into a semi-industrialized nation over the past three decades. Industrialization and urbanisation and those of immediate concern in Malaysia are;

1. Gaseous and liquid effluence from a wide variety of industries in manufacturing and the agro-based industry;
2. Erosion and silting of watercourses as a result of rapid urbanisation and infrastructure construction;
3. Emissions from vehicular traffic, quarries, crushing and construction activities, open burning of wastes.
4. Discharge of untreated sewage into watercourses;
5. Mining and unplanned deforestation and logging;

6. Indiscriminate dumping of solid wastes, inefficient refuse collection system, littering into watercourses;
7. Indiscriminate disposal and dumping of toxic and hazardous waste;
8. Rural-urban drift leading to slume, overcrowding and limitations of open spaces and recreational facilities.
9. Rural-urban drift leading to slume, of overcrowding and limitations of open spaces and recreational facilities.

In the Penang Island Municipal Council, (PIMC), pressing environmental pollution problems identified are;

1. Discharge of untreated sewage at a sea cutfall;
2. Discharge of sullage water directly into open drains from premises built before 1979;
3. Discharge of untreated waste from pig rearing and animal husbandary into water courses,
4. Indiscriminate dumping of refuse and discharge of sullage waters into rivers by riverside settlements and into the sea by coastal inhabitants;
5. Littering and discharge of waste waters into open drains by petty traders, commercial houses and the public;
6. Threat of gaseous and leacheate pollution from solid waste disposal sites;
7. Flooding resulting from rapid urbanisation, silting and earth-works.

Environmental Legislations

There are a total of 35 environmentally related legislations. To cope with the pressing environmental issues in the light of increasing industrialization and urbanisation the Environmental Quality Act was formulated and made law in 1974. The Government adopted strategies to ensure that economic

development and environmental management becomes an integral part of national development plans. One of the measures was the creation of the Department of Environment (DOE) under the Ministry of Science, Technology and Environment as the national environmental protection agency. Regulations have been made under the Act for pollution control measures for crude palm oil processing, raw natural rubber processing; sewerage and industrial effluents, clean air; control of smoke and gas emission from motor vehicles; and reduction of lead in gasoline.

Under draft is federal legislation for the development, management and operation of toxic and hazardous waste disposal sites, and for noise pollution control.

National Agency and Local Government in Pollution Control

The Department of Environment (DOE) is the National Agency given the mandate and legislative powers to accomplish national goals in environmental protection. The Local Government does not make separate by laws for environmental pollution control so as to avoid duplication of or be in conflict with areas of jurisdiction of the DOE.

In practice pollution control measures and affluent standards for industries and agricultures are imposed by the DOE.

The PIMC exercises environmental control measures with regards to solid waste management (excluding toxic and hazardous waste), public health, the sewerage system, road and drainage infrastructure, flood control and earthworks.

Although the role of the two agencies have become defined in terms of areas of jurisdiction, there is inadequate communication in policy directions, research and development material and integrated planning strategies. Shortcomings like these are being resolved by establishing channels of communications with State and Local Government agencies so as to realise stronger communications, co-ordination and willing co-operation. In Penang a State Pollution Control Committee had been established over several years and it allows for inter-departmental and inter-disciplinary interaction.

The Federal and Local Government

The PIMC has identified its major environmental problems. Under the Colombo Plan, the Master Plan for Georgetown Sewerage Scheme was prepared in

1969 and updated by PIMC in 1980. The Japan Government initiated an Area Traffic Control Plan for Georgetown in 1984. JICA sponsored a Master Plan Study for Solid Waste Management of a National Waste Disposal Action Plan for a Beautiful and Clean Malaysia, A Drainage Master Plan is in progress.

Having benefited from the several studies initiated by external agencies through the Federal Government, PIMC has some insight of alternatives available to resolve some of its environmental issues. Though PIMC is extremely keen to implement some of the more immediate projects, its financial capacity does not permit it to do so, PIMC has to resort to financial assistance from the Federal Government in the form of Grant and soft loans. The Federal Government is in turn faced with resolving the issue of competing priorities in the Country. Developments in the Federal Government strategy is encouraging as emphasis is being directed towards solid waste management sewerage treatment and development of the tourism industry through a clean and beautiful environment.

The Government and the Industry

The private industry has its own priorities and constraints and it may view pollution control measures as costly with little or no return on such investment. However the overall objective of enhancing the quality of the environment should not be compromised. This is a difficult situation in a rapidly developing country like Malaysia.

All new factories are required to comply in full the existing legislation on pollution control measures but the legislation is flexible to allow time for existing industries to bring down their pollution load progressively. The control measures may be instituted in a considerate manner and in stages giving the industry sufficient notice and time to set aside funds and develop appropriate technology to meet standards.

While factories in the designated industrial estates are complying with emission or discharge effluent standards, or will be able to do so in due time, the many older factories in urban and suburban areas, are unable to comply with the control measures and continue to pose environmental problems. Many of these factories have constraints of space for installation of treatment facilities and of high capital and operational cost and trained personnel. The State Government and the Local Authority should identify and zoning plans for their relocation to meet with environmental considerations. Such consideration is being made in the Structure Plan for Penang Island being prepared by the PIMC.

Policy and Strategies

The present problems have arisen from a lack of anticipatory planning. The solutions now being sought by the adoption of a problem-responsive strategy is costly and arduous.

The many environmental issues emerging have warranted a review of the existing Environmental Quality Act 1974 to tackle the developing problems and also the issues of responsibilities of agencies and administrative jurisdiction of the three tiers of Government.

A new integrated environmental management strategy is being adopted and some of the approaches are:

1. Enlargement of the existing machinery for planning to incorporate environmental dimension through multisectoral and inter-departmental collaboration;
2. Amendment of the Environmental Quality Act to improve its scope, effectiveness and environmental impact assessment;
3. Establishment of environmental committees at State Level to enable definite commitment of States on an integrated development approach and joint enforcement action;
4. Technical Training of relevant personnel;
5. Development of an action plan to enhance environmental awareness of target groups and to introduce a stronger environmental theme into school and university syllabi;
6. Preparation of an optimal land use and zoning plan
7. Development of a comprehensive environmental information system to facilitate decision making;
8. Shifting from the conventional pollution control approach of treating and dumping to a more rational approach of waste utilization leading to the creation of more valuable resources from wastes as well as development of low-waste and non-waste technologies;

9. Private sector participation in waste management;
10. Promoting greater Government-industry cooperation;

International Co-operation and Transfer of Technology

A rapidly developing country like Malaysia has an urgent need to cope with the emerging environmental issues. Although institutional review to adopt improved strategies, constraints of finance, indepth knowledge of appropriate technology and the lack of expertise seriously impede the development of sound and practical integrated action plans. Tackling environmental problems is a multi-secteral and inter-disciplinary participation requiring specialists in each aspect of environmental assessment. Malaysia is in dire need of such specialized training and skilled personnel both in the public and private sector. Necessarily, she would have to turn to developed countries who have developed appropriate planning tools and technology based on their previous experience with environmental problems.

The PIMC has benefited from 17 training courses in Japan extended to its officers by the Government of Japan through the Colombo Plan, JICA and YOKE over the past 5 years. In the course of preparation of Master Plans for PIMC, by Japan, several experts have been sent to PIMC and this gave the staff of PIMC the opportunity to closely work with them and understand Japanese work ethics an important aspect which the Malaysian Government is encouraging in its Look East Policy.

Having experienced such cooperation and transfer of technology, PIMC is in a position to emphasis the need for such venues to be reenforced and sustained. This would enable its officers to be appreciative and participative in feasibility studies and project implementations that would necessarily follow when financial resources improve.

Technology transfer and international cooperation with Malaysia by agencies of the Governmental of Japan has been reenforced over the past decade in response to the Malaysian Government's Look East Policy, Japan has adopted technology transfer that is appropriate in terms of financial capacity, available and potential manpower resources and user acceptability. Hence Malaysia's willing acceptance of assistance from and sustained cooperation with Japan.

THE CAPITAL CITY OF JAKARTA

by MR. HERBOWO

1. The Country & The City

In order to give greater insight into the problems faced by the city of Jakarta, allow me first of all to present a broad description of the country, Indonesia, as a whole.

The Republic of Indonesia consists of 13,000 islands with a land territory of approximately 1,9 million Km² and 5,8 million Km² of maritime territory. It is divided administratively into 27 provinces. The population is around 175,6 million people with the majority concentrated on the island of Java. The population growth rate of Indonesia is 1,9%, with a GNP of 5% and an industrial growth rate of 10% yearly.

Independent since 1945, Indonesia has only been able to develop itself systematically since the establishment of the New Order in 1966.

Development could then be accomplished, covering all aspects of National life, like the re-establishment of the State Ideology of "Pancasila" & the legislative system, the improvement of the country's structure & infrastructure in order to increase national welfare besides further creating greater consciousness towards the living environment.

The island of Java is about 132,200 Km² wide, with a population of approximately 105,9 million inhabitants of 800 for each /Km² with a growth rate of 1,54% yearly.

Java is thus the most densely populated island area in Indonesia.

Jakarta, situated on the island of Java, is one of the 27 provinces of the Republic of Indonesia and is the most populated city in the nation.

The provincial area covers about 590 Km² with a population of about 8,8 million people in 1988 and a density of 14,922 person/Km².

The population growth rate in Jakarta is about 3,213%/Year and its GDP is about 7%/Year, with an industrial growth rate of 10,1%/Year.

Compared to other Cities, Jakarta is the largest and the most densely populated city in Indonesia.

Being the Capital and the most attractive city of the nation, Jakarta's population is expected to reach 12 million by the year 2005.

As the Capital City of the Republic of Indonesia, Jakarta is a special region. It is the centre of the Government of the Indonesian Republic, the centre of political, economic, industrial and socio-cultural life.

On the other hand, the Capital City of Jakarta (DKI Jakarta), is also a province which has the authority and obligation to manage its own affairs.

According to the law, Jakarta is an autonomous region & as further stipulated it is lead by a head of a Special Region (DKI Jakarta), a Governor, who is responsible for coordinating all development programs in the region while nurturing the life of society in all fields (article 80). The Governor Reports to the President through the Ministry of Home Affairs.

In general, implementations are conducted on local level with policy guidance from the central government.

II. Environmental Pollution Control

The present situation

The national development which has been implemented so far, has brought on one hand progress in all fields. Public welfare has appreciably improved while the urban environment has consequently developed to accommodate the increase in population growth and also adjusted to its ever growing needs. On the other hand, progress started to bring its negative impact to the environment.

As density increased, provision of urban structures and infrastructures could not catch up with the growth of population and as a result, the ever growing volume of urban wastes could not be handled accordingly. In this respect, the situation could not be improved, for society was not yet totally conscious as yet about environmental issues.

One of the signs of the deterioration in environmental quality could be detected at the quality of the water found in the region's drainage system.

Periodic monitoring on the region's water system since 1983 shows that the pollution load of the 13 main rivers which drain the Jakarta plain has reached an alarming degree, very much above the required standard.

The conditions are worsening gradually towards the eastern, part of the city where a greater density of industrial and residential areas are situated.

Therefore the quality of sea water in the Jakarta bay has been seriously affected by these circumstances showing a great degree of concentration of certain heavy metal sediments.

The quality of the air had also deteriorated but at a lower degree compared to the water situation. This decline in air quality is mainly a direct consequence of the increase in the number of motorized vehicles.

As far as the ground water quality is concerned the conditions are still tolerable even though the greater majority of the population is still using it for household or other purposes. But the quality is clearly deteriorating especially along the coastal areas and the high density settlements of the city.

With regard to solid wastes, impressive achievement could be witnessed all over the city, even though the method being used is still traditional. Wastes are still dump either by open dumping or sanitary land filling at special disposal sites outside the city.

JICA has involved in the preparation of a master plan in 1979 which regrefully has not been implemented even in part.

Incineration is still considered too costly and financially not viable. Pelletizing or compositing as well baling are also considered not feasible.

While drinking water as to the present stage each only serve 60% of the population either direct or indirect, the remaining 40% still have to rely on either shallow or deep wells. Two more purification plants will be built in two/three years time fenced by OECF loan and the World Bank.

Seweragesystem is being constructed at present, covering an area of app.500 ha consisting of housing as well as commercial areas. The project is financed by The World Bank traditional septic tanks are still widely used. A master plan has been prepared also under JICA technical assistance in 1974 and is being reviewed now.

Flood is no longer a thread since most of the major drainage canals have been completed except a small part in the eastern part of Jakarta. The minor drainage system will be extended, starting in two years from now, and financed by the World Bank.

The current problems

In the stride to overcome environmental pollution, the greatest constraint was the general indifference and consciousness concerning

environmental issues. This state of affairs has consequently influenced the selection of priorities.

Great progress in the change of attitude is now reality. The public concern for environmental issues is constantly increasing.

The ordering of more acts and laws to prevent pollution have been issued while improvements and development of legal and administrative aspects, still need to be done in order to follow up consistently with all actions of preventions as well as ameliorations, all of which need to be enforced with appropriate measures.

The elaboration of technologies of prevention and control still need to be developed and supported with training programme and education, of the mass.

Various ways & means in funding environmental conservation activities need to be developed.

The possibility may rise that some should be financed with funds originating from compensations from those convicted of environmental damage.

III. Main Policies on Environmental Pollution Control

As it was mentioned earlier the public concern for environmental issues has tremendously increased in the past few years.

The concern for environmental conservation in fact been always a national policy and has since 73 been included in the State Guidelines for National Development. This was followed by the publishing of laws pertaining to the conservation of the environment regulating the duties & responsibilities of each citizen in order to prevent any possibility of environmental pollution & damage with the objective to conserve the functions of natural living environment.

According to the National Policy (Environment Act No.4,1982) environmental pollution control should be developed following "the polluter must pay" principle (Chapter VI. Art. 20).

Conform to the Government regulation, (PP No.29,1986), each activity with a significant impact on the environmental will need an Environmental Impact Assessment Study.

On the national level environmental management is conducted by the Ministry of Population & the Environment in collaboration with interdepartmental institutions while on the local level, the responsibility falls on the Local Government.

Article No.15 of the Environmental Act stipulates that the conservation of the environment has to conform to the Environmental Quality Criteria as regulated by Decree No.02 issued in 1988 by the Minister of Population & the Environment.

(KEP-02 / MENKLH / 1 / 1988).

Already since 1971, the City Government has issued a regulation for the conservation of the environment, to prevent air, water and sea water pollution (in the Capital City of Jakarta region through the Local Government Regulation)

(No. 12, PERDA No. 12, 1971).

This regulation is reinforced by several other regulations, such as the Governor's Decree No.382, of 1977 (SK.GUB.No.382,1977), which rules that each industrial establishment in the region is subject to a quarterly waste water test carried out by the city's Research and Laboratory of urban environment.

1. Chronological Environmental Management in Capital City of Jakarta

- 1971 Local Government Regulation No.12/1971, about "Prevention of air, water and sea water pollution in industrial and commercial activities"
- 1972 Governor's Decree, the establishment of Centre for Research and Development of Urban Environment.
(One month after STOCKHOLM conference June 5, 1972)
- 1977 Governor's Decree No.382/1977 which states that each industrial establishment in the region is subject to quarterly tests carried out by the laboratory of the Center for Research and Development of Urban Environment.
- 1977 Governor's Decree No.484/1977, River Water Quality Standard.
- 1980 Governor Decree No.587/1980, Ambient Standard of Air and Noise.
- 1982 Environmental Management act.
- 1984 Local Government Decree No.5/1984, the Master Plan of Capital City JAKARTA 2005.
- 1986 Government Regulation No.29/1986, Environmental Impact Study and Assessment.

- 1988 Ministerial Decree No.2/1988, Environment Quality Criteria.
Governor's Decree No.1608/1988, Review of River Water Quality Standard.
Local Government Decree No.5/1988, Cleanliness of the Environment in JAKARTA.
- 1989 Governor's Decree No. 1004/1989, the installation of River Clean-up Program Team of Capital City of JAKARTA.

As has been indicated above, measures to cope with pollution have been initiated in 1971.

In addition, a National Action Plan on water pollution control is going to be implemented this year in 8 provinces. The Clean up River Program, as it is called, is planned to clean 3 most polluted rivers of Jakarta.

Another important program in Jakarta, is the Ground Water Recharging Program which will limit the overdrawng of groundwater.

Private companies, especially industrial establishments (established before 1986) have been very cooperative in implementing the government policy to prevent pollution by gradually installing treatment plants.

New industries, aside from the obligation to have an environmental impact assessment, should also install treatment plants if so required.

IV. Future Prospects for International Cooperation

The Environmental Issue is a problem which goes beyond national limits and cannot be confined within country's boundary.

Pollution in one country can easily propagate to a neighbouring one and affect it.

International concern dealing with the safety of the environment is fastly developing all over the world, not only because of the imminent danger the world is facing but also because of the advancement of ideas and the elaboration of value systems concerning our living environment. As a whole, one can conclude that these matters cannot be solved alone by one country without any connection with one another international operation is indeed the absolute answer to the problem.

By principle, international cooperation in this field should be non political in nature, for living environment knows no political nor

administrative boundaries.

We all live on one planet which basically has only one universal & continuous aquatic, atmospheric & land systems, and in fact environmental problems faced by all nations of the world are basically the same.

The only difference which may exist between one country and another is the degree of control. For one country might already have developed its own techniques as well as resources to develop a prevention & control system while another has not.

In the latter case, such a country very often has to bear an additional impediment as a consequence of the introduction of technologies, related to assistance programs which often have been prohibited in their country of origin.

International cooperation can and should be a good action as long as it is based on good intentions to cooperate in solving a common problem of humankind but not as a simulated mean for profit making.

This pattern of cooperation will need the participation of all nations, for after all, every country is a member of the world community whose fate is determined by us all and so the burden should be proportionally borne by all.

But considering the fact that we are now assembled here to discuss this question within the limits of the urban environment, let us start with intercity cooperations which from past experience has offered practical means for action without too much intervention of the higher administration, which further could be the media for the extended JICA assistance programme.

Nevertheless intercity cooperation should be based at a national level by a general cooperation agreement between countries concerned.

INDUSTRIAL POLLUTION CONTROL IN INDONESIA

by MR. SUYATNO

1. Introduction

1.1 Present Situation on Industrial Pollution

One of major problems in most developing countries, including Indonesia is the ever increasing population, making it prerequisite for the respective government to implement more development programs. One of the important sectors to be developed is industry, in addition to agriculture which is the backbone to the economic development of these countries.

Indonesia is the fifth biggest nation in the world viewed from its population. It is estimated that the country has a population of approximately 175 million (1989). In order to pursue economic growth for the welfare of its people, the government enhances industrial development which is now progressing at a fast pace; as a consequence, industrial pollution has become a point of concern. In general, water pollution has been given special priority by the government and beginning June 1989, the Ministry of Population and the Environment has adopted Clean River Program (CRP) for eight provinces, i.e. Jakarta, West Java, Central Java, East Java, East Kalimantan, North Sumatera, South Sumatera and Lampung. The short term objective of CRP is limited to identification of industrial pollution sources, especially those having hazardous wastes and seek commitment of industrial sector to comply with effluent standards within a predetermined time frame. Industrial air pollution is not a critical problem yet, however, some cases emerged lately, especially from cement industry.

1.2 Problems on Industrial Pollution Control

There has been a lot of problems concerning industrial pollution control, such as lack of understanding in the industrial sector, and unavailability of specific effluent standards. In addition, industry in general still think that environmental control will increase production cost so that it reduces the competitiveness. However, lately environmental awareness in the industrial sector has improved markedly, thanks to the effort implemented by Ministry of Population and the Environment. Other constraints for effective and efficient

implementation of industrial pollution control are trained personnel, technology, lack of information, funds, etc.

1.3 Relationship Between Concerned Parties

a. Central and Local Government

On national level, government body which is in charge of formulating environmental policies is the State Ministry of Population and the Environment. However, this Ministry formulates policies while their implementation, at national level is by other ministries. In Indonesia, there is no such a body as Environmental Protection Agency like in Japan which executes environmental policies. A plan is still underway to create a similar agency in order to enhance environmental control in Indonesia.

At local level, provincial government is in charge of environmental control; in this case, usually Vice Governor takes care of all environmental problems in his province. Provincial Government, under the guidance of State Ministry of Population and the Environment set up standards, guidelines, etc. to be used in the province under its jurisdiction. Hierarchically, provincial government is under the Ministry of Interior and there is an agreement between Ministry of Population and the Environment and Ministry of Interior on pollution control to be exercised by provincial government.

b. Government and Industry

Relation between government and industry is manifested by various forms, such as through industrial association, direct contact, through national and local Chamber of Commerce and industry, etc. In addition, in the case of industrial pollution control, at least three ministries are in charge, i.e. Ministry of Industry, Ministry of Population and the Environment and Ministry of Interior. Ministry of Industry through its research laboratories will monitor industrial pollution. Meanwhile, Ministry of Population and the Environment may send in industrial sectors to discuss draft of standards, guidelines, etc.

2. Policies, Laws and Regulations on Industrial Pollution Control

2.1 Policies on Sustainable Development

The government of Indonesia (GOI) is actively pursuing a balanced development between economic goal and environmental preservation, which is more familiarly called sustainable development policy. This policy stresses wise utilization of natural resources in order to support continued development and the sustenance of the harmonious and balanced environment. In line with the above policy, the GOI enacted Act No. 4 of 1982 - Basic Provisions for the Management of the Living Environment since March 11, 1982.

This Environmental Act adopts Environmental Impact Assessment (EIA) for activities having significant environmental impact, penalty for polluters, etc. In 1984, the GOI enacted Industrial Act, i.e. Act No. 5 of 1984; this Act is a corner stone for industrial development with environmental considerations.

2.2 Guidelines and Regulations on Industrial Environmental Control

In order to implement industrial development with environmental considerations, Ministry of Industry has issued several regulations, such as for hazardous wastes, EIA, etc., while Ministry of Population and the Environment issued guidelines for implementation of EIA, standards for water bodies and effluents. Other ministries such as Ministry of Mine and Energy and Ministry of the Interior, also issued guidelines for EIA, etc. Several provincial governments, such as East Java, West Java and Metro Jakarta issued regulations, guidelines and effluent standards to protect the environment. A more realistic guideline on effluent standards will be issued soon; these standards will cover 14 different industries, such as urea fertilizer, palm oil, rubber, pulp and rayon, etc.

2.3 Commitment of Industrial Sector

In May 1985, Ministry of Industry in cooperation with Ministry of Population and the Environment initiated a talk with the management of state-owned industrial enterprises. Highlights of the talk, among other things are as follows:

- a. Industrial sector support sustainable industrial development policies.
- b. Communication among concerned parties, including with non Government Industries need to be enhanced.
- c. A persuasive approach will be applied to concerned parties/industries.
- d. The government will give incentives to bear environmental cost, such as credit facilities, tax exemption, import tax allowance, etc.
- e. Non polluting industry will have a good image and standing in the society; therefore, environmental indicator need to be used to judge a company performance.
- f. Efforts and technology to reuse waste need to be developed especially that will give profit and avoid pollution.
- g. Environmental management need to be included in the company management process and its coordination need to be enhanced.
- h. The highest management in an industry is supposed to be in charge of environmental matters.
- i. A just and fair treatment need to be applied to all industries, except small industries.
- j. In the context of industrial development with environmental consideration, sense of responsibility to God-given environment need to be developed among company management.

3. Future Prospect for International Cooperation

3.1 Highlights of WICEM

Indonesia was one of the countries participated in the first World Industry Conference on Environmental Management (WICEM) sponsored by UNEP in France in November 1984. Some of the important items of the conference are transfer of technology from developed countries to developing countries, training

of personnel, expert/technical assistance, exchange of personnel, funding for such activities, and exchange of information, etc.

3.2 Future Cooperation

Japan is a developed country which took part in the WICEM in France; therefore, it has a commitment to the Declaration of the Conference. Several items as mentioned above are useful topics for future cooperation between Japan and developing countries. However, comprehensive program need to be developed to suit the specific needs of each country.

4. Conclusions and Recommendations

International cooperation such as the ones managed by JICA is of prime importance. In the long run, this undertaking will in turn reduce pollution from industry through transfer of technology, exchange of information, technical assistance, etc. However, programs need to be worked out to suit the needs of each individual country to accomodate specific needs of the country concerned.

MEXICO CITY'S PROGRAM TO REDUCE AIR POLLUTION

by MR. FERNANDO MENEDEZ

Geography, Economy and Pollution in Mexico City.

The Metropolitan area of Mexico City consists of more than 2,000 square kilometers, comprising the federal district and 17 towns in the State of Mexico. It has a 19.5 million population. It is located at approximately 2,300 meters above sea level and at a tropical latitude of 19.5 degrees. Mexico City is confined within a deep valley naturally encircled by a great chain of mountains, all of volcanic origin.

These physical and geographical characteristics create a natural isolation and contribute to frequent thermal inversions and atmospheric depressions, especially during the winter, presenting an impediment to the development of air currents during prolonged periods of time. The lack of winds impedes the dispersion of pollutants.

The enclosed valley of Mexico, where the Metropolitan Area of Mexico City is located, suffers from severe hydrological and ecological damages. Almost seventy-five percent of its coniferous and oak forests have disappeared and almost 99% of its lakes have dried up. A little more of 70% of its rural lands show an advanced state of erosion, large amounts of suspended dust particles in the atmosphere, during windy days, are attributable to these areas with a total lack of vegetation.

For various historic and economic reasons, the metropolitan area of Mexico City has become an urban, economic, and political concentration with few precedents in the world. Its growth has been extraordinarily rapid in past three decades due to the economic opportunities it offers, a fast natural population increase and continuous immigration from rural areas. The metropolitan area (which represents just a one thousandth part of the total Mexican territory) contains 25% of the national population, still growing at a 5% per year. This represents almost two times the national average. The metropolitan area of Mexico City generates 36% of the gross national product and consumes nearly 25% of the total energy of the country, primarily as hydrocarbons burned by a broad spectrum of transportation, manufacturing and service industries. All of these factors contribute to its atmospheric pollution problem.

More than 2.5 million vehicles consume approximately 14 million liters of gasoline and 4 million liters of diesel fuel per day, while close to 30 thousand manufacturing and service industries and two energy generating plants

burn approximately 32,000 barrels of fuel oil and more than 200 million cubic feet of gas. The resultant emissions combine to interact in a photo-chemical process with hundreds of tons of suspended particles that the wind brings from the deforested, dried up or eroded zones that surround the city. For this reason, throughout the year air quality levels in Mexico City normally exceed standard levels (similar to those in other countries) causing decreased visibility and treatheningly public health.

Trends

After 10 years of positive fiscal, economic and regulatory stimulus and penalties to induce decentralization, with increasingly successful results, it is still unavoidable that the city will continue growing at relatively fast rates in the predictable future. This growth could bring among other consequences, a larger consumption of energy and continued ecological damage in the metropolitan area of Mexico City due to the following factors:

1. The population growth, which increases at an annual rate of 5%;
2. The number of vehicles circulating, which increases at an annual rate of 4%;
3. The number of trips/per person/per day, which grows with the population, new lifestyles and economic activity;
4. The kilometers driven/per vehicle, which also grow based on the above mentioned items, the expansion of the urban area, and the reduction of average driving speed;
5. The continuous expansion of the urban area, over forested zones, which grows between 4 and 5 percent a year;
6. The existing extent of deforestation and soil erosion; and,
7. The ever increasing volume and intensity of the consumption of goods and services, which thrives on additional economic activity, population growth and new consumer habits.

Basis for an Action Program

It was not until very recently that a consciousness of the real meaning and implications of the atmospheric pollution problem was acquired.

In march 1988, the "general law of ecological balance and environmental

protection" became effective as an integrated legislative response to the environmental problems of the country. The law establishes a broad system of mutual assistance between the federal government, federal entities and municipalities, decentralizing resources and responsibilities under a coordinated and cooperative framework. Article 6 of the law grants authority to states and municipalities for the prevention and control of atmospheric pollution generated by sources in their jurisdiction. Article 9 of the law also grants the Mexico city's government authority to regulate mobile sources and emissions from business and services. Also parking lot inspections, vehicle traffic management, control over transportation systems and public roads, emission regulations for public transportation, as well as authority over urban development and land use. The federal regulatory agency has reserved to itself control over industrial sources, determination of technical regulations and operation of atmospheric monitoring systems.

The law makes available a repertory of ecological policy instruments of broad coverage and applicability, strong enough to support an integrated planning process comprising the federal government, the federal entities, municipalities and society itself. Such is the case of the ecological organization of regions and human settlements, the mandatory evaluation of environmental impacts of important projects, ecological planning regulations; steps for the protection of natural areas, research and education; inspection and mechanisms for social participation.

In this context, the president of Mexico has decided to approach the problem decisively, engaging the highest political will, in order to contain the deteriorating trend of the quality of Mexico City's air. At his inauguration ceremony on December 1, 1988, he clearly instructed the federal district government to assume the commitment of combating atmospheric pollution in Mexico City. His instructions were unequivocal: "...I am giving precise, urgent and strict instructions to the mayor of the federal district to start working immediately, with effective actions and encouraging community participation, in the fight against pollution".

Program Description

Taking into consideration the characteristic of our atmospheric pollution, during the next five years a series of measures will be adopted in transportation systems, in energy generation, in manufacturing and service industries, and in urban and rural zones surrounding the metropolitan area of Mexico City. These measures will include one or more of the following actions:

a) Improved fuel quality

Addition of oxygenated components to gasolins. Construction of refineries and isomeriation, methanol and other oxygenated products plants. This infrastructure will allow us to offer the necessary volume of lead-free gasoline of high quality that will be required by vehicles fitted with catalytic converters, as well as the fuel and oxygenated additives that will allow efficient combustion processes at the high altitude of Mexico city.

We will also begin the construction of desulfurization plants to produce low sulfur diesel and fuel oils.

b) Change of highly polluting fuels for clean burning ones.

We are starting a fuel oil substitution for natural gas in power generating plants and the ten most highly polluting industries.

Also the substitution of liquefied petroleum gas for leaded gasoline, in 45 thousand in city city cargo trucks.

c) Installation of new systems for combustion and emissions control in vehicles, in manufacturing and service industries.

Now annual automobile inspections are required and are performed in public stations as well as in private workshops. We anticipate strengthening this requirement and shortening the time period to perform inspections every six months. Industries are now subject of constant inspections and will be required the installation of scrubbers and particle control systems.

We will start next year the mandatory inspection and control of diesel vehicles.

We have begun the renovation of urban buses fleet, the installation of new engines and an adequate diesel motor maintenance program to reduce pollution and expand public transportation services.

Next year we will begin a wide program for the retro-fitting of three-way catalytic converters in public service vehicles.

d) Rationaliation and restructuring of transportation activities.

This item contrins a broad spectrum of actions to rationalize vehicle circulation and transportation systems.

The following actions are being considered:

I) Mechanisms to restrict circulation of all private vehicles one day a week, during winter time.

- II) Establishment of a corresponding system of incentives, and penalties through higher prices of fuel and parking lots.
- III) Removal from circulation of all vehicles found polluting excessively,
- IV) Prohibition of parking lots in specific zones, as a disincentive and means of alleviating traffic congestion and increasing average speed,
- V) Incentives for shared use of vehicles,
- VI) Restrictions to traffic in specific areas and at specific times,
- VII) Regulation and encouragement of institutional transportation,
- VIII) Reconfiguration and freeing of roadways and lanes for buses exclusive use,
- IX) Establishment of continuous working hours in public sector offices in order to reduce the volume of trips/per person, and,
- X) An increase in traffic policemen for adequate enforcement of these actions.

e) Ecological restoration of areas from which the wind brings suspended particles.

The program will involve the establishment of permanent vegetable covers through extensive reforestation, grass planting, water recovery, agriculture and livestock revitalization activities and paving of streets.

These Actions Were Selected Based on The Following Criteria:

1. They have already undergone experimentation in other countries, as well as in Mexico, and have been widely applied; their effectiveness has been proven.
2. They imply the use of technologies that are commercially available.
3. The energy they require is available at a reasonable cost.
4. They require adjustment in urban lifestyles and in institutional activities, that can be accomplished in a short period.
5. They have a significant reduction effect on total emissions and on one or more of the major pollutants.
6. Their relative cost/effectiveness is significant.

The present and future well-being of our populations is at risk. In Mexico we will take whatever decisions and actions are necessary to provide a healthier environment for our children to grow in. This is an effort to save our common mother earth. Mexico offers and welcomes the cooperation of mankind. We thank the people of Japan for their kindness, support and understanding.

MEXICO'S COUNTRY REPORT

PROBLEMS ON ENVIRONMENTAL POLLUTION CONTROL, RELATIONS BETWEEN GOVERNMENT AND INDUSTRY AND PRINCIPAL POLICY DIRECTIONS

by MR. JOAQUIN ZEPEDA

Introduction

It is indeed an honor to have the opportunity to speak before this selected group of people interested in one of the key problems of our times: The conservation of a clean and healthy environment for our children to live in the future.

I am an Industry representative of Mexico. I have led for about six years now a Committee for the Improvement of the Environment of the largest Industry organization in our country, known as the Chamber of the Transformation Industry. Close to 100,000 thousand industries belong to this Chamber or Association. The Committee for the Improvement of the Environment was created by these Industry organization in 1971 as a response to the concerns associated with the generation of pollutants of the environment originated by industrial activities. The main objective of this Committee is to help the individual Companies to comply with their social responsibility in the fight against environmental pollution.

Background

In order to give a realistic picture of the status of the environmental problems of Mexico, let me briefly review the industrial development of our country as related to the legislation regarding environmental pollution control. Since the main interest of this meeting is urban pollution and since close to 75% of the industrial activities in our country originate in Mexico City, for the sake of simplicity I will concentrate my comments on Mexico City.

As you probably know, Mexico City is perhaps the largest city in the world in terms of number of inhabitants, close to 20 million people live there. To make things worst the city is located in a valley surrounded by high mountains at an altitude of 2240m or 7100ft over the sea level. There are no large rivers or lakes in the City. About 50% of the drinking water is extracted out of wells and 50% pumped up from places located 100km apart and 1000m below. Waste water is collected in one large channel which empties out of the valley thorough an artificial opening cut out through the mountains. The meteorological

conditions of the valley are such that poor horizontal dispersion of air pollutants occurs and there is a high frequency of thermal inversion episodes which prevent the vertical movement of air out of the valley for periods which have lasted in some days during the winter for 6-8 hours, making the air very inappropriate for breathing. God has been quite kind to us and has let us live breathing this air, so far. A last point; given the high altitude of the city, the probability of photochemical reactions activated by ultraviolet light is very high and the formation of ozone out of atmospheric pollutants is a common occurrence.

Historic Overview

Important industrial activity started in Mexico City in the 50's. The industrial growth which achieved rates of 5-6% a year brought together an unchecked urban development which caused the city to grow to have at present 25% of the country's population and 75% of the industrial activity. Environmental Pollution was of not much concern during the 50's and 60's and the related Government regulations on the matter dealt mainly with human health problems. It was in 1971, when Congress enacted for the first time a federal law to prevent and control environmental pollution. Regulations to fight atmospheric pollution and water contamination were published in 1971 and 1973 respectively. The regulations were simplistic and could not be enforced to the degree required for various reasons.

In the case of the regulations on air pollution, just particulate emissions and opacity of the fumes/gases were quantitatively specified. In general, the Industry moved to comply with the regulations but obviously more than just control on particulate matter was needed. Lack of precise specifications on emissions of sulphur oxides, nitrogen oxides, hydrocarbons, etc. caused confusion among Industry. Industry was hesitant to make important investments to control their atmospheric emissions because of lack of clarity on the parameters which should be met. Enforcement of the Regulations was also difficult for the sense of progress which was perceived by the Government with the industrialization of the country and the attitude of the manufacturers showing that money should only be invested in projects which had a good monetary return. The use of fuels of very poor quality containing high levels of sulphur became a major factor in air pollution. The Government owned oil Industry assigned low priority to the production of adequate fuels relative to other investments in petrochemicals, and Industry had to use the poor quality fuels. Availability of natural gas as an industry fuel was very limited.

In terms of water pollution, the regulations did not help prevent a major problem. Limits for the discharge of industrial waste waters were set up in just a few areas, like temperature, pH, etc. A major negative of the regulations was to give the option to Industry to treat their waste waters or to pay the City authorities for their treatment. Most of Industry opted to pay the City. However, the City never installed the required facilities to treat industrial, nor municipal, waste waters and they continue being emptied to the environment with no treatment.

No appropriate regulations on solid waste disposal nor toxic wastes management were published by the Government, and Industry dealt with these issues the best they could; which was not that good.

Confusion in the enforcement of the available regulations came also out of lack of definition on the Government Agencies in charge of managing the regulations. Agencies like the Board of Health, the Water Resources Department, the Marine Department, etc. did not work in coordination and the lack of definition of whom was responsible for what became evident. This lack of definition of authority was also obvious between the Federal and the States Governments.

Present regulatory situation

The 1971 environmental Law has been improved substantially now. The Law was replaced by a new Act in 1982 and finally the standing legislation published in January 1988 was enacted by Congress.

The new Law on Ecology and the Protection of the Environment takes into consideration the need for industrial development, but not at the expense of the quality of the environment. The Law clarifies the authority at the Federal, State and Municipal levels of the Government and confirms the Urban Development and Ecology Secretariat as the sole Agency responsible for its enforcement.

Industry considers the new Law as an important step towards the solution of the environmental problems. A key legal instrument defined by the Law is the "Ecological Standard". A draw back of the previous legislation was the stiffness of the specifications, given that these were defined in the Regulations to the Law and, as I mentioned before, they remained unchanged for more than 15 years. The "Ecological Standard", however, is to be drafted by small technical groups, for specific areas of concern. Government and Industry experts sit together, discuss and agree on realistic parameters which should be specified in the Standard. This makes compliance of the parameters possible under the present situation.

Eventhough only around 50 "Ecological Standards" have been published so far, Industry believes this is an appropriate legal instrument to clarify and define the rules of the game and openly supports the drafting and enforcement of the standards.

In addition to the "Ecological Standards", new Regulations on Air Pollution, Toxic Wastes Management, Environmental Impact Evaluation and Automobiles Emissions have been published. The Regulations further clarify the authorities of the Federal and Local Governments on the matter and define other requirements, in addition to compliance to the "Ecological Standards". We believe that the new Regulations are a huge improvement over the previous ones, to help solve our environmental problems.

Areas of Concern

Our Industry, we are convinced, is a mature industry responsible for its actions. Once the corresponding maximum allowable levels of emissions are defined in the "Ecological Standards", it is our obligation to get prepared and comply with the parameters. We have detected however, in the recently published Regulations the intention of requesting Industry to apply for "Permits" to operate. We feel that the need to get a "Permit" for operation should be avoided. If the parameters of the "Ecological Standards" are complied with, the Industry should be allowed to operate freely. If the parameters are not complied, the Industry should be sanctioned and the required steps to correct the problem should be immediately taken. We see therefore, no need for the "Permits" required in the new Regulations. We are presently working with the corresponding Government authorities to solve this issue.

Other very important area of concern for the compliance of the new legislation is the economic factor. In order to comply with the "Ecological Standard" requirements, there is no doubt that substantial investments will have to be made in the industrial plants. As you may know, Mexico is living now one of the most critical economic stages of its history. The country has been subject to an Economic Stabilization Program or Shock Plan, in which prices and salaries have been strictly controlled by the Government since January 1988. Under these circumstances, it is clear that most Industry is not in a position to make the investments that the compliance with the specifications of the "Ecological Standards" probably require. Therefore, we need to prepare investment programs sanctioned by the Government in order to, step by step, comply with the emission specifications as soon as possible.

The scarcity of economic resources in the country points to other key consideration in the battle against environmental pollution, the need to prioritize our actions. In the past, the actions of the authority followed not well defined routes. Pressing problems brought to light by public or political pressures were tackled on an urgent basis and were not necessarily the most important on an overall basis. Industry reacted alike. Investments to control environmental pollution followed in general no defined strategy. Some examples: Piping systems to get natural gas to industrial plants were built at high cost and then it was found that no natural gas was available. Waste water treatment plants were built to then discharge the treated water to the city sewerage which carried municipal waste water with no treatment. A great deal of economic resources was underutilized.

We believe that the time is ripe to prepare a master plan to tackle the environmental pollution problem on an integral basis making an optimum use of our scarce economic resources. Priorities should be clearly defined. Let us define seriously where the largest part of the problem is and let us put our scarce economic resources to solve it. For the time being, let us leave aside minor problems which have no high priority.

Conclusions

- 1) We believe Mexico has now appropriate regulations to tackle the problem of environmental pollution. The introduction of the "Ecological Standards" as a flexible instrument to establish specifications seems to be key for Industry to program the investments required for compliance.
- 2) The scarcity of economic resources in the country and specially the tight financial position of industry due to the Economic Stabilization Program, requires the development of individual investments programs in each Industry to adopt new processes or install anti-pollution equipment to comply with the "Ecological Standards".
- 3) The time has come to clearly define priorities to solve the pollution problem and invest our scarce economic resources in the key, most important problems, first.

ABATEMENT OF URBAN POLLUTION PROBLEMS IN BANGKOK

by DR. WICHA JIWALAI

Introduction

The Bangkok Metropolis is a large agglomeration of 27 districts with population as large as 6 million sprawling over about 1,600 squarekilometres. There had been a marked improvement of the cleanliness of the street and public places since 1985 when the present elected governor, Major General Chamlong Srimuang took his office. Many of his new policies, especially, on the refuse management were noted as the basis of an achievement on the municipal management in spite of various constraints prevailing in the city.

Prevailing Problems of The City

Uncontrollable growth

The explosive growth of Bangkok in the fifties and sixties and the quickly rising industrialization have created serious capacity problems. Services, utilities and infrastructure lagged behind not only due to a lack of policy and money, but also due to the unco-ordinated, space-squandering character of that growth of which the external costs remaining with the public authorities.

The growth occurred along the main transportation-axes and was mainly ruled by free-market processes. The conversion of paddy land into urban land followed the growing network of major roads, with a marked tendency towards ribbon development resulting in a sprawling, haphazardly developed suburban with dead-end accesses reaching only to particular land-owners with little government intervention. When there is a new road construction there will be a big boom of building constructions.

The imbalance between living and working place is growing worse. In the inner city, the developments and problems reinforce each other. The rise of a Central Business Area goes hand in hand with a growing traffic congestion, resulting in a reaction of an even higher concentration of functions. The high land-prices and speculation lead to downfall of the housing stock and rise of condominium constructions.

The populatin in Bangkok is increasing rapidly. From the last census of BE 2528 with a population of 5.36 million. It is expected that the population number of Bangkok will grow to 7.6 million by BE 2543. The population growth

at present is estimated to be around 3% per annum, largely due to natural growth of the young population. The fringe urban areas in the region (Samut Sakhon, Nakhon Pathom and Pathum Thani) have an estimated growth rate of 4.8% per annum. Therefore, a part of the growth has been taken over by these vicinity towns.

Traffic Problems

The limited road network, the fast growing number of motor vehicles, the growing imbalance between working and living place as well as the absence of a secondary road system makes Bangkok almost a synonym for "a permanent traffic congestion". The road hierarchy is incomplete at many levels including also missing links in the primary system. The condition is most severe at the secondary distributors and access levels. The traffic in many stretches of the roads are already going at less than 10 km/h during the rush hours. These deficiencies increase journey distances and congestion. The BMA is trying their best to accelerate the construction of multilevel crossing at many existing roads to reduce the traffic flow obstructions. Automatic traffic control system and also utility tunnels are also being planned with the assistance of JICA. However, the main feeder roads to the BMA are planned and operated by other two main agencies of the central government, the Expressway and Transit Authority of Thailand and the Highway Department, Ministry of Transportation. Therefore, the solution of the problems are still dependent upon the central government policy.

The public transport in the city which is mainly the public buses operated by a separate agency under the central government is still inadequate, both in terms of capacity and quality.

The increase of vehicle number from 320,000 in BE 2515 to 850,000 in BE 2525 and 1,740,000 in BE 2530 shows the booming increase of the need for road transportation in this area. However, the available road surface in the Bangkok City is only 9% of the total municipal area. This is very low in comparing with the recognized level of adequacy at about 20%. Many dead-end lanes are not accessible by the refuse trucks. Therefore, it is not possible for the public transportation and the municipal service trucks to serve in such a condition with their standard size vehicles.

Shortage of Water Supply

Only 60% of the population is presently covered by the service of the Metropolitan Water Works Authority. The water supply system is under stresses due to the limited resource capacity, pollution and leakage in the distribution system. While losses of 25% are considered to be normal, the losses in Bangkok is up to 40%.

Groundwater is an alternative source of public water supply. However, it is becoming more and more brackish and unsafe, while the excessive rate of abstractions is causing high rates of land subsidence.

Land Subsidence

The city extension in the past have almost entirely taken place on low-lying, marshy paddy fields.

The land subsidence in the BMA and vicinity had been observed since 1969. The center of subsidence coincides with the center of the artesian pressure decline. Recently the most severe annual rate of subsidence during 1978-1982 has been estimated at more than 10cm/year. As much as 1.14 meters of subsidence occurred between 1940-1980 at the critical zone in the south-east sector of Bangkok.

If the architects in Bangkok follow the prevailing practice of land filling the construction sites about 1 meter on top of the previous ground level prior to the building as a precaution against flood. The cost of land-filling will gradually at about 200 million Baht per squarekilometre as the urbanization grows. Assuming that the urbanization in the next 10 year is 30% of the BMA, the total cost will be 90,000 million Baht!

Water Pollution

The city has not yet built a sewage treatment plant. But there are already some community plants constructed by the National Housing Authority and small institutions such as hotels and department-store buildings. The existing treatment capacity is only in the order of 0.1 million out of the 5.8 million population. The existing combine sewerage are basically short stretches of road-side drains leading to a natural stream "klong" near-by. These klongs are working as settling basins for solid removal and constitute to a marginal removal of pollution load by the anaerobic decomposition. A recent survey by the

Department of Drainage and Sewerage in 1986 revealed that none of the klongs in Bangkok contain more than 25% of the natural oxygen content with BOD values in the order of 60mg/l. Moreover, it was found that the heavy metal concentrations such as zinc has gone up as high as 10,000mg/l while chromium, copper and lead were found at 1,000mg/l.

The BMA realized that the water pollution conditions in the city and also in the Chao Praya River is getting worse. However, the prevailing budget constraint and also the need for remedy in the other acute problems such as traffic and city cleansing are truly over-whelming. Therefore, instead of following the existing master plan for 10 sewage, works serving about 5 million population, the BMA is planning to take over the operation and maintenance of the 6 community sewage works for about 10,000 persons already constructed by the National Housing Authority while the additional implementations for the next 5 years will stress the area where the efforts are most cost-effective and try to enhance the public participation in the construction of community plants for large buildings, hotels and housing projects.

Flood Problems

Most of the BMA situates on a flood plain lies between 0-2.5m above mean sea level except some relatively small patches of deposits and narrow natural levees about 2.5m above mean sea level; much of the city area and the suburbs were as low as mean sea level. The city roads and also most all of the urbanization in the the vicinity are placed on land-filled sites only slightly above the maximum tidal levels which reach about 2m above MSL. It is almost a general practice that every architect will demand a land fill of about 1 meter above the original ground level as foundation of a house or any building in the BMA and the vicinity to ensure safety against flood. Earth-filling industry is an important market for hauling trucks most of which are Japanese made. The spills on the road are the important source of the high dust contents in the air of Bangkok.

Floodplain-Management

It was urged that the government offices must keep ponds and parking lots for early rain-fall detentions. The private housing estates schools and large building were also proposed to follow the practice. In order to avoid the

high cost of drainage system enlargements. The areas of previous floods. The marks will be made clearly observable by the general public of the potential risks.

Refuse Problems

Bangkok has not yet introduced so many kinds of modern packaging techniques such as throw-away cans of beer and soft-drinks or multi-layer packaging of TV-dinners. The city is still struggling with the organic garbage of vegetable cuttings and fruit peels which are moist, heavy and bulky to handle. This is the main reason that has crippled the efficient workers of the BMA. The refuse in the rainy season contains 70% water, and in the dry seasons 40%. The mass is about 40% vegetables wood and grass. But the city is growing. Old properties give way to the new and turn themselves into refuse. Each day the population increases, and the daily solids waste quantities to the disposal sites also keep increasing. It is predicted that the increase in per capita rate of generation will bring the total daily amount of collected refuse up to 9,500 tons per day by the year 2000.

Bangkok is rapidly growing and every district has a unique blend of residential, commercial, tourist institutional industrial and other activities. Between 1984 and 1987 the daily refuse weight increased from 2500 to 4700 tons per day with a seasonal variation.

The biggest problem of refuse disposal of Bangkok is the collection and transportation of the refuse to the disposal sites. The BMA has 7,000 workers and 750 refuse trucks of various kinds. Which collect about 4,500 Tons of refuse per day from 73.5% of the households. However, the widely spreaded urban fringe make it very costly to transport the refuse to the disposal site. The BMA, therefore, concentrates on the collection and disposal of refuse from public spaces such as market places and intermediate stations provided in the form of large containers. It is inevitable that the individuals will have to play an important roll to complete the set-up by bringing the refuse to the provided facilities. The prevailing use of various make-shift containers such as paint-canisters, oil-drums, bamboo-baskets etc. for the pre-collection refuse storage is a major dissatisfaction to the public. The collection cost was found at approximately 12 Baht/ton/km.

The amount of refuse collected by the BMA is a huge amount of approximately 4,500 tons per day of 14,000 cubicmetres. Which is as large as 20 blocks of commercial houses 4 stories high and 12 meter deep. The dumping sites are being

exhausted very quickly. New sites will have to be obtained, otherwise other effective but costly methods such as incineration may have to be implemented. The official land price which was regulated by the government is very low. Therefore, land purchase is very difficult.

BMA Policy

Ever since the present administration has taken the responsibility, the cleanliness of the city has improved very much in general. Major General Chamlong Srimuang had followed the following policies:

Improve Efficiency of BMA

Cooperate with Other Agencies

Rely on Public Supports.

Governor Chamlong had initiated many effective activities as follows:

1. Ordered the BMA officials to take special care of the cleanliness and tidiness of the office rooms and office buildings.
2. Make random telephone calls to residences to ask for information concerning with the door to door services of refuse collection.
3. Initiate a study to control the hygienic condition of the municipal land-fill by introducing a private enterprise to tender for a disposal contract.
4. Acquire small size collection vehicles based on 1 ton pick-up trucks to enable extended services into the small back-yard lanes. These trucks can handle 3 cubicmetre load serving about 225 homes on each trip. The BMA purchased 25 units in 1988 and 50 units in 1989 making the increased services to at least 33,750 home of approximately 185,000 people more, when calculating the each truck makes two trips in a day.
5. Initiate a cooperation program between the BMA refuse collection service and the household participation in the suburban housing estates. The BMA arrange for the establishment of a transfer station within the housing area where the residences bring refuse on their own. This set-up held reduces the cost and the delay previously caused by the time spent on the door-to-door services.

On one hand the residences had to put-in more effort but obtain a more frequent service from the BMA on another. This help increased the hygienic condition of the housing areas.

6. The Governor took good care of the street sweepers and strongly support their morals. He made surveys and carefully analyzed the work loads of the street sweepers, took time-out to try the street sweeping himself to assess the real conditions and consequently increased the number of the sweepers to match the optimum load. Assignment of sweeping area in squaremetre per day of a street-sweeper in Bangkok had been reduces to suit the capabilities of the workers.

SQUAREMETRE/DAY	BEFORE	AFTER
Urban road	15,000	7,500
Suburban road	20,000	10,000
Small lanes		25,000

On the security matter, the Governor provided them accident insurance of 50,000 Baht each to relief 700 workers from worries over the family's security. As these workers are very poor, the insurance premium had been paid by charity funds raised by the governor himself. The governor also acquired the right for free health services and subsidiary funds for their families which they had not been given before. He personally took care of these hard workers by providing them better equipment such as new brooms and wheel barrows with reflectors for safety. He obtained 8,197 sets of safety jackets with reflective color for the street sweepers. These jackets had been specially designed from abroad (Vancouver Canada) where he had made an official visit. The are light, cool and valued up to about 160 Baht each. The governor personally handed the jackets to 2,967 street sweepers on December 26, 1988. Moreover, the Governor also extended the supply to the street sweepers of the High-way Department under the Ministry of Transport who he looked upon as equally important for the cleanliness of the streets in Bangkok.

7. The governor requested a practical participation of the street vendors and evening market vendors to stop vending on the side-walks and road

corners one day a week on Wednesday as a tribute to their earning venues, the vendors were requested to assist the BMA personnels to rinse and scrub the surfaces which had been smeared by food-stuffs and litter.

8. The governor initiated a special "Disposal Day" of a week to collect bulky wastes such as beds, chairs and old utensils which are not collected on normal refuse truck. Otherwise, householders would have to find their own ways to dispose off those bulky wastes.

The budget allocation is very low in relation to the vast responsibility of the BMA. For example, the allocation for refuse disposal at approximately 118 Baht per capita per year while each person in Japan would be allocated with 1,200 Baht per year for refuse disposal.

**THE MANAGEMENT OF ENVIRONMENTAL
POLLUTION CONTROL IN THAILAND**

by MR. SOMBAT LIMTHONGCHAI

Mr. Chairman, Ladies and Gentleman,

On behalf of the Federation of Thai Industries, I would like to express our sincere thanks to the Government of Japan, through the cooperation of JICA and Kitakyushu City for inviting the Thai private industrial sector to participate in this International Symposium on Environmental pollution Control in the Urban Areas of the Developing Countries.

Introduction

Over three decades of modern Thai economic development, an agricultural and raw materials export-based economy has rapidly moved towards the industrialised economic system. The GDP of agricultural sector declined from 40.5% in 1960 to 22.5% in 1986, while the GDP of the industrial sector rose from 11.7% in 1960 to 21.4% in 1986. This increasing industrialisation brings with it the potential for major chemical accidents, routine environmental contamination and the problems associated with the disposal of hazardous waste, threatening the quality of our lives.

Present Situation

Of environmental concern is a structure alteration within the industrial sector. The food industry, which produces organic and non-toxic waste, has shifted regressively in term of GDP share from 34.5% in 1960 to 15.6% in 1986, while other industries, particularly the import-substituting industries such as textiles, chemicals, iron & steel, pharmaceutical, plastics and electroplating which are considered as portential hazardous waste generators have increased their share in the GDP structure. These hazardous wastes have brought about public concern because of their toxic and long term accumulation effects to the environment.

A recent study has been conducted to formulate the Natural Hazardous Waste Management Plan (NHWMP), Using a Category Number System of,

- 0 - for little or no potential for generation of hazardous wastes,
- 1 - for potential for generating only small quantities of hazardous wastes,
- 2 - for potential to generate moderate quantities of hazardous waste or potential to generate large quantities of waste having low concentration of hazardous constituents,
- 3 - for potential to generate large quantities of hazardous waste or lesser quantities of waste with high concentration of hazardous constituents,

a total of 16,664 factories in Bangkok were ranked with respect to hazardous waste generating potential as described above.

The results were:

hazardous potential	number of factories in Bangkok
"0"	3734
"1"	6119
"2"	6320
"3"	491

The high concentration of factories with potential to generate varying degree of hazardous wastes in a city as densely populated as Bangkok is a major concern to be reckoned with.

River Pollution

The CHAO PHARAYA is the largest river in Thailand, feeding the rich fields of the central basin, producing rice and other cash crops for the populace of the Kingdom. It has long served as the bloodline and the symbol of the country. The Bangkok Metropolitan Region, which comprises of Bangkok and others five adjacent cities with the population now of 8.2 million, have grown and prospered in the Lower Chao Prospered Phraya Basin. The dominance of this region is evidenced by the fact that half of all national economic growth between 1970 and 1986 was due to activities generated in this area.

The positive effect of economic development in this area has also resulted in the deterioration of the waste quality of the Chao Phraya river. Now the levels of dissolved oxygen and coliform bacteria in the lower reaches exceeded the standards set by the Office of the National Environmental Board (ONEB). The main culprits releasing organic wastes into the Chao Phraya are domestic wastewater and industrial discharge with the proportion of waste loads in the

region of 176 percent and 24 percent respectively. Many studies have been conducted on ways to clean up the river but have all been suspended due to budget constraint. (e. g.-36,671 million baht in JICA's study in 1981). However, the fact that standards for major parameters such DO, coliform bacteria, biochemical Oxygen Demand (BOD) has been specified reflects the intention of the government to maintain water quality at appropriate levels. Our challenge in Thailand is how to derive a lower cost system that meets the basic requirements of sanitation.

Air Pollution

Lead in Gasoline

Automobile is the main culprit emitting lead to the environment Bangkok and five surrounding satellite cities, the number of private cars, public buses, trucks and motorcycles combined, will grow from 183,100 in 1981 to 2,399,000 by 2001. Since the combustion of leaded gasoline is solely responsible for lead emission to the environment, the government has planned to introduce unleaded gasoline by the year 1992. The current lead content in gasoline in Thailand is 0.45gm/liter, compared with 0.15 in Singapore and nearly zero in Japan.

Acid Rain

Every year, large quantities of SO₂ and NO_x are discharged into the atmosphere from the combustion of fossil fuels such as coal, lignite and oil. In Thailand about 48 percent of SO₂ is emitted by electricity generating and another 34 percent from other industrial sources. Industrial and utility boilers emit about 44 percent of NO_x and transportation vehicles generate another 23 percent. Since large number of industrial plants and transportation vehicles are found in Bangkok, large proportion of the country's overall SO₂ and NO_x emissions are also from this area.

There is very little information on the background PH values of rainfall or water resources to indicate the present situation regarding acid rain in Thailand. However, there is no room for complacency since the ever-increasing electricity demand will force the Electricity Generating Authority (EGAT) to increase its consumption of lignite and coal 5 folds by the year 2001. EGAT will face increasing pressure to control its SO₂ emission in the future.

The Federation of Thai Industries

The Federation of Thai Industries is a legally representative of the industrial private sector in Thailand. It plays a key role in bringing about cohesion between the private and government sectors.

At present, FTI has more than 1800 members, grouped in 24 Industry clubs and 6 provincial branches. (see appendix I). A look at the grouping of the Industry Clubs and their ranking in Category Number System reflects the vital role FTI plays in the management of industrial environmental pollution control in Thailand industrial development. The tasks are enormous and challenging.

The Future

As Thailand is progressing smoothly to attain the newly-industrialised country (NIC) status, the environmental issues should be considered in its proper context. Between 1970 and 1987 the economy has grown 2.7 times with a sustained growth rate of more than 6 percent per annum. There is no doubt that the economy has been on the right track. The remaining question is whether the country has progressed at the expense of the depletion of our natural resources and the growing degradation of our environment.

The experience in Thailand confirms that "environment" cannot be separated from "development" and vice versa. The public will no longer tolerate any single-minded pursuit of development objectives without due regard to the environment. Industry must take a leading role and become instrumental in introducing clean technologies, initiating accident prevention and hazardous chemicals management. The role of the business community and multinational in particular is wide open. The past practices of doing business in Thailand relying on personal connections to corner the domestic market and conforming only to stipulated regulations, may no longer suffice. The motive, however, should be derived from mutual benefits. I am certain that such business philosophy would not only be appreciated by recipient government, but in itself a good public relation which would prove to be cost effective in the long-term operation of the company.

In closing I would like to urge those who have had the success in managing pollution control to share the experience with us. So that in the many years to come, we can still welcome you in our land of smiles with more smiles.

Thank you.

Industry clubs and their ranking (APPENDIX I)

RANK "0"

- 1 Food processing industry
- 2 Leather-based industry
- 3 Gas industry
- 4 Glass industry
- 5 Cement industry
- 6 Shoe industry

RANK "1"

- 1 Plastic industry
- 2 Rubber-based industry
- 3 Printing industry
- 4 Ceramic industry
- 5 Packaging industry

RANK "2"

- 1 Electrical industry
- 2 Furniture industry
- 3 Iron & steel industry
- 4 Auto-parts industry
- 5 Air-conditioning industry
- 6 Industrial machinery
- 7 Automobile assembly
- 8 Agricultural machinery
- 9 Pulp & Paper machinery
- 10 Textile machinery
- 11 Plywood machinery

RANK "3"

- 1 Chemicals industry
- 2 Pharmaceutical industry

討 論

開発途上国における環境対策の
課題とそのとりまとめ

司会

これまで各国からご報告いただきましたレポートや、ディスカッションがありました内容等に基づきまして、それぞれの分野ごとに取りまとめをしていただきます。コーディネーターは橋本先生にお願いいたします。

コーディネーター：

このセッションの議長を務めさせていただきたいと思います。

まず、都市の環境管理の法的な側面について、インド・ボンベイ市助役のチャーリーさんに報告していただきたいと思います。

チャーリー：

議長、時間が限られておりますので、率直に申しまして、これは、非常に難しい作業であり、また、内容の性質からも困難なものです。ここで簡単に都市の環境管理の法的な側面についてお話しします。

こちらに出席されている皆様のお話を伺っていると、法制度などの制度的な側面につきましては、環境保護を担当している中央機関が、環境保護の為の機関にサービスを提供し、開発プロジェクトを行っている全体の統括をしなければいけないようです。

また、全ての国のお話を聞いてみますと、行政面の責任につきましては、実際の実行面では、責任は中央政府のものであり、また連邦政府の構造をとっている場合には、州政府にも責任があるようです。また、中央政府と市町村自治体という構造もあるようです。ですから、三つの段階の法政公機関があるわけです。また、一般的には中央政府そして自治体という二段階、連邦機関の場合には、連邦政府、州政府と市町村政府と三段階に分かれる二つのケースがあるようです。

また、中央には環境庁があり、各州では州の公害防止委員会があり、市町村政府では、実際に都市の行政の先端にいる、という状況がよくみられるようです。

それともう一つ、こちらで発表された全ての国の中での共通点があります。それは導入されている環境問題に関しての法律が、全て非常に最近導入されたものであるという点です。

例えば、インドでは、間接的直接的に、環境にたずさわっているたくさんの法律がありましたけれども、本当の意味での公害関係の法律としては、公害防止法、汚染汚濁防止法が74年に制定されております。また、同様にメキシコでも71年の環境法はありましたけれども、本格的な法律が施行されましたのは1988年の1月です。タイをみますと、こちらでも国レベルでの環境委員会があり、産業界が維持しなければいけない基準が決められています。

インドネシアでもやはり、最近施行されたものです。人口環境省が政策立案を担当しようとしているようですが、実行面は他の国レベルの省庁が担当しています。しかし、環境保護庁のようなものは、インドネシアの場合にはないようです。また、ローカルなレベルでは、州政府が環境管理を

担当しています。インドネシアの政府は1982年に法律を施行しております。従って、この環境保護という法律はまだ新しいわけです。

他の国々をみてみると、エジプトでは、1982年の法律があります。マレーシアの場合には、ちょっと古くて1974年ですが、それでもまだ新しいものです。また、マレーシアは、参加国の中では、環境保護の機構がしっかりと制定されているようです。連邦政府では住宅省、科学技術庁があり、そして各州の委員会が担当しており、環境関係の部門の調整を行っております。そして、地元レベルでは市町村レベルがたずさわっております。ブラジルの場合には、有害廃棄物の連邦法が最近導入されております。

皆様のペーパーを拝見いたしましたして、法的・制度的側面について検討してみますと、全ての法律はまだ新しいという共通点がみられます。また、中央政府と地元政府の行動を調整しようという試みも行われており、実際の導入を担当する最先端にありますが、市町村の政府レベルとなっております。

皆様のペーパーを拝見し、皆様とお話をして感じたのですが、私どもの国では、本当の意味で、完全に法律・制度的な環境保護というものを実行するのに、まだ長い道のりがあります。各機関がそれぞれ違うレベルでこの問題に対処しようとしており、本当の意味での調整のとれた、協調のとれた努力をし、環境保護・公害対策という問題を導入しなければいけませんので、まずは、調整をはかることから出発する必要があります。

法的・制度的な観点からはこのよう共通点がありますが、各国にはこの問題を法律化しようという政治的な意志があるようです。といいますのは、発展途上国だけではなく、先進国を含めた全ての国々で、環境保護の重要性が認識されているからです。従いまして、参加国の皆様は、自分達独自の法的な制度を導入し、公害対策と言う問題を導入することができる、ということを示していると思います。

ご静聴ありがとうございました。

コーディネーター：

チャーリーさんありがとうございました。

少し、皆様のコメントをお受けしたいと思います。この法制度に関する質問とかご意見はありますか？コメンテーターの浅野先生どうぞ。

コメント：浅野

自治体の方たちが中心になって、シンポジウムが行われているわけですが、やはり、自治体だけで環境管理ができるわけではなく、国の役割が大きいということは各国共通であります。しかし、国がすべてなんでもやってくれる、という様に考えるのは大変問題がありますし、一番問題を抱えている現場にいるのは、自治体でありますから、どの国でもいずれ、方向としては自

治体の役割が大きくなるだろうと思います。

日本の経験は、橋本先生がすでに最初にプレゼンテーションなさいましたように、最初にまず、自治体が努力をいたしました。その自治体が努力をした一番の大きな力になったのは、住民の要求でありました。そのような自治体の努力を受けまして、国はこれを国の政策として、法律化する努力を進めました。その結果、さらにまた、その国の法律化した政策というものが、自治体の仕事を非常に力づけ、それを進めていったという経験をもっております。

このようなことをおそらく各国とも、これから経験されていくことだろうと思いますけれども、お聞きした中では例えば、法律の制度はあるけれども、それをいつから実施するかということについて明確な基準がない、というご報告を受けたところもあります。これは、ある意味では、私ども日本の経験からいいますと、少し驚くようなところもありますが、しかし、環境の問題というのはともかく、時間をかけて解決しなければいけない問題ですから、あまりいっぺんに答えを要求するというような考え方をとるべきではないと思います。少しでも良くなればそれで成功である、さらにまた良くなっていく、ということが必要だろうと思います。ですから現段階では時間をかけて努力をしようとしておられる国があることも、私どもは大いに尊敬しながら、お聞きしなければならないということを感じました。以上です。

コーディネーター：

浅野先生ありがとうございました。他に何かありますか。

もし、他に特別なコメントがなければ、一言私の方から加えたいと思います。

国と地元の関係というのはかなり違います。連邦政府と他の国とはタイプが違います。また、日本では地方自治体というものがあります。地方自治体に自立権を与えなければいけません。

これもまた別の問題です。協力をする場合には、まず、政府の政治的な制度を国が決めなければいけません。従いまして、この問題は、非常にセンシティブに考えなければいけません。日本の各地方自治体の独立性という制度を、全て導入しようとするのではなくて、各国の状況に合わせて考えていかなければいけません。また、これは垂直的な問題であれば理解し易いのですが、水平的な責任分担となりますと、ますます難しくなります。

例えばエネルギーに関しますと、環境当局はエネルギーを管理することはできません。エネルギーは、たとえば工業省とかエネルギー担当の部門がまた別にあります。これも重要な点です。日本がSOXの管理に成功しておりますのは、通産省の政策の変更によるものであります。ですから、地元レベルと国レベルというのは、はっきりとした法制制度の方向を決めておく必要があります。

はい、ハウスマンさんどうぞ。

コメント：ハウスマン

一つ私の方から申し上げたいのですが、法的な枠組みをつくり、規則をつくって政策をつくると

いうことは、比較的易しいものだと思います。

弱点といいますのは、実際にそういった制度や規則の実行の段階です。単に構造ができてから、物事ができてしまったと思っはけません。そういう規則とか政策が実行に移される方法というのが、成功のカギだと思います。

コーディネーター：

ハウスマンさん、ありがとうございました。

私もその通りだと思います。規制とかは必要ですけれども、それが実行に移されるという保証はありませんし、過去にはそういう経験もあります。

時間が限られておりますので次に移りたいと思います。チャーリーさん、どうも大変大切な発表をしてくださしまして、ありがとうございました。

では次にメキシコのメネンデスさんに発表をお願いいたします。メネンデスさんに発表していただきますのは、都市管理における経済及び財政面についてです。

メネンデス：

私がお話しますのは、環境問題に関する財政面の問題についてであります。

これには、3つの基本的なポイントがあげられます。

まず第一には、都市環境の管理。それから持続可能な開発を行うということであります。

途上国における都市化というのは長期間にわたりまして、生活の質の改善の可能性というものを、市民に対して提供してまいりました。いろいろな雇用をし、都市に対して新しいいろいろなサービスを提供し、そして健康と快適さを提供してまいりました。生産などの活動はますます盛んになっており、基本的なニーズというものは満足されておりますが、しかし、公害というものが非常に大きな問題となっております。このような公害問題によりまして、今まで達成してきた全てのものが破壊されようとしているわけでありまして、今は力を合わせて廃棄物の管理、貧困者の管理を行い、そして福祉を達成していかなければなりません。公害を生まないような技術、リサイクルのプロセス、そして、天然資源の保護などが都市の持続可能な開発に必要なのであります。

第二の問題は、都市環境の管理における国家開発の観点からみた最重要課題の問題であります。

都市環境の管理というものは、国家開発計画のトップ・プライオリティとなっております。しかしながら、それぞれの都市によってそれぞれ違った重要課題があるわけでありまして、例えば、上水とかあるいは下水のサービスの拡大が必要な場合もありましよう。また、同じ町で同じ市でそういった、有害のあるいは有毒の廃棄物の管理といったものが重要になる場合もありましよう。また、国際的な責任としまして、オゾン層の保護といったことがあり、さらにグリーンハウス、温暖化現象を低下させるというような問題もあります。

こういった優先課題というものは、それぞれの市のそれぞれのニーズに従って決定されるべき

問題であります。

第三の点であります、都市環境の管理のプロジェクトという点があげられます。

この環境プロジェクトに関しまして、5つのものが上げられます。まず第一は、是正するよりも保護する、予防する方が易しいのであります。環境アセスメントというものは、不可欠の条件であり、将来の主たるプロジェクトを実施する上で、不可欠のものだあると思います。公害を生まないような技術の使用、リサイクルの設備、そしてまた、自然資源の保護というものが、全ての活動の前提条件とならねばなりません。

第二の問題は、我々は選択的に先進国から学んでいかなければならないということです。いろいろなアクションや戦略がとられており、技術もプロセスもたくさんあります。これらのものは、先進国から適用することができます。我々途上国といたしましては、そうすることによって、こういった環境保護の対策に対して追いつくことができるのだと思います。

第三の問題として、優先課題をかかげ、社会的あるいはコストの利益という観点から、みていかねばならないということでもあります。資源というものは常に乏しいものであります。我々は努力を集中して明確で具体的な問題を追及し、社会的な健康の利益というものを追及する、そしてそれを短期間で、なるべく資源を使わないで達成していかねばなりません。これは、必ずしも他の問題を忘れていいということにはなりません。いろいろな立法とかプログラムを策定いたしまして、将来引き続き環境の悪化が起こらないように努力しなければなりません。資源をもっと広い、社会的な利益のインパクトの観点から集中していかねばならないと思います。

第四の点は、長期的なローンをもって、財政的な援助を行っていかねばならないということです。今日、我々が行う環境のアセスメントというものは、将来及び今の世代に対しましても、利用可能なものであります。ですから、そのためのコストというものは、平等に分配されるべきであります。この分野というのが、途上国としまして大きな貢献を行うことができる分野ではないかと思えます。

第五は、コストそして社会主義というものの分配の問題であります。計画をたてて、返済を行っていかねばなりません。公共のサービスの恩恵を受けているものは、まだ欠けているものに対して、その恩恵を提供していかねばなりません。この様な投資の実施から利益を受けているものが、こういったコストの負担をするべきであります。他方、公害を起こしているものが、直接その浄化のコストを負うべきであります。

以上私の方から簡単なまとめを行いました。

ありがとうございました。

では、ディスカッションをしたいと思えます。どなたかコメントはございますか。橋本さんどうぞ。

コメント：橋本

私の理解によりますとそのシナリオの一部としましては、コスト効率の良い、様々な活動を行っていかねばならない、即ち、伝統的なやり方で行うとやはり見通しがたたなくなってしまう。多く

の環境上の利益というものは、必ずしもコスト利益というものに計算していくことができないということであります。

現在、様々な森林があるわけですが、それを伐採していきますとGNPは増大するのであります。しかし、その価値というものがどうも不均衡になってしまうわけでありまして、それから大局的にみまして、様々な違った経済の評価ツールというものをうちたて、そういった面も計算の中にいれていかねばならないと思います。

メネンデス：

たいへん重要な点を指摘され、ありがとうございました。持続可能な開発のためには、それを組み入れるべきだと思います。

しかし、その古い評価方法は、メキシコでは使っておりません。環境上のインパクト等多くの評価方法を使っております。それによって、生命はどれぐらいの価値があるのか、病気になればどれぐらいの価値が失われるのか、といったことを計算しております。様々な生産的な人生の中で、それを計算していくわけでありまして、これによって、環境上のインパクトというものの結果は大いに改善されてきております。

コメント：氏名不明

今やられていることは大変結構だと思います。多国籍の開発銀行は、いまでも伝統的な評価形態を使っているわけでありまして、今のプロジェクトの決定などは、これがなかなかうまく合致しておりません。世界銀行も非常に早く勉強しているわけでありまして。

メネンデス：

それも大変重要な点でありました。他に何かございますか。

参加者の方でどなたか。

コメント：桜井

コスト効率といった点からでありますけれども、JICAの固形廃棄物の面からいいますと、同じようなプログラムを行っております。利益の定量化ということはほとんど不可能であります。

多くのケースにおきまして、最低のサービスレベル、適切なサービスレベル、可能なサービスレベルというものを、その社会ごとに決定していかなければならないと思います。そして、最もコストのかからない代替案というものをつくって、サービスを達成していかなければなりません。現時点で一番適切なアプローチというものを考えねばなりません。そういった観点から、環境（改善）プロジェクトという点から、どのプロジェクトがコスト効率が良いかということは、なかなか比較できないものでありまして、現時点ではそのようなものはないのです。

コメント：ベンカット・チャーリー

議長、ここでちょっと皆様の注意を喚起したい点があります。

故ガンディ首相の言葉であります。これは、ストックホルムの会議中の発言でありました。彼女が言うには、「貧困というのは一番大きな公害である。社会的なコスト効果の点からみてそうである。途上国のジレンマというのは常に開発か、あるいは環境かという選択である。そして、その政策決定者は選択を迫られている。特に、大蔵省関係の役人が、環境上のいろんな提案を評価しなければならない。すなわち、開発か環境かという二つの間の二者選択を迫られている。少ない資源を使って両方の目的を達成することができれば、それ以上良いことはないであろう。しかしながら、現実には途上国は常に資源上の制約というものを経験している。それ故、社会的なコスト効率の面から、なんらかの試みがなされねばならない。」

確かにこれは難しい問題でありまして、桜井さんの意見にまったく同感であります。この計算は確かに難しい問題であります。しかし、途上国としましては、その最優先課題というものを選んでいかねばなりません。より多くの投資というものが、ある機構に向けられねばなりません。途上国はますます工業化されております。いいか悪いかは別としまして、これが開発の哲学なのであります。しかしながら、多くの観点からみまして、途上国は工業化すればするほど、環境上の観点からそのコストをどの様に評価するかということが、常に途上国の政策策定者の前に出されるのであります。大変難しい決定であると思えます。同時にまた、もし我々が後発国として出発すると、生態系に対するダメージが大きくなるであります。即ち、そういう様な考え方では、もうほとんど保証不可能になってしまうということです。これは大きな問題なのです。

コーディネーター：

チャーリーさん、どうもありがとうございました。この問題は大変深く複雑な問題であると思えます。時間が大変制限されているため十分な討議が行えませんけれども、皆様も大変重要な点を指摘されました。私としましては、貧困というのが大きな問題であるということはよくわかります。また、社会コストの分配、平等といったことがあります。これを何世代にも渡って分配していくという問題があります。しかし、経済という点に関しましては、伝統的なコストと効果の研究というものを無視してはいけないと思えます。

もし、今からこの問題についてディスカッションを始めれば、長い時間を要すると思えますけれども、時間も限られていますので、この部分の討議はここまでにしたいと思います。

メネンデスさんどうもありがとうございました。

三番目のスピーカーはウイッチャさんです。バンコクの副知事で公共事業担当であります。社会的な面について話をさせていただきます。

ウィッチャ :

この会議は都市が直面しておりますマクロ問題、即ち、大気汚染・水質汚濁等に関するものでありまして、社会的な面はあまりないわけですが、これは検討されるべきであると思います。

共通した問題、即ち、都市化の急速な発展によりまして、それに対応する十分なサービスが提供されていない、例えば、大気汚染もありますし、水質汚濁もありますし、それぞれの国におきまして、レベルの異なる汚染がありますが、同じ問題に直面しているということが言えると思います。

大気汚染・水質汚濁対策ばかりでなく、十分なレジャーの提供などがなされておられません。より良い生活の質を提供するサービスもない、設備もないということが言えると思います。これも、やはり大きな社会的な影響がありまして、肉体的・精神的な影響が大きい問題であります。果たして、この傾向が良いか悪いか分かりません。けれども、より多くの人達が週末旅行をしております。世界的な傾向でありますし、特に途上国において言える事だと思えます。外に出かけて、別の雰囲気を楽しみたい、または、別の所を見たいということがあのではないかと思えます。しかし、そのこと自体がやはり、環境問題を増長していると言えらると思います。

特に、熱帯地方におきましては、熱いために一年中外で暮らすことができるわけです。そういう点で、社会的にみますと他の国に比べて大きな違いがあると思えます。

それぞれの国の経験に照らしまして、連邦政府と地域社会は、いろいろやっております。東京と北九州のケースが説明されました。すばらしい成果を上げておられます。都市全体をきれいな都市に変えていく、清潔な都市に変えていった、サービスも提供するようになってきたということが言えると思えます。インドネシアも同じように努めていりました。即ち、スラムを無くし、良くしようとしてきておりますが、まだ、成功しておられません。けれども、我々がこの事に関心を持っていて、社会の問題として解決したいという気持ちは、わかっただけと思えます。この都市の再開発について様々なスライドも見せてもらいました。建物の間のわずかな土地でも、緑地帯を造ろうとする努力も示されました。そういうことをやっておりますも、まだまだ解決しなければならない、将来の大きな問題が残っております。

そこで、私は、将来どういうことができるだろうかということを考えてみたいと思えます。

まず、家族計画。このことをもっと真剣に考える必要があると思えます。熱帯地方またはアジアの諸国、これは非常に人口増加が大きい国であります。やはり、この人口増加率を下げるように努めなければなりません。総人口の1%の伸びに下げようしなければ、この社会的な問題を解決することはできないだろうと思えます。

二番目は、地域社会の開発をやらなければならない、または、地域社会の参加を育てなければならないと思えます。そして、その地域的な問題に対処していくということでもあります。

もう一つに、輸送関係というものがありますが、この会議ではあまり取り上げられておりません。簡易な輸送関係、大都市におきましては、このことをもっと考える必要があると思えます。

さらに、都市の開発をできるだけ抑えるようにしていく必要があると思えます。例えば、土地の

社会構造、これを検討して、通勤の方法であるとか人の動きの構造を変える。こういったところまで考える必要があるのではないかと思います。

そして、あまり金を使わなくても、公害を起こすような商品を少なくする方法等を、検討する必要があります。

例えば、箸を使い捨てにする。これは、日本で広く行われているものでありますが、これは一つの例で、使い捨てを無くすということによって、ゴミの排出量もある程度少なくすることができるのではないかと思います。

我々は共通する多くの問題をもっておりますので、年に2回または年に1回この近隣諸国で会議を持って、そしてお互いの経験を分け合って改善をはかる。1年ということになりますと、時間が立ちすぎて遅くなりすぎるということもありますけれども、意見を交換することができれば、より効率的でより安いこの方法を考え出すことができるかもしれません。やはりこういう活動を支えるためには、様々な支持が必要であります。それぞれの国に共通した問題としまして、連邦政府・中央政府から十分な支援がないという問題があります。一番良いのは、問題を解明して、効率的に他の国で解決された問題の例を取り上げて、良い例があれば、その例を真似するというのではないかと思います。

短期的にみて、効果を上げるような経験があれば、お互いにこれを分け合いたいものであります。この会議には、我々の経験を分かちあえるような国際機関があまり参加しておりませんが、UNEP にお願ひしましてこの会議でこういう話があった、ということをお互いの国際機関にお伝えいただきたいと思ひます。そして、先進工業国に対しましては、我々にもっと援助して欲しいと思ひます。今ではこういう問題は、ある地域だけの問題ではなく、世界的な問題であります。この会議のはじめにUNEP、USAIDの方がこの問題を取り上げていろいろ話をされました。これから20年先のことを考えますと、我々は、お互いに協力して対処していかねばならないとおもひます。

コーディネーター：

ウィッチャさんありがとうございました。

コメントがございましたらどうぞ。

松下さんどうぞ。

コメント：松下

議長、指名ありがとうございます。

ウィッチャさんが、人間のライフスタイルの話をしました。

私の方から、9月11日から13日まで開催されました、世界の環境問題についての東京会議の一節を、ここで申し上げたいと思ひます。会議のまとめを皆さんの手元に配っております。その会議では、環境的な倫理というものが話し合われました。

21世紀を考えた場合、環境倫理ということに対して、全ての国がもっと注目しなければなりません。そして、いろいろな社会・経済的な政策を統合することによって、開発途上国の国民たちが基本的なニーズを満たし、または、社会・経済的な活動を修正し、先進工業国におけるライフスタイルというものを考えることができると思います。このことについて、タイの科学技術庁長官のドクター・サンが、次のようなことを言いました。

「環境倫理ということは、世界的に考えなさい。そして、今日行動しなさい。」

世界的に考え、そして、行動は地域的に考える。考えは明日のことを考え、行動は今日的に行動する。ドクター・サンが言われたことが、私、非常に印象的でありましたので、ここで皆さんに披露し、注目していただくよう申し上げたわけであります。

コーデイネイター：

他にコメントはないでしょうか。

私の方から短いコメントをしたいと思います。

産業または政府関係の方が、汚染の問題をマネジメントするということは、非常に難しい問題をたくさん抱えております。

ここで、日本の公害患者の団体からの訴えを受けましたので、申し上げたいと思います。

我々は、日本における公害問題から大変な被害を受け、非常に苦勞をしました、という訴えがありました。これは、とても難しい問題であります。やはり、工業的なコンプレックスといったものについて考えなければならない問題であります。

後2、3分残っておりますので、他にコメントをしたい方ございましたら、どうぞ。

コメント：加藤

昨日、今日のカントリーレポートに目を通しまして、行政側からみた切口、それと企業の側からみた環境問題の切口、外国から来ておられます皆様方に、住民の目からみた一つの切口というのをご披露したいと思います。

それは何とかいいますと、昨日の東京都、北九州市それから新日鉄の報告がございました。あれは、外国からいらした皆様からみたら、非常に大きな理想図と映られたかもしれません。しかし、あの様に非常に苦しい時期を経て、そして、ああいう姿になってきたというのを、最も大きく促進したのは、実は日本の報道関係であり、マスコミの力を決して忘れてはならないということです。昭和30年代といえますと1955年以降、特に公害問題が日本で非常にやかましくなってきました。1960年以降から約15年間ぐらいは、極端なことをいいますと、いろいろな企業の垂れ流し事故だとか、あるいは、「水俣病」それから神奈川県流域の「痛い痛い病」、「スモン病」、「あざらし奇形児」そういういろいろな薬害・公害事件が連日新聞・テレビを賑わしておりました。マスコミはマスコミで企業の内部告発者を募っては、その内部告発を記事にする。大学では、学生が大学の処理施設

の土を分析して、重金属がたくさん含まれているということで、大学当局をつるし上げる、というようなことが国中で起こったわけです。

そういう過程を通して、我々国民が基本的に得られたコンセプトというのは何かと言いますと、結局、化学物質は、我々の物質文明を助ける上では非常に便利な存在である。しかし、化学物質の持つ潜在的危険性を無視してはならないということです。

そういうことで、地方行政がだいたい公害問題の主要な役割を果たしましたけれども、地方行政は住民達からものすごく突き上げられ、企業は地方行政の厳しい指導を受けたわけです。

そういう過程を経て、これは私なりの解釈ですがおそらく日本の企業は、環境防止にかかるお金をケチるとその後とんでもない高いツゲがまわってくるということが、良くお分かりなのだろうと思います。それはどういうことかと申しますと、例えば公害を出した企業で、有名な企業が水俣市にありましたけれども、あの企業には大学の新卒の若い優秀な人は、しばらくは就職しなかった。それから、住民達の中には、ある企業の製品に対し不買運動を起こして、企業イメージを非常に損なうというようなこともありまして、結局公害対策をしないで、その点を安上がりにしようとすると、その後に非常に高い代償を支払わなければならないということも、日本の企業はよくご承知になったことだと思います。

ただ、北九州市の場合、昨日もお聴かせ戴いたように、非常に理想的なケースがいろいろな点で揃っていたと思います。洞海湾が狭かった故に、多量の汚染物質がどっと流れ込み、あの海が一遍に死の海に化してしまっただけで、死の海からは、魚も海老もとれませんので、それを食べて水俣病になる人は誰もいなかったという点は、非常に幸運だったと思います。それから大企業に余力がありまして、日本を代表するような企業ばかりでしたので、大企業であるという面目にかけても、公害を出して住民運動の矢面に立つといういうことはできない、ということで企業自身もがんばりましたし、北九州市の方も住民の後押しでがんばってきた。ですから、かなり特殊なケースによってうまくいったということです。

以上です。

コーディネイター：

加藤教授、どうもありがとうございました。

これは重要なポイントですから、忘れてはならないと思います。

では、このセッションはこれで終わりました、次のセッションに入りたいと思います。ありがとうございました。非常に重要な点を指摘されたと思います。感謝申し上げます。

次のスピーカーはラファルジョさんです。ジャカルタの環境研究開発センターの所長をされております。技術的な側面からお話いただきます。

ラファルジョさんどうぞ。

ラファルジョ :

議長ありがとうございます。

参加国の皆様のカントリーレポートの技術的な側面からお話したいと思います。

まず、最初に様々な国で使われている技術についてお話したいと思います。

かなりの国が、適切な技術を既に導入しているようです。といたしますのは、環境問題は、技術を外国から輸入することだけで解決できないと認識されているからです。ですから、技術はその国独自の技術能力から引き出すべきものであり、その国で使うことのできる資源を利用しなければいけません。この場合にも、外国の技術援助はあるかもしれませんが。他の国の経験を参考にすることもあると思います。同じような問題の経験ということは特に参考になります。

例えば、インドでは、インド自身の生産能力を使って環境公害の問題と戦っています。しかし、もちろん多くの高度な技術に関しましては、輸入せざるをえません。しかし、その部品の多くはインドで造られております。このようにしてインドの経験から多くのことが学べると思います。どうやって、電気集塵機を造るかという技術もインドにおける経験が参考にできると思います。

また、モニタリングの分野も大切です。

環境の汚染物質の変化をモニタリングしなければいけません。これについては、導入の度合は違いますけれども、ほとんど全ての参加国で既にモニタリングの活動を始めております。例えば、インドの方の話によりますと、インドは既に、22の大気モニタリングのステーションがあるということです。これは、断続的ではありますが、しかし、何年かたてば、あるいはこのシンポジウムの後その結果を受けて、連続的にモニタリングができるようになるかもしれません。また、インドネシアでもモニタリングを始めております。大気だけではなく水質・騒音等のモニタリングをしております。また、ジャカルタ湾の海水の水質もモニタリングしております。このようにモニタリングの活動は非常に重要な活動です。

公害のモニタリングを解決するためには、まずモニタリングが必要です。と言いますのは、基準からどれだけ逸脱しているかということをも把握しなければいけないからです。

次に地形的・気象的な側面ですがこれも重要な要素です。と言いますのは、どの国でも、どの都市でも独自の地形的な状況、気象条件を持っております。地形と気象というのは、制限要因になる可能性もあるし、また逆に公害を解決する力になる可能性もあります。

例えば、メキシコです。メキシコは、海拔2300メートルという高い海拔で、最初から独自の問題を抱えておりました。非公式には既にこのような話をしてありますが、このような高台では、酸素自体がそれほど豊富にないということです。この場合も、もちろん大気汚染の問題が非常に重要な問題となります。

また、低い地域、例えばインドネシア、ジャカルタ、バンコク等では、都市の一部は海拔マイナス1メートルという地域も一部にあります。この場合にも制限となります。特に洪水の問題などを抱えております。また、森林の伐採とか、森林の製品の利用などが不適切であるというような問題

もおこります。こういった場合にも、特に都市の経験、同じような地形的な条件のある国の経験というのが参考になります。このシンポジウムは、お互いにそういうことを話し合えるチャンスであります。

次に、この七ヶ国の中の共通点ですが、同じような共通の問題を抱えていることがわかりました。

まず、人口増加という問題を抱えております。人口が増加しているために、人々の福祉をサポートするためには経済成長が必要です。そして、経済成長というのは、ほとんどの場合、工業面の発展につながります。従いまして、経済成長により、人々の福祉の増進を目視しているわけですが、環境に対する認識も深める必要があります。また、環境の品質というニーズを理解する必要があります。しかし、特に産業部門の活動が活発になりますので、環境の質がだんだん悪くなってしまいます。従いまして、これは矛盾しているわけです。そこで大切なのは、どうやって調和をはかるのか、持続可能な発展をどうするのかということを考えなければいけません。発展というのは、経済成長を達成するためのあらゆる発展が必要です。しかし、同時に継続可能な環境というものも必要です。

もう一つの共通点といたしましては、地上の性質という問題があります。川の水質がますます悪化しておりますので、飲料水の品質もますます悪化していきます。

もう一つの問題は、大気の品質です。ほとんどの国で自動車の量が増えているために、大気汚染がおこっております。そして、大気汚染のもう一つの理由は、産業活動です。車による大気汚染というのは、移動している発生源でありますので、非常に難しいわけです。ですから、固定的な汚染源、産業の煙突の煙など両方の種類の発生源を考えなければいけません。固定されている煙突と、移動している車と両方の汚染源を考えなければなりません。

また、固形廃棄物ということも、もう一つの重要な問題です。

インドネシアの方から発表がありましたように、我々の国の多くは未だに野積みの埋め立てを使っております。野積み埋め立てがまだ一般的に行われておりますと、地表水の質という問題がありますし、大気の質という問題もおこってまいります。

もう一つの共通の問題点は、有害廃棄物です。

また、このシンポジウムの後での技術面の将来のニーズについては、もちろんモニタリングの能力を高めるということです。モニタリングの設備や機材を改善する必要があります。また、廃棄物の処理の設備も改善しなければなりません。また、制度も改善する必要があります。また、皆様のレポートを見てますと、共通の財政面での資源を必要としているようです。特にこの面での援助がある分野につきましては、援助というのは、全ての国が関係しているようです。設備の資源、また、人材の訓練面での資源というのも必要とされています。

コーディネーター：

ラファルジョさんありがとうございました。

では、皆様のご質問やコメントをお受けしたいと思います。どなたかいらっしゃいますか。はい、どうぞ。

質問・コメント：花田

環境対策技術というのは、非常にお金がかかるわけですが、日本でもかなりのお金をかけております。しかし、やはり使用するエネルギー、例えば石炭、そういう種類によっては相当システムが変わる訳です。先ほども発表者の方からありましたけれども、そういう質によるシステムの変更というものが、なされなければうまくない。しかも、その導入したシステムをうまく動かす為には、技術者、これは、後でヒューマン操作の方にも出てくるかと思えますけれども、運転技術、メンテナンス技術が重要でありまして、これがもしうまくいかなければ大損害になるわけです。環境設備をつけたために、工場のアベラビリティが下がる、ということは許されないことですので、こういうのは、メインシステムとの一体でなければいけない。そのためには、設備の技術的な検討も重要であります、メンテナンス技術が必要になってくると思えます。

しかし、やはりそうはいても、経済性のあるシステムを考えなければなりませんので、日本と同じようなものがまったく導入されるということは、当面はないのではないかと思います。が、いずれにしても、一番コストが安くて、しかも効果のあるというようなものをこれから先進国も努力をしなければならぬと思えます。

コメント：浅野

モニタリングのことについての感想でありますけれども、確かに日本の場合に、モニタリングのシステムが完成されておまして、非常に高い水準のモニタリングが行われているわけですが、途上国の場合にそれと同じようなものを極少数導入するというよりは、今の段階では、簡易なモニタリングでもいいから、多くの場所でモニタリングができるというのが大事ではないかと思います。そして、できることならば、このモニタリングの方法を各国で共通のシステムを取り入れていけば、得られたデータをお互いに比較しあうことができると思えます。こういう点での国際協力を、技術の進んだ国と途上国というだけでなく、途上国お互いの中で考えていっていただきたいという気持ちを強く持っております。

日本の場合には、今のような技術に至るまでの途中の経過があるわけですが、例えば、既に完成したシステムを持っている国が、その途中で使っていた中間的なシステムでも、それなりに合理的な役割を一定程度果たせるというものがありましたら、これは積極的に採用していかれるのがいいのではないかと、ぜひそのような形で協力ができるといいなというように考えております。

コーディネーター：

浅野先生ありがとうございました。また、花田さんありがとうございました。お二人とも技術的・経済的な側面についてお話をいただきました。他にどなたかいらっしゃいますか。ウィッチャさんどうぞ。

コメント：ウィッチャ

一言指摘されていなかった点がありますので、申し上げたいと思います。

御存知のように環境というのは世界的な問題です。我々途上国というのは、そのような必要な設備を導入することが、資金的にできない場合があります。しかし、我々はノウハウが必要です。ですから、先進国に売ると同じ価格ではなく、もっと安い価格でそういうものがが必要です。トラクターを売る場合には、どの国にせよ、同じ材金で売るとは思いますけれども、環境保護に使われるような機材というのは、安く売っていかねばいけないと思います。そうでなければ、いつまでも環境の問題が解決されません。

我々には、高い機材を買うだけの予算がありません。融資とか補助金などをいただいておりますけれども、融資というのは、それほど簡単に受けることはできませんし、融資の受ける金額の上限が決められている国もありますので、自由にできないのです。

ですから、公害対策の設備を十分に備える方法を考えていただきたいと思っております。

コーディネーター：

ありがとうございました。ウィッチャさん。

では、この部分のディスカッションは終わりにしたいと思います。どうもありがとうございました。

ラファルジョさん、大変おもしろいご発表をありがとうございました。

では、五番目のスピーカー、リッコさんです。サンパウロ州の環境保護庁のマネージャーでいらっしゃいます。

問題は、人材教育の面についてです。

リッコ：

議長、どうもありがとうございます。私、簡単にお話することを約束致します。

いろいろなカントリーレポートを勉強してみました。その中で、大変詳細にいろいろな報告がでておりますが、それに関して、私の方から幾つかコメントをしたいと思います。

まず第1の点であります。我々の環境問題というものを評価してまいりました。

第2、人口に対する影響の点などもうまく評価してまいりました。大部分のケースにおきまして、どの様な措置をとり、そして問題を是正するべきかということが分かってまいりました。

第3、我々はそれを行うコストというものがどのくらいかということもよく分かっております。

第4、我々はまた、我々の経済的また財政的な制約というものも承知しております。

第5、一般的にいいまして、かなり妥当な法制というものがあり、環境保護、そして公害防止のための規制ができているということがいえます。

しかしながら、2つのポイントが非常に顕著にカントリーレポートにでてまいりました。

その一つは、環境政策というものは、余りにも広いということがいえるのではないのでしょうか。私の考えでは、いろいろ例外的な条件がそこに存在するということであります。

第2の点、人材教育にはほとんど資金がさかれていないということであります。環境方針、及び実施に関しまして、私よりも私の同僚が最も明確なポイントを挙げておりますが、人材教育・開発ということに関しまして、我々は、あまりうまくいっていないのではないかということが言えます。また、ジャカルタ、ボンベイあるいはサンパウロでのいろいろなアクションプランを見てみても、その例としてわかります。

政府のプログラムが成功するためには、効果的な人々の参加というものを仰がねばなりません。しかしながら、このような参加のためには、人々は組織し、教育し、そして良い情報を与えねばならないということでもあります。どの様にして行うかということが問題なのです。人材教育開発、これがキーワードとなっております。正式なあるいは、非公式な教育の仕方というものが、そのツールとなるでしょう。

正式な学校教育に関しましては、環境関係のトピックを初等・中等・高等教育に入れることを提案します。例えば、一般的な生態学あるいは、社会学、その他の科学で、人々が環境を良く理解できるようなものを入れるべきであります。環境関係の技術は大学レベルで入れるべきでありましょう。そして、その大学の学生に対して特別のトピック、例えば、空気の汚染であるとか、水質の汚濁であるとか、エネルギーの節約であるとかいった特殊なトピックを入れるべきでありましょう。

非公式な教育に関しまして、これは最もチャレンジングな、難しい、また効果的な方法であります。どの様にして人々に理解させるか、そして生態系を保護するかということです。それに対する良い答えというものを私はわかりません。しかしながら、サンパウロでのここ2、3年の経験をちょっとご紹介したいと思います。

森林の散歩などをして、どの様な部分が保護されていないかということを描く活動を行っています。人間の生態系に対する影響をそこで指摘するわけでありまして。こういった活動は毎週行われております。

第2、大気汚染のエピソードとして、ある種のシュミレーションを行います。これは、公務員などの訓練を行う為に、大気汚染のひどいところでキャンプを行います。サンパウロのダウンタウンでCOのシュミレーションを行っております。サンパウロの大気の質を改善するために自動車に乗りまして、人々を集めてそして非公式の形で、自動車にアルコールを使う利益というものを経験させる。また、規制されたエンジンを使用する車の利益というものを経験させます。煤煙に対してもアクションプランをとっております。その目的というのは、人々に大気に対してどの様な汚染があ

るか、経済がどのような影響を与えているかを分からせるものであります。その次は、ラジオやテレビで宣伝広告を行い、人々に訴えるというやり方であり、東京でも見られますように、汚染のレベルをいろいろな市で展示致しまして、人々に公害の警告を發します。ポリューションクロックと我々は呼んでおります。

これらの問題は、我々の環境の教育プログラムの一環をなしているものであります。しかし、これは将来のアクション、行動のための出発点となるものでありましょう。

コーディネイター：

リッコさんどうもありがとうございました。では、ディスカッションをお願いします。

何かコメント・ディスカッションはありますか。

セベタさんどうぞ。

コメント：セベタ

教育というものが明らかに、こういった大きな環境問題を解決するための鍵となるでしょう。しかしながら、私が一つ懸念しておりますのは、教育というものは非常に長い時間がかかる、という点であります。特にわが国におきましては、意識の高揚というもの、環境保護に関する意識というものを何世代にも渡って行わねばなりません。ですから、今の世代とかあるいは、次の世代でもそれは達成できないであります。この問題について本当に関心を持つのは、まだまだ将来のことになりましょう。ですから、我々の子供が、この問題で教育を受けるときには、もうこういった大きな問題を解決するには、遅すぎるのではないか、という点を私は大変懸念しているのです。

コーディネイター：

どうもありがとうございました。セベタさん。

他にどなたか。

コメント：ラファルジョ

私の経験をちょっとご披露したいと思うのでありますが、ジャカルタ市の経験というものをちょっとお話してみましよう。

それは、リーダーというのが重要なのです。宗教的なリーダー、あるいは非常に有名な人というものが、大変大きなツールとして、いろいろなコミュニティの参加というものを喚起できると思います。こういった宗教的なリーダーが一言いいますと、これは非常にパワフルであり、コミュニティの住人に良く理解される、先生とか教授が発言するよりもパワフルなものであると、これが私の経験です。

コーディネイター：

ラファルジョさんどうもありがとうございました。他にどなたかいらっしゃいますか。

コメント：桜井

ある人数の研修員の方がJICAの研修コースにおくられております。これは、人材教育の一環ではありますが、もし、我々の方で改善すべき点があれば皆様の率直な意見を、JICAの提供している人材研修教育について、いただきたいと思います。

コメント：ウィッチャ

まず第一に、非常に多くの様々な組織というものが、各国内にあり、こういった環境問題に関与しているわけであります。ですから、研修生が母国に戻りましても、組織としましては、誰が研修されたか知らない場合があります。そういうことから、各国におきます環境関係の組織のリストが必要でしょう。そして、研修生のリスト、研修の科目のリストというものも必要でありましょう。そうすることによりまして、人材教育に関する情報が、あまりうまく整備されていないような国にとりましては、どういったことが行われているかを知る良い手だてになると思います。

コーディネイター：

どうもありがとうございました。ウィッチャさん。大変必要な点であると思います。ハウスマンさんどうぞ。

コメント：ハウスマン

一つ私の経験をご披露したいと思います。

ワシントンでは、USAIDの中でディスカッションが行われておりますが、そこでは家族計画、人口抑制のプログラム、そして環境などのディスカッションが行われております。一國で学んだことが他の国でも適用できるかどうかという問題であります。家族計画というものはかなり成功しております。そして基本的な社会的な人材のコンセプトというものを、短期間の内に達成するという上でかなり成功しております。多くの国で一つの世代において、家族計画の方法というものが適用されております。そして、このスピードというものが環境問題に対しても、同じようなスピードで達成できればと思いますが、好運にも家族計画というものは、必ずしも有効な例ではないのであります。といいますのは、これは一つの問題点だけのものであります。非常に単純な概念なのでありまして、家族の規模をコントロールするという、そして家族計画を導入して、それをツールとして家族の規模をコントロールするというやり方であります。しかし、環境保全統制に関する問題というものは、非常に大きな分野にわたっております。都市の公害であるとか、農村分野であるとかこういったものが関係してきます。こういった人々を教育するのは、家族計画よりもずっと難し

い様相を含んでおります。

コーディネイター：

ハウスマンさんどうもありがとうございました。

コメント：メデンデス

日本に対して、我々途上国のメンバーの研修を増やしていただくようお願いしたいのであります。

私の母国語はスペイン語でありまして、私は一度アメリカに留学するようという奨励を受けまして、そのために英語で話すことができるようになったので、今、このように皆様と英語でお話しをすることができております。

いろいろな環境関係の分野における研修におきましても、同じ言葉を使い、そして同じ経験をすることによって、この共通の我々が分かち合っているものを享受することができると思います。

もう一つ追加的なコメントをしたいと思いますが、これは意識の問題です。

我々の国では、公害の問題を知らない人々もいますが、公害が非常にひどいレベルに達しております。北九州市でも同じような状態でありました。そのために住民の人々が、それに反応して正しい答えを発見したのであります。メキシコ・シティにおきましても、その関心があるわけでありませんが、この公害に非常に関心を持っているのは子供なのです。学校で公害に関する基本を学んだのです。ですから、子供達が両親に対して公害に対するなんらかの措置をとるように働きかけているのです。ですから、何か我々は早く早急な措置をとらねばならないということでもあります。

北九州市は確かに模範的な例であると思います。

コーディネイター：

メネンデスさんどうもありがとうございました。

大変重要な点を指摘されました。

時間がきましたので、この開発に関する人材教育のディスカッションはこれで終わりにしたいと思います。リッコさんどうもありがとうございました。

次に最後の課題を取り上げたいと思います。公共及び民間協力につきまして、セベタさんをお願いします。セベタさんは、メキシコの全国製造業連盟環境改善委員会の会長をなさっています。

セベタ：

議長、指名ありがとうございます。

私は、いろいろな討論の中で公共部門と民間部門との協力を通して、公害の問題を解決するとい

うことを注目してまいりました。

参加者のペーパーもいろいろ読ませていただきました。また、直接参加者のメンバーと話をする機会もありました。その結果として、私は、三つの結論を得ました。

一つは、民間と公共部門の人たちが、それぞれどういう問題を抱えているかということをお互いに知る必要があると思います。

二番目の点としましては、やはり両者にこの問題を解決しようという、意欲を持ってもらわなければならない。そして、両者の間でこれを実施するために、共に協力する必要があるということでもあります。エジプト、インド、マレーシア、インドネシア、タイ、メキシコ、ブラジルの出されたペーパーでは、これは、共通した考え方であるというのは明かです。また、具体的な問題について検討する必要があると思います。

第三に、この協力を推進するための組織、機構を造る必要があると思います。

しかしながら、やはり別に扱わなければならない問題もあります。それについて申し上げたいと思います。二つあります。

一つは、ポイントソース・エミッションということについての考え方、もう一つは全体的な環境的な基準についての考え方です。

公害の原点ということについて考えてみますと、技術的な委員会を設けて使用、規制、最大許容といったようなことを決める必要があると思います。そして、この委員会をつくるにつきましては、公共、民間両者の代表が参加するということでもあります。次に、各民間で、企業の中においてこれらの基準を満たすための計画をつくり、そして、外部コンサルタントによって、新しいプロセス等を紹介するということです。特に開発途上国においては、これらは大切でありまして、外部コンサルタントは先進工業国からきてもらうということでもあります。そして、この段階の前に、やはり政府によってそれぞれの計画等を承認してもらう。そうすることによって、投資を必要とするならば、その投資予算を確保してもらうことができるからであります。そして、プログラムを実施するについては、やはり、それぞれの政府の機関の監督のもとで行われなければならない。ということは、やはりその政府の承認があった、ということを示すものであります。

この基準ですけれども、果してポイント総数の規制が有効であるかどうかということを考えるについては、政府の方で全体的な基準というものを設けて、そして、大気の基準指数であるとか水質基準指数であるとかいったものを監視する必要があります。事実、基準にあっていないかどうか、仕様にあっていないかどうかを確認する必要があります。そして、責任の分け方ですけれども、ポイント・ソース・エミッションのコントロールは、業界がやるべきだと思います。政府は、実施のための指導を提供する。必要とすれば、金融的、資金的な援助をする。または、奨励策を設ける。そして、それを実施してもらう。しかし、全体的な品質基準ということについては、民間が責任を持って実行する必要があると思います。

二番目に申し上げたいと思いますのは、直接外国投資、即ち援助であります。私が今まで聴いた

プレゼンテーションから受けた感じとしまして、我々の国がこの仕事をするにあたり、一番障害となっておりますのは、資金不足であります。お金がないためにプログラムを実施することができません。

もう一つは、技術的な制約もあってできない、ということであります。ですから、金融資源ばかりでなく、技術的な資源も加えていただくことが必要であると思います。

コーディネイター：

セベタさんありがとうございました。

非常に重要な点を指摘されたと思います。では、この問題についてディスカッションをしていただきたいと思います。非常に重要な点を話されたと思いますので、どなたかご意見はございませんか。

メネンデスさん、どうぞ。

コメント：メネンデス

議長、ありがとうございます。

私はメキシコでありますので、メキシコの人が言ったことに対してコメントするというのは、適切ではないかも知れません。けれども、メキシコにおいて、規則を工業ばかりでなく、工業製品自身に対しても設けるということにつきましては、政府と業界と協議した上で、基準を設けているのであります。そして、様々なプログラムをつくるにあたりましては、どういう防止をするか、どれぐらいの資金の投資をするか、また、それを実行するにはどれぐらいの時間が必要か、共に話し合いながらプログラムをつくり、雇用を守り、生産能力が落ちないようにするというのであります。

一応協約をつくり、いつまで立ってもそれが守れないということになれば、強制執行となるわけです。それは、工場を閉鎖するということですので、この契約に従うケースが多いのであります。これらのことをしたために、公害防止の戦いに前進を見ているのであります。

コーディネイター：

メネンデスさん、ありがとうございました。

チャーリーさん、どうぞ。

コメント：チャーリー

議長、今セベタさんのおっしゃったことに全く同感であります。やはり、公共部門と民間部門との密接な協力が必要であります。そして、さらにその密接が進むように支援すべきだと思います。その結果につきましては、政府としてはどういったものを期待するか、ということをはっきりと示す必要があると思います。

議長は、元その役所に勤めておられた方ですので、公共部門と民間部門との協力、そして、さら

に政府機関同士の協力、これも非常に大切であるということをご理解載けるとと思います。特に、開発途上国につきましては、大きなプロジェクトということになりますと省庁間の協力が大切であります。

私達の経験を一つ披露したいと思います。

私は何年か前まで、マハラシュトラ州の工業関係のディレクターをしておりましたが、その中で、私は産業育成に関心を持っておりました。育成するにつきましては、短期・長期の資金が得られるようにし、また、支所も完備するようにしたかった訳であります。しかし、その当時の市側としては、市郊外または支所を置くのに適した土地に移りたいと思いましたが、ただ単に建物の立地に適した土地に移ってほしいということでした。こういった市の施策には、州全体の産業開発にあまり関心がないわけでありまして、ただ、立地を変えたいということだけだと、組合も反対しますし、いろいろ問題があります。それで、私もいろいろ困惑した訳であります。

今は私、ボンベイ市の仕事をしておりまして、公害を無くそうとしております。今度は、工業関係の人たちについては、環境の問題の重要性を意識していない、協力してくれていない、そして、地域性を進めてもらっていないということでありまして、いわゆる縦割行政といった問題も、問題になってきておりまして、水平の協力が無いということですから、省庁間においてもっと協力があれば、やはり、この問題はさらにスムーズに推進することができるのではないかと思います。

コーディネイター：

チャーリーさんありがとうございます。

重要な点を指摘されたと思います。やはり、こういった会議の一番いい点はこのようにして、公共部門の代表の方、また、民間企業の代表の方がこういう国際的な、または共通の問題について話し合いをするということでありまして。

非常に重要な機会でありまして。政府も政府間の協力というものを進める必要があるという点を指摘されたと思います。

ありがとうございました。

コメント：氏名不明

メキシコの経験をもう少し申し上げたいと思います。

新しい法律が1980年の初期に制定されました。それによって、こういった問題を対処することに、非常に大きな前進を見ることができました。何故、これができたかといいますと、政府が、誰がこれを推進するかということをはっきりさせたからだだと思います。過去においては、保健局または水道局、海洋関係を担当している局、それぞれの人たちが、それぞれのことをやっていた、そしてそのそれぞれの大きな問題の一部を担当していたわけです。チャーリーさんの言われたように政府、省庁間の間において混乱がありました。民間部門の方から、政府の誰が、どの省庁が、どういう問

題を担当しているのかはっきりしていない、という指摘があったわけです。新しい法律が制定されて、今度は新しい部門ができて、これは生態ばかりでなく、都市開発も担当するというように、一つの所でこれらの問題を担当するようになったので、問題解決に非常に大きな貢献をしているのではないかと思います。

コーディネイター：

これは、多くの国において直面している実際的な問題だと思います。この問題を解決すると同時に、開発も進めるということでもあります。これは、政府関係者にとりましても、産業関係者にとりましても本当に大きな挑戦であります。時間もだいたい終わりに近づきましたのでこのセッションを終わりにしたいと思います。

セベタさんありがとうございました。非常におもしろいプレゼンテーションをありがとうございました。

参加していただいた皆様にお礼申し上げます。積極的に参加していただきましてありがとうございました。産業界ばかりでなく公共部門の方も参加して下さいまして、いろいろな意見を出していただきました。非常に広範囲な問題について話し合うことができました。ありがとうございます。

総 括 討 論

環境対策に関する今後の国際協力の 課題と基本的方向

**COMMENTS ON THE INTERNATIONAL SYMPOSIUM:
POLLUTION CONTROL IN URBAN AREAS**

by **NAIGZY GEBREMEDHIN**

I believe the Symposium was superbly organized. The division of responsibility along six topics was most ingenious. I think the report of the rapporteurs of the six areas together with the comments of the commentators provides the bases for a good report of the Symposium.

From the point of view of UNEP in particular and international co-operation in general the Symposium broke fresh ground along two lines:

- (a) It brought forth the willingness and readiness of local authorities to participate in international co-operation. This can only be most welcome. It might open a new and thus far untapped source of knowledge and expertise.
- (b) It brought together participants of private industry and the public sector for co-operation in environmental co-operation - parties usually assuming an adversarial position.

Several additional points could be made along some of the six topics devised for discussion.

Socio-Economic Aspects

There is need to pay attention to those cultural norms that are believed to foster environmental protection. Is there something we could learn from Japanese cultural norms that would re-enforce the habit of environmental protection and generally good environmental ethics? Is there something we could learn from Japanese (indeed other) cultural norms that would decrease the propensity of nations to plunder and pollute environmental resources? How can we encourage "transfer" or "adoption" of such positive norms?

Technology

There is need to pay more attention to the criteria for successful transfer of technology. In this regard one of the most important points should be to

establish "sustainability" as a key criterion of technology transfer: i.e. only technologies that ensure sustainable development should be transferred. There is a role that the new centre in Kitakyushu can play in this regard. It could serve as the centre to evaluate and propagate such technologies that pass its rigorous test for sustainability. In this regard the new JICA centre could play a leading role - the role of policy analyst in technology transfer.

Besides this role the centre should of course play a leading role in training of specialists in environmental protection technologies and planners /industrialists that specialize in ecological aspects of planning and development.

Coordination

There is great need to improve coordination of action, surveys and studies in developing countries for environmental protection. Both multi-lateral and bilateral agencies need to coordinate their action in this area both at the national and regional levels - particularly at the national level. In this regard the clearing - house mechanism of UNEP which brings together donor agencies and developing countries to solve critical environmental problems could be fully utilized.

UNEP welcomes the conclusions of the Symposium and will do everything possible to collaborate in its implementation.

BRIEF COMMENT

by MR. T. HANADA

Commentator

Environmental issues have been coming out recently in the common field in all of the world, and it is recognized that such problem is not only that of each country.

Following two view points are considered as the countermeasures for environmental issues. First one is the view point of government administration and second one is the view point of technologies. The countermeasures shall be carried out under the ballanced progrecement of these view points. In accordance with these view points I would like to mention some advices and comments.

At first, concerning the government administration;

- a. For enacting the regulations and standards, the circumstances of each country should be considered. At the same time, these regulations and standards shall be enacted step by step with the target by short, medium and long term. In order to reach such consensus among the government, public people and industries, we need enough discussion and information exchange each other.
- b. When the national master plan is set up, the most effective procedure has to be selected in accordance with investigation result of environmental pollution conditions. In other words, the national master plan has to be sequentially set up with the consideration of priority and relation between its effects and investment.
- c. The experience of which countries such as Japan has carried out the countermeasures for environmental issues, might be a big refference for the developing countries. Therefore we'd better to promote the international cooperation concerning such experiences.
- d. The environmental protection facility is non-production one, and it needs great amount of cost. Thus national government has to strongly think over

the enacting law in the field of investment and tax. And at the same time, the developed countries have to fund the investment to support the developing countries.

On the other hand, I regard the introduction of environmental protection technologies;

- a. In case of existing plants, the application of environmental protection technologies shall be introduced based on the relations among the pollution conditions, cost and the other limitations such as installation space.
- b. For newly construction of plants, enough environmental assessment and enough discussion between industry and government are to be established before the commencement of construction.
- c. For training of the operation and maintenance engineers, the international cooperation is necessary. It means that the developed countries have to hand over the technologies to developing countries based on enough these experiences. For this purpose, Japanese government, local authorities and industries including power utilities must make their efforts on this cooperation.
- d. The people in the various circles such as middle, young generation and leaders of government, industries and public, should deeply understand and recognize with respect to the global environmental issues and the technologies for countermeasures. For this instruction purpose, we Japan shall also cooperate to make the program and manual.

COMMENTS

Dr. MICHIO HASHIMOTO

The purpose of this symposium has successfully achieved in terms of overall aspect of urban management as the starting point of international cooperation at government level.

Considering the issues of discussion in this symposium, I would like to suggest the following directions for future development of international cooperation on environmental pollution control in urban areas of the developing countries.

- 1: overall aspect of urban management is necessary for further in depth examination of environmental pollution control
- 2: special problem of environmental pollution control management is to be examined on the problem-by-problem basis.

Followings are the important problems brought up from the discussion of the Symposium.

- 1: technology transfer
- 2: financial aspect and cost bearing of pollution control in urban management.
- 3: standard setting (risk/cost/benefit/feasibility)
 - a) enforcement
 - b) environment
 - c) products
 - d) policy criteria
- 4: Manpower Development Plan
- 5: community participation, environmental education and information

This type of symposium is desirable to provide three phases, namely, 1) overall aspect, 2) selected one special problem and 3) field observation.

Participation of local government managers and industrial managers in this symposium has created vital discussion in this symposium. I would like to expect participation from community leaders to discuss community participation in the future.

開発途上国の都市の環境対策に関する国際シンポジウム討論のコメント

福岡大学 浅野直人

明治大学 新美育文

シンポジウムで有益な討論が展開され、私たちもまた環境問題を考える新たな視点を与えられたことを感謝します。私ども二人は、このシンポジウムに出席させていただいて、次のような感想を持ちました。

① 日本では地方政府に、地方自治体としての一定の権限が与えられています。そして特に公害対策については、住民の生命・財産を守るために、積極的に施策を展開してきたことは、東京都・北九州市の報告から明らかにされたと思います。国と地方政府の権限関係についてどのようなシステムがとられているにせよ、地方政府は、環境政策について、積極的な役割を果たす必要があり、その重要性は常に強調されつづける価値があります。

どんなに法規が整備されていても、それを執行し、あるいは執行をうながすエネルギーがなければ、成果が上がらないわけであり、地方政府にそのエネルギーが求められています。しかし、地方政府の環境政策に対する役割には限界があることも事実です。たとえば基準の設定について、関係者を説得するためには、まず、国家による指針がしめされなければ担当者は苦勞することになります。これは極端な過去のエピソードにすぎませんが、福岡県で1955年に公害規制の基準を作ろうとしたときには、国の基準として唯一数値が存在したのは、工場労働者の作業環境の基準であり、結局この基準が一般住民の居住地域に対する基準にされたのでした。つまり、当時は、工場の中よりも悪い環境で生活することがないようにする、という程度の規制しかできなかったものでした。これに反して一方、北九州市の洞海湾の再生の事業の成功は、国の港湾整備事業としての事業の位置づけがあり、また、公害防止事業に関する費用の事業者負担についての国の法律の支援があったことも、18億円の費用の7割を、事業者に負担させて実施することができたことにも注意する必要があります。また、たとえば、東京湾に対する環境政策は、東京都民にとって重大な関心事ですが、これも、東京都だけでは、十分に成果をあげることが困難であり、国の積極的な関与が必要です。

国と地方政府の協力関係のほかに、国の関係機関相互あるいは地方政府内部の関係機関相互の、関係機関の協力関係の必要が指摘されましたが、同感です。たとえば、車両による大気汚染の防止のためには、交通法規の活用、交通整理・規制の励行も有効ですが、これらは環境部局の権限をこえるものであり、日本でもこの面では、未だ十分に連携がとられているとはいえないところです。

② 日本の経験として、行政組織の整備、人材の養成・確保に成功したことが政策の成功につながった事実も指摘されました。資金・施設・機器やこれをめぐる科学技術のほかにこのようなソ

フト技術が、環境政策の展開にとって有用であるとする指摘がありました。これに賛成するものです。

今後の国際協力、とりわけ自治体相互の国際協力としては、人材養成や組織整備のノウハウの交換に着目することが有用であろうと考えます。技術研修を受けた者のリストの整備を求める発言がありましたが、特に重要な指摘であったと思います。

「持続的開発」というキーワードが使われますが、「持続的行政組織の確立」というキーワードを付け加えることができます。ソフト技術（ノウハウ）・情報が組織内で共有化される必要があります。いつでも検索可能なようにファイリングされる必要があります。最近特に適応可能な技術の移転、開発の重要性が指摘されており、このシンポジウムでも同様の意見がだされていましたが、人材養成にあたっては、各国の状況に近い問題をかかえ、その克服に成功し、あるいは、成功しつつある自治体での情報の取得が効率的であると思われます。また、2日目にも発言しましたが、たとえば、モニタリングシステムの導入については、国際比較が可能な共通のシステムの採用、また簡易で低コストであるが、環境動向の傾向は確実に把握できるシステムの採用、といった配慮が必要であろうとおもわれます。このための研究開発を進める必要がありますが、このための国際協力は成果をあげるものと信じます。

環境には国境がない、というご意見に感銘を受けました。環境政策の多くの部分は、技術性が多く、これに関心をもつ者は、国籍をこえて共感できるという体験をすることがしばしばあります。今回のシンポジウムの成果が、さらに生かされ、協力関係の強化につながることを期待いたします。

(以上)

国際協力に関するコメント

九州工業大学

加藤 安彦

開発途上国において、工業の振興と環境保全との調和という問題で悩み、それぞれの国情のもとで多大の努力を払われていることに、まず敬意を表します。

参加された各国の現状を総括すると、以下の3点に要約できると考えられます。

- 1) 大気汚染問題
- 2) 水質汚濁問題
- 3) 廃棄物問題

これらの問題を多少とも軽減ないし解決するためには、政府の役割、企業の役割を明確にすること、国民の環境問題に対する意識の変革を計ることが重要なことでありましょう。

政府の役割については、環境保全関連の法体系の整備と、違反に対する罰則の適用等、それぞれの国情に応じて適宜対策を立てられましょう。この点については、日本政府や地方自治体がアドバイスできると思われまます。

また環境汚染対策に取り組んでいる企業に、政府補助や税金の優遇措置なども適宜講じることも必要でしょう。

企業の役割については、現在、世界に存在する技術は多種多様で、その中から自国に合致した適正なものを選択し、環境対策技術を同時に進めることが必要でしょう。その為の資金は外国の財政援助や政府の優遇措置を仰ぐこともできましよう。また企業内の環境保全技術者の養成も重要なことでありましよう。この点についても日本政府および日本側企業のキメこまかい援助もしくは指導が必要であります。

国民の意識の変革については、日本の過去の事例は、今後工業開発を進める国にとって模範的な手本となりましよう。何故なら、現在知られている公害の典型的な事例は全て日本で経験したものであります。したがって、公害のもたらした被害者の事例を、可能ならば視覚的なもの、たとえば写真、映像といったものを収集して途上国の人々に見てもらうことが意識の変革を計る最もよい方法であると思われまます。国を構成するのは人でありまます。国の基礎を支える人々の意識の変革があって、はじめて政府や企業の努力も実のあるものとなりましよう。そうでなければ「笛吹けども踊らず」の結果に終始するでしょう。

この点に関しても、日本政府、JICA、企業その他の関係団体は、より一層の協力と工夫をして頂きたい。その国の実情に合せた「処方せん」を作成し、実行ある援助、協力を期待したい。

(以上)

DESIRABLE ODA
FOR
THE IMPROVEMENT OF URBAN ENVIRONMENT

by MR. KUNITOSHI SAKURAI
JICA, Development Specialist

Japanese ODA in the field of urban environmental management will become more desirable assistance for the people of developing countries if the following points are duly taken into account in the design and implementation of ODA projects:

1. Careful selection of technologies to be used

- * The designers of ODA projects are liable to select sophisticated technologies which are not appropriate and sustainable for the communities concerned.

One of the reasons: Japanese professionals who work as the designers of the projects are, in some cases, too accustomed to sophisticated systems.

One of the effects: Lack of projects' sustainability in terms of local staff, local cost, spare parts, etc.

- * Local authorities of developing countries have also some tendencies towards sophisticated systems.

One of the reasons: Capital intensive systems (for example, mechanical street sweeping) may be cheaper than labour intensive systems (for example, manual street sweeping) for some local authorities. <Financial cost is lower.>

One of the effects: Opportunity to create jobs for unskilled workers abundant in the metropolises of developing countries will be lost. (Economic and social cost is higher.)

2. Participatory planning of ODA projects

* To overcome above-mentioned problems, it is highly desirable to work out means and measures to fully involve the authorities of recipient countries and the communities concerned in the planning process of ODA projects. Professionals of Japan and the recipient countries should work together carrying out the planning process as a mutual learning process.

日本側総括コメントにおける公害対策局長発言
「環境対策に関する今後の国際協力の課題と基本的方向」

北九州市公害対策局

局長 鮫 島 稔

1. 10月3日～4日の報告と討議、そして昨日の現地視察を踏まえて、一言コメントを申し上げる。
2. その前に、今回の国際シンポジウムに遠路ご参加いただいた外国の方々及び国内の皆様に対して深く感謝したい。
3. これまでの報告によりますと、開発途上国の大都市は、都市化、工業化の急速な進展により、極めて困難な公害問題、環境問題に直面しており、これ以上の都市環境が悪化することを防止するとともに、都市環境の改善を図ることが焦眉の課題であることが明らかになった。
4. また、それぞれの国においては、すでに法・組織体制の整備がすすめられているとのことであるが、その推進体制が、完全に機能していないように見受けられ、その結果として、環境の改善は、あまり進んでいないことを理解することができた。
5. 過去の激甚な公害を克服してきた日本では、北九州市の事例報告にもあったように、生産現場である産業界や、これを直接的に規制、監視を行う地方自治体が協力して解決してきたものであり、その結果として公害克服の技術、人材、ノウハウが蓄積されている。
6. 現在、国レベルで行われている環境国際協力をさらに効果的かつ実践的に推進するためには、橋本先生をはじめとする皆様方のご指摘のように、国レベルだけの取組では不十分であり、都市レベル、産業界レベルにおける国際間の相互協力が絶対に不可欠であると考えます。
7. 北九州市では、すでに開発途上国の技術研修員を受け入れるため、2つの環境対策研修コースを設置しているが、先日のJICA九州国際センターのオープンを契機として、さらに新しく4つのコースの増設を関係者をお願いいたしているところである。この件については、メキシコのメネデス氏からご要望があったところである。
8. また、今回のような都市レベルにおける環境対策に関する国際会議の継続についても、インドネシアのヘルボウォ氏からご指摘があったように、2～3年に1度ぐらいの割合で、人材養成面、

財政面、技術面など、特定分野に着目したテーマで、開催していきたいと考えている。

9. 以上のことを踏まえ、最後に、私は、開発途上国の大都市と日本の大都市の間で、環境に関する情報、技術、人材、ノウハウ等を相互に交換しあうことを目的とした「都市間環境情報ネットワーク」を提案したい。

さらに、そのお世話は、北九州市において、させて頂きたいと考えている。

(以上)

日本側総括コメントにおける発言 「環境対策に関する今後の国際協力の課題と基本的方向」

環境庁国際課環境協力室

室長 松下和夫

1. 私は日本政府が国連環境計画（UNEP）の協力を得て去る9月11日から13日まで開催した「地球環境保全に関する東京会議」に参加した後、この会議に参加させていただきました。「東京会議」では地球環境の保全のために、先進国と途上国が協力を強めていくべきであることが強調されています。本シンポジウムは、その具体的なステップであり、実にタイムリーであると思います。参加者の具体的な経験に基づく熱心な討議を拝聴し、また昨日の現地視察にも参加し、深い感銘を受けました。主催者の皆様に感謝を申し上げるとともに、本シンポジウムの参加者の方々に敬意を表します。
2. これまでの討議の中から、いくつかの教訓が得られると思います。
その1つは、環境対策の政策形成と戦略づくりについてであります。日本の経験、あるいは北九州市、東京都の報告からみてもわかるように、環境政策の形成、戦略づくり、その実施には大変な時間と努力を要します。このためには、次のような要素が必要です。
 - ① 行政、産業、住民の連携
 - ② 中央政府、地方政府、都市の連携と役割分担
 - ③ 政府の政策の中における環境対策の優先度を高めるためのマス・メディアの活用
 - ④ 行政のリーダーによる政治的決意とリーダーシップ
3. 政策を形成したり対策を実施する上で次の点に留意すべきである。
 - ① 予防が修復より安くつくこと
 - ② 対策には当然のことながら資金と技術が不可欠
 - ③ 限られた資金を有効に使うには優先分野を特定していくことが必要
 - ④ 公害対策費用は汚染者負担原則（Polluters Pay Principle）が適用されるべきであるが、税制上、財政上のさまざまなインセンティブを活用すべきである。
 - ⑤ 技術については、それぞれの国や都市の実情に応じた適正な技術を採用活用すべきであり、先進国の技術移転についてはSelectiveであるべきである。
4. 今後の国際協力の方向について、いくつかの考えを述べてみたい。
環境分野における開発途上国との協力はまだ端緒についたばかりであるが、ステップ・バイ・

ステップで計画的に進め成功例を積み上げていく必要がある。具体的な協力の分野としては、以下の点が考えられる。これらを各国・各地域の実情に応じて着実にかつ体系的に実施していくことが望まれる。

1) 情報と経験の交換

具体的ノウハウを持った自治体の情報と経験を交換することは特に有益であろう。その際、情報と人材のネットワーク化、データ・バンク化を検討すべきである。

2) 多様なレベルにおける職員・専門家の研修と訓練

3) 具体的な行動に結びつく包括的かつ体系的な環境管理マスタープランの作成

4) モニタリングと調査研究

5) 公害対策手法と技術移転

6) 以上を実施していく中心的な機能を持った「環境研究研修センター」を各国に設けることも奨励されるべき

5.1) 環境分野における途上国との協力は、これまでは主として、国対国（政府対政府）で行われてきたが、地方自治体や産業界に、具体的な対策のノウハウや人材があることから、このような協力にあたって地方自治体や産業界の果たしうる潜在的な役割は極めて大きい。地方自治体や民間の人材・ノウハウの活用を促進しうるシステムを早急に検討すべきである。

2) また、都市と都市との直接的な協力、交流も期待される。この点において北九州市が果たそうとされる新しい取組への先駆的役割を高く評価したいと思います。

地方公共団体の国際協力への努力に対し、国やJICAにおいても財政（面）を含めた支援措置を行なうことを提案したい。

(以上)

OVERALL COMMENTS

by MR. KAZUO MATSUSHITA

Director, Office of Overseas
Environmental Cooperation,
Environment Agency

1. First of all, let me congratulate the city of Kitakyushu and JICA for your superb organization of this symposium.

I have just taken part in organizing "Tokyo Conference on Global Environment" which was sponsored by the Government of Japan with the support of UNEP, held on the 11th thru 13th of September.

At that conference, it was emphasized that cooperation between industrialized and developing countries should be enhanced in order to protect global environment and to realize "sustainable development". In this connection, this "Kitakyushu Symposium" is a very timely and concrete step.

After listening to the intensive discussions based on the actual experience of the participants and joining the study tour yesterday, I must confess that I was really impressed.

2. There are several lessons to be drawn from the previous discussions.

One of them is in relation to the formulation of environmental policies and strategies. As you can see from the experiences of Japan and reports from Kitakyushu City and Tokyo, it takes enormous time and efforts to formulate the system of environmental policies and strategies and put it into practice.

This process must include the following components:

- Good linkage between administration, industry and citizens,
- Central government, regional authorities and city authorities should keep good partnership and share respective roles,
- Increasing environmental awareness of the public, politicians etc, through mass-media,
- Political will and commitments by the leaders of administration.

3. There are several points to be kept in mind in formulating and implementing environmental policies.

- (1) Prevention is cheaper than cure.
- (2) Funding and technologies are key factors in implementing policies.

- (3) In order to allocate limited resources effectively, priority areas have to be identified.
- (4) Polluter Pays Principle should be applied to the control of pollution. At the same time, comprehensive incentive measures such as tax incentives and disincentives, financial measures should be utilized.
- (5) As to the technologies, it should be kept in mind that appropriate technologies, which are in conformity with local situation, be employed. Technology transfer from developed countries should be selective in that regard.

4. Some thoughts on future directions of international environmental cooperation.

International cooperation with developing countries in the field of the environment is an early stage of implementation in Japan. It is essential to proceed step by step and accumulate success stories. Some of the possible fields of cooperation is listed below. It is hoped that assistance projects be implemented steadily and comprehensively based on the situations of individual countries and cities.

(1) Exchange of information and experience:

It is most effective that local authorities, which have actual know-how, exchange their information and experience.

In this connection, network and data bank of information and experts should be considered.

(2) Training of personnel and experts at various levels.

(3) Formation of action-oriented comprehensive environmental management master plan.

(4) Monitoring and research.

(5) Transfer of pollution control measures and technologies.

(6) Establishing of a central environmental training and research institution which has the function of assisting the implementation of the above activities.

5. (1) Internatinal cooperation with developing countries in the field of the environment was, so far, carried out, mostly by government to government basis. However, since there are substantial potentials of actual know-how of control measures and man-power in local governments and industries, the roles expected to be played by local

governments and private industry are enormous.

The system to utilize this know-how and man power should be considered as early as possible.

- (2) The expansion of direct cooperation between cities is also highly expected. In this connection, the initiatives taken and the pioneering role played by the City of Kitakyushu is highly appreciated.

I would like to propose that supporting measures including financial aspects to the efforts of the local authorities in international cooperation should be considered on the part of the national government and JICA.

提 言

開発途上国の都市の環境対策に関するシンポジウム

北九州、日本、1989年10月3 - 6日

結論と提言

本シンポジウムにおける4日間にわたる集中的でかつ建設的な議論を踏まえ、別紙に示されている7ヶ国の開発途上国代表は、次のように結論し提言する。

結 論

1. 都市の環境管理の分野で、開発途上国間の経験の交流を進め、かつまた日本から開発途上国への経験の移転を促進する意味で、このシンポジウムは非常に有益であり、また示唆に富むものであった。地方公共団体は、環境分野において実際的な経験とノウハウを持っているがゆえに、基調講演と都市環境管理における地方公共団体の事例報告は印象的であり、有益であった。このシンポジウムの開催地である北九州市及びその他の地方自治体の成功例は、大いに勇気づけられるものである。1868年の明治維新以後の日本の工業化の発祥の地である同市は、工業化、都市化の過程で深刻な環境汚染に苦しんだが、見事に問題を克服し、環境庁より「星空の街」として表彰されるまでになった。また、1986年にOECDは、北九州市が「灰色の街」から「緑の街」へ変貌を遂げたと報告している。7ヶ国の開発途上国の代表は、このような貴重な機会を与えて頂いたシンポジウムの開催者に対して、心から感謝の意を表したい。
2. 開発途上国の大都市は、記録的な速さでいまだかつてない規模に成長しつつあり、それに伴い前代未聞の問題に直面するようになった。これら大都市の首長達は、こういった問題を克服する闘いにおいて、職員の士気高揚や市民参加の推進を図ることにより、少ない資源でより大きな効果をあげるべく最善を尽くしている。また国家の指導者達の中には、環境汚染がもたらすものの真の意味を認識し、重大な政治的決意をもって臨んでいる者もある。しかしながら開発途上国の都市環境は、一方で都市化と工業化が急速に進み、他方で基幹施設の設備と公共サービスの充実に立ち遅れているため、環境の悪化が進んだ。開発途上国のすべての大都市では、これ以上都市環境が悪化することを防止し、また都市環境の改善を図ることが、焦眉の課題となっている。
3. いくつかの開発途上国の大都市の中には、多くの人々が満足な住居を持たず、基本的な公共サービスの恩恵を受けず、まともな職すらも得られずに生活している所もある。増加する都市人口の内のある者は、都市内の古いスラムか或いは危険な斜面、洪水に見舞われ易い低地、工業地

帯沿いなどに次々に建てられる粗末な家にひしめいて住んでおり、その生命は天災、人災の危険にさらされている。都市の無秩序な成長は、交通量、水消費量、エネルギー消費量、産業活動、そして汚染の増大をもたらしている。開発途上国によっては、飲料水の不足は深刻であり、地下水の汲み上げ過ぎにより地盤沈下や洪水あるいは、地下水への塩水の浸入がしばしば発生している。都市によっては、地形や気象条件の特殊性によって、汚染が悪化している場合も見受けられる。人や家畜の排泄物の不適切な処理により、地表水と地下水が汚染され、飲み水の安全が脅かされている。未収集のゴミや無差別に投棄された固形のゴミは、鼠族昆虫の繁殖をもたらすのみならず、排水路の閉塞を引き起こし、洪水を頻発させる原因となっている。

4. 開発途上国は、上記の伝統的な環境問題にいまなお苦しむのみならず、有害廃棄物のような、今まさに先進国が直面している新しい環境問題にも同時に直面している。

従来の環境問題と新しい環境問題が同時に存在することは、開発途上国における環境管理をより困難かつ複雑にしている。それ故に、工業国が得た経験が開発途上国に対して適応し得るか否かを十分に検討することが必要である。例えば、工業国で採用されている現行の下水設備とゴミ焼却技術は、開発途上国の経済力では多くの場合到底まかなうことはできない。

5. 開発途上国の多くは既に環境庁を設置し、環境法や条例、規則、基準などを整えている。しかしながらこういった法制度の実際の適用ならびに環境改善策の実施は、現在までのところ満足のいくものではなく、特に地方レベルでの早急な実施が求められている。

6. このような開発途上国において都市環境の改善が著しく遅れているのは、次のような理由による。

- ・ 誰が何に責任があるのかについて明確な定義がない。
- ・ 生態系アプローチに基づく先見的都市開発計画がない。
- ・ 非常に限られた財源をめぐって多くの資金需要が競合している。
- ・ 失業問題が深刻で、斜陽産業に環境汚染対策の実施を厳格に求めると失業問題が一層深刻化する。
- ・ 経験のある専門家や技術者が不足している。
- ・ 一般市民や産業界の環境問題についての認識が十分でない。
- ・ 国と地方公共団体及び行政と民間の間で、相互の調整と協力が不十分である。
- ・ 使用されている技術が、簡単なデザイン、安いメンテナンスコストといった地域の必要性にそっていない。
- ・ 適正技術の研究開発が不足している。

7. 日本では、国、地方自治体、企業、学界、NGO、市民が一体となって努力を重ねた結果、都市環境汚染が、現在制御されているに至っている。開発途上国でも、その都市環境を改善するに当たっては、同様の一体的努力が必要であろう。

また、それぞれの開発途上国による自助努力に加えて、大都市間の経験交流を組織的に進めたり、あるいは先進国や国協力機関から技術協力・資金協力を得たりすることが、開発途上国の都市の環境問題の解決を促進する上で決定的な役割を果たすであろう。

提 言

1. 環境目標達成のためには、この先何十年もの努力が必要であるが、開発途上国における都市改善のための多大な努力は、直ちに始められる必要がある。開発途上国の政府、地方自治体、企業、学界、NGO、市民は、既に策定したこれらの政策やプログラムを実施し、また都市環境を改善するため、一体となって努力を重ねるべきである。この一体となつての努力を可能にするため、多くの関係団体を巻き込んで、環境管理のマスタープランを行動志向的にかつ包括的に作成すべきである。
2. このように策定したマスタープランに基づいて、第一に、都市環境管理に直接的に責任を有する機関、とりわけ地方レベルのそれを強化すべきである。第二に、国営企業を含むあらゆる企業が公正・公平に扱われ、環境汚染防止にむけディスインセンティブよりもむしろインセンティブが与えられるべきである。但し、小企業の場合には、環境規制に対応できるよう、よりきめ細かな対策がとられるべきである。第三に、リサイクリングおよび低廃棄物技術の使用が組織的に促進されるべきである。第四に、関係者の訓練と公衆・産業界の環境認識向上とを常時実施していく仕組みを国レベル・地方レベルで確立すべきである。これらの課題を遂行する場合、持続可能な開発を忘れてはならない。政府当局は、都市環境管理にもっと高い優先順位を与え、より自足的な人間居住を目指すべきである。国家開発計画担当者、環境担当省庁、大都市の行政機関、学界、NGO、および産業界は、率先して関係機関の間の調整と協力を強化すべきである。さらに都市計画の既存の手続きの中に、環境配慮を織り込むべきである。
3. 開発途上国および先進国の大都市は、都市の環境管理の分野で、経験の交流を組織的に行うためのネットワークを構築すべきである。先進諸国の政府および国際協力機関には、大都市政府がこの面で行う努力を技術的にまた財政的に支援することが求められている。このため、北九州市が提案した都市間環境情報ネットワークシステムは注目に値し、その実現が強く希望される。
4. 過去30年間、都市環境管理に関して実務的ノウハウを蓄積してきた北九州市や東京都のような

日本の地方公共団体は、開発途上国における都市環境の改善に、より積極的な役割を果たすことが求められている。第一に、この分野における経験とデータが、現在の環境問題を取り扱う場合に参考とするため、日本の地方公共団体によって保存されるべきである。このようにして、蓄積された情報は、開発途上国の様々な人々、あるいは団体に分かち合われるべきである。

第二に、開発途上国と日本の大都市の間に既に存在する、あるいはこれから結ばれる姉妹都市関係が、都市の環境管理改善のために最大限に活用されるべきである。その際に実際されるべき主な協力活動としては、日本の大都市行政機関から開発途上国大都市行政機関への専門家の派遣、開発途上国大都市行政機関スタッフの日本の大都市行政機関での実地研修、そして適正技術開発にむけた研究協力、である。日本政府は、姉妹都市関係に基づくこういった協力を全面的に支援するため、政府開発援助（ODA）を割り当てることが求められている。

5. 都市環境管理改善のために、より多くの投資が行われるべきである。累積する対外債務にあえいでいる開発途上国にとっては、このようなものを生ませないセクターに財政的資源をさらに配分することは極度に困難になっている。日本を始め、他の先進国及び国際協力機関には、環境管理に関するマスタープランの策定や、実施に際し、開発途上国の大都市と共同で取り組むことが求められている。また、環境管理対策の実施に向けて使用される援助を含む財政協力は、極めて有用である。

INTERNATIONAL SYMPOSIUM ON ENVIRONMENTAL POLLUTION CONTROL
IN URBAN AREAS OF THE DEVELOPING COUNTRIES

Kitakyushu, Japan 3-6 October 1989

CONCLUSIONS AND RECOMMENDATIONS

After intensive and constructive discussions held over the four-day period of the Symposium, the delegates of the seven (7) developing countries, whose names are shown in the annexure, have arrived at the following conclusions and recommendations:

CONCLUSIONS

1. The Symposium has been very useful and informative, facilitating the transfer of experiences from Japan to developing countries as well as the exchange of experiences among developing countries in the field of urban environmental management. The keynote speeches and the case studies on experiences of Japanese local authorities in urban environmental management have been impressive and beneficial because the local authorities have practical experience and know-how in this field. The successes of Kitakyushu City, one of the sponsors of this Symposium, and other municipalities have been very encouraging. Kitakyushu City, where Japan started its industrialization after the Meiji Restoration in 1868, suffered from serious pollution in the course of its industrial development and urbanization. However, it has successfully overcome its problems. Consequently, it has won official commendation from the Environment Agency of Japan as a "city under a star-filled sky." The Organization for Economic Cooperation and Development (OECD) reported in 1986, that Kitakyushu "...had changed from a smoke coloured city to a city of green." The delegates of the seven (7) developing countries would like to express sincere appreciation to the organizers of this Symposium for the provision of this valuable opportunity.

2. Metropolises of developing countries are facing unprecedented problems as they grow at record rates to sizes never known before in human history. In the battle to overcome these problems, administrations of these metropolises are doing their best to accomplish more with less, instilling morale in their workers on the one hand and promoting community participation on the other hand. In addition, certain national leaders are engaging the highest political will

to improve the environment, recognizing the real significance and implications of environmental pollution. Nonetheless, urban environments have deteriorated because of accelerated immigration, urbanization, and industrialization, in contrast with the slower rate of development of urban infrastructure and services. Measures to stop further deterioration and improve urban environments are urgently needed in all metropolises of developing countries.

3. In some metropolises of developing countries, many people are living without appropriate shelter, basic public services, and productive employment. A portion of the new urban population crowds into old slums or new shanty towns, precariously springing up on hillsides, in flood-prone depressions and alongside industrial zones, making their lives vulnerable to disasters caused by nature and/or man. Rapid growth of cities is accompanied by increases in traffic, water consumption, energy consumption, industrial activity, and pollution. In some countries, drinking water supply shortages are very serious and consequent over pumping of ground water often causes land subsidence, flooding, and penetration by saline water. Pollution is aggravated in some cases by peculiar geographical and meteorological conditions. Improper management of human and animal wastes is not only polluting the surface and ground water, but also endangering the safety of drinking water. Uncollected and improperly disposed solid wastes cause proliferation of vector animals, clogging of drains, and frequent flooding in some areas.

4. In addition to the conventional environmental problems mentioned above, metropolises of developing countries are also suffering from modern environmental problems faced by industrialized countries, such as toxic wastes. This co-existence of conventional and modern environmental problems makes environmental management in developing countries more difficult and complicated, thus requiring a careful assessment of the applicability of the experiences of industrialized countries. For example, the conventional sewage system and refuse incineration technologies used in industrialized countries are far beyond the financial capacity of many metropolises in developing countries.

5. Most of the developing countries have already established environmental authorities, environmental laws and regulations and standards for emission control and environmental quality. Thus far, however, enforcement of these legislations and implementation of concrete improvements have not been satisfactory, necessitating urgent measures, especially at the local level.

6. This delay in the implementation of concrete measures for improving urban environments in developing countries has had many causes including: lack of clear definition of who is responsible for what; lack of anticipatory urban development planning based on the ecosystems approach; existence of many competing financial demands as opposed to very limited financial resources; serious unemployment problems which would be aggravated even more by rigorous enforcement of pollution prevention measures on sunset industries; insufficient numbers of experienced professionals and technicians; insufficient awareness of environmental problems in the public and industrial sectors; insufficient coordination and cooperation between national and local governments as well as between the public and the private sectors; use of technologies which do not meet with local requirements such as simple design and low maintenance cost; lack of R&D activities for developing appropriate technologies.

7. In Japan, urban environmental pollution has been controlled through the concerted efforts of the central government, the local governments, the industrial circles, the academic institutions, the non-governmental organizations (NGOs), and the citizens. Similar concerted efforts will be required in each developing country to improve its urban environment. In addition to these self-help efforts, inter-city cooperation for the systematic exchange of experiences among metropolises of the world and external supports in the form of technical and financial assistance from industrialized countries and international cooperation bodies will play a crucial role in solving urban environmental problems in developing countries.

RECOMMENDATIONS

1. Serious efforts for the improvement of urban environments in developing countries should be intensified immediately although environmental goals may take decades to be achieved. Therefore, central governments, local governments, industrial circles, academic institutions, NGOs, and citizens of developing countries should make concerted efforts to implement the policies and programmes already established to improve their urban environments. As the basis of these concerted efforts, comprehensive action-oriented environmental management master plans should be prepared involving all the related parties.

2. Based on these master plans, institutions directly responsible for urban environmental management should be strengthened, especially at the local level.

A just and fair treatment with incentives, rather than disincentives, should be applied to all industries. However, a more nuanced policy should be adopted in the case of small industries. Recycling and the use of low waste technology should be systematically promoted. Permanent scheme for training relevant personnel and for enhancing environmental awareness among the public and the industrial sector should be established at both the national and local levels. In doing these things, the necessity of sustainable development must not be forgotten. Authorities should give a higher priority to urban environmental management, aiming at increasing self-sustainment of human settlements. Coordination and cooperation among related parties should be strengthened through the initiatives of national economic planners, national environmental agencies, metropolitan governments, academic institutions, NGOs, and industrial sectors. Environmental considerations should be incorporated into urban planning.

3. Metropolises of developing countries and industrialized countries should establish an inter-city cooperation network to promote systematic exchange of experiences in the field of urban environmental management. National governments of industrialized countries as well as international cooperation bodies are requested to support such efforts by metropolitan governments both technically and financially. For this, among other things, an inter-city environmental information network system proposed by Kitakyushu City merits consideration and its realization is highly desirable.

4. Japanese local governments such as Kitakyushu and Tokyo, which have accumulated practical know-how of urban environmental management for the last thirty (30) years are requested to assume more active roles to improve urban environments in developing countries. Firstly, relevant experiences and environmental data should be compiled by local Japanese authorities for use as reference in dealing with current environmental concerns. The information thus compiled should be shared with the various peoples and groups of developing countries. Secondly, existing and forthcoming twinning arrangements between the metropolises of developing countries and their Japanese counterparts should be used to the maximum for the benefit of urban environmental management. Major activities to be carried out are the dispatch of experts from Japanese metropolitan governments to their counterpart agencies in developing countries, on-the-job training of professionals and technicians from the metropolitan governments of developing countries in their counterpart agencies in Japan and cooperation in research aimed at developing appropriate technologies. The

Japanese government is requested to allocate its official development assistance (ODA) in full support to these cooperation activities based on twinning arrangements.

5. More investments should be made for the benefit of urban environmental management. Priorities should be clearly defined in the environmental management master plans in order to make optimum use of scarce resources. Japan, along with other industrialized countries, and international cooperation bodies are requested to work together with metropolises of developing countries in the formulation and implementation of master plans for environmental control. Also, financial cooperation, including grants, used to aid in the implementation of necessary environmental control measures would be extremely helpful.

Annexure

DELEGATES OF THE SEVEN DEVELOPING COUNTRIES

BRAZIL

Mr. Eduardo Antonio Licco Manager of the Environmental Pollution Control Support Division, Environmental Protection Agency for the State of Sao Paulo

Mr. Dante Ludovico Mariutti Vice-President
(Director of Environmental Relations),
Federation of Industries of the State of Sao Paulo

EGYPT

Mr. Mohamed Farouk Bedewi Director General of Egyptian Environmental Affairs Agency

Mr. Ahmed Hassan Abdel Rahman Vice Governor of Cairo for South Area

INDIA

Mr. Venkat Chary Additional Municipal Commissioner, Municipal Corporation of Greater Bombay

INDONESIA

Mr. Herbowo Vice Governor of DKI Jakarta for Economic and Development

Mr. E. Budi Rahardjo Director of Centre for Research and Urban Environmental Development, Jakarta

Mr. Suyatno Head of Analysis, System and Technology Div. KADIN, Indonesia (Director of Research and Development, Kujang Fertilizer Company)

総括

「北九州市における今後の環境国際協力の取組みについて」

北九州市公害対策局
局長 鮫島 稔

1 はじめに

北九州市は、明治以降旧八幡製鉄所を中核に「石炭」、「鉄」を資源とし、日本の代表的な産業港湾都市、重化学工業都市として、1950年代の高度成長を支えてきました。

この経済の高度成長と都市化の進展の中で、厳しい環境汚染が進行し、深刻な硫黄酸化物汚染と日本一といわれた降下ばいじんに見まわれ、北九州市は「灰色の街」と呼ばれ、産業活動の中心となった洞海湾は「死の海」と化しました。

これに対し、公害規制の強化や事業者、行政、市民が一体となって公害克服に取り組んだ結果、かつての「死の海」洞海湾では車海老が取れ、市街地の中を流れる柴川にもアユなどの魚影が見られるまでに環境改善が進みました。今では、環境庁の「星空の街」の選定を受け、OECD（経済協力開発機構）の環境白書（1985年版）において、「灰色の街」から「緑の街」に生まれ変わった都市として、世界に紹介されています。

2 環境国際協力の推進

北九州市は、この公害克服の過程で、公害防止や環境対策に関する経験、技術、人材を行政や企業の中に豊富に蓄積してきており、これらは北九州市の特長ある貴重な財産となっております。

これらの貴重な経験や技術を開発途上国の人々に役立ててもらうため、1986年から国際協力事業団の環境国際研修に企業、大学、行政が一体となって取り組んでいます。

現在、「産業環境対策コース」と「産業廃水処理技術コース」の2コースを実施しておりますが、これらは地方の取組みとしては日本で初めての環境国際研修です。

これらの研修は、企業、大学、行政における第一線の技術者、研究者が講師を担当し、実習や見学にも企業や大学、行政の組織的なバックアップを得るなど、理論的かつ実践的な研修となっております。

産業環境対策コースは、1989年度に4年目を迎え、4ヵ月間に及ぶ研修期間に、大気汚染対策、水質汚濁対策、騒音・振動対策、産業廃棄物処理、環境アセスメント、コンピューター操作などの多岐にわたる実習、演習、講義を行っております。

産業廃水処理対策コースは、2年目を迎え、水質汚濁物質の健康影響、水質の測定・分析、排水処理設備の設計、管理、操作などについて、講義、演習を行っております。

これらの集団研修以外にも、アジア諸国などの技術者を市に受入れ、個別テーマの研修を行っております。また、市役所の技術者等を環境専門家として開発途上国へ派遣しており、現在までに中国、コートジボアール、タイ、韓国などにおいて、大気汚染や水質汚濁対策、水質測定・分

析の技術指導を行っております。

1989年度には、北九州市の新しい国際協力取組みとして、環境問題に関する3つの大きな国際会議を開催しました。今回の「開発途上国の都市の環境対策に関する国際シンポジウム」をはじめとして、同じ10月に国際連合地域開発センター（UNCRD）と共催の「アジア大都市廃棄物問題国際会議」、1990年2月には環境庁との共催による「第2回日韓環境シンポジウム」を開催しています。

3 今後の展望と課題

北九州市では、国際環境協力を体系的、総合的に推進するため、「北九州市国際環境協力システム基本構想案」を1989年5月に作成しました。このシステムは、関係機関の協力を得て、公害対策、環境保全における各種機能を整備し、有効かつ効果的に機能させようとするものです。

第1期 国際研修都市の体制づくり

① 国際集団研修の拡充

1989年10月北九州市にJICAの九州国際センターが開設され、これを契機に、開発途上国の技術者を対象としたJICA集団研修の拡充、充実に努めることとしています。

現在、前述のとおり2つの研修コースを実施していますが、1990年度には新たに工場発生源のモニタリング、生活排水対策、廃棄物処理などの現場実習を主体とした4コースの増設を申請中です。

② （仮称）北九州市国際環境協力機構の整備

システムの中核組織として、国際環境協力システム全体のコントロール、各機能間の調整、関係機関との折衝などを行う（仮称）北九州市国際環境協力機構を整備します。

第2期 国際研修都市の機能拡充

③ 環境対策適正技術のトレーニング

開発途上国の技術レベルに対応した実践的かつ効果的な研修を行うため、汚染物質の測定・分析、公害防止機器の操作、管理などについて、実戦的なトレーニングを行う機能を整備します。

④ 都市間環境情報ネットワークの整備

日本と開発途上国の都市の間で、環境に関する情報、技術、人材、ノウハウなどを相互に交換する都市間環境情報ネットワークを整備します。

これは、今回のシンポジウムの中で本市が提案し、その実現が強く要望されたものです。

⑤ 環境国際協力のための人材養成

国際協力を実効的なものとするためには、その指導者の質の向上が不可欠であるため、

国際研修の講師や途上国への派遣専門家などの国際環境協力の指導者となる人材を養成します。

第3期 国際技術情報都市への発展

⑥ (仮称)北九州市環境技術移転センターの整備

北九州市の産、官、学が一体となって、開発途上国の実情に応じた適正技術の研究開発、技術移転の支援、コンサルティングなどの専門機能を有する(仮称)北九州市環境技術移転センターを整備します。

このように、北九州市は、21世紀の国際交流都市、国際技術情報都市をめざして、新しい実践的かつ具体的な国際交流を進めるため、国際途上国のニーズが高く、本市が世界に誇れる最大の資産である公害防止・環境保全技術をさらに積極的に活用し、世界に誇りうる本市独自の国際協力システムの構築をめざしています。

国際協力事業団における国際協力の新たな展開について

国際協力事業団
国際協力総合研修所

所長 加藤 清

1. 本シンポジウムが、9月に開催された政府主催の「地球環境保全に関する東京会議」の直後に開かれ、開発援助における環境問題への取り組み方に大きな関心が持たれている最中に、国際協力の具体的ステップとして援助の実施機関と、環境対策に関する実際の技術、経験、ノウハウの蓄積を有する地方自治体との連携に基づき、本シンポジウムを実施したことの意義は非常に大きい。
2. 「都市環境管理とその対策」を主題に熱心な討論がおこなわれたが、開発途上国においては行政、産業、住民の連携に乏しく又、中央政府、地方政府又は、都市との連携や役割分担が不十分であり、機能していないことが明らかになった。今回の参加者には日本側も産業界、大学研究機関及び政府機関（中央政府と地方公共団体）の代表が参加し、又、開発途上国側も都市の環境管理責任者（知事、市長）及び産業界の代表を招いて、各国の都市環境対策の抱える問題と国際協力のあり方を率直かつ直接対話したことは、今後の環境対策を実施した上で大きな成果を得たと評価することができる。
3. 都市環境管理や公害対策技術に大きな実績と経験を有する地方自治体や産業界が、国が行う環境国際協力事業に今後積極的に参画することが可能になる仕組みをつくり、都市や産業界が有する実践的技術やノウハウを早急に技術移転していくことの緊急性と要望が強いことが明らかとなった。これらのニーズに対応するためには援助実施機関としてのJICAは、政府及び地方自治体産業界との連携の強化や実施体制の整備をおこない、同時に技術移転を円滑にするための公害対策手法や、技術に関する基礎調査研究の充実や多様なレベルの援助する側の職員、専門家の研究、訓練を強化することが重要となった。「北九州市の環境対策に関する適正技術の研究（昭和63年度）」や「滋賀県の湖沼環境対策に関する適正技術研究（平成元年度）」などの基礎研究を継続しておこない、これらの環境対策の知見を適切に整備し活用を計ることが大切である。
4. 技術移転を促進する観点から、本シンポジウムにおいて北九州市から提案のあった「都市間環境情報ネットワーク」構想は、今後国際協力を推進していく上で重要な

中核的役割を果すものであり、真剣に検討する必要がある。開発途上国の都市、地方自治体と日本のカウンタパートが情報、技術、人材、ノウハウを相互に交換し国際理解と協力を深めていくことが強く求められている。

JICA