

## The State of the Malaysian Environment and Its Outlook for the 1990s

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### ABSTRAK

*Kertas ini menarik perhatian kepada beberapa ciri utama alam sekitar di Malaysia kini dan kemungkinan-kemungkinannya pada dekad 1990-an. Ia menunjukkan bahawa walaupun keadaan "bercampur-campur" yang dialami sekarang ini dijangka akan berterusan dalam dekad 1990an, banyak bergantung kepada jenis komitmen yang dibuat oleh kerajaan (di kedua-dua peringkat Persekutuan dan Negeri) dan berbagai sektor masyarakat berhubung dengan pemuliharaan alam sekitar dan pembangunan berterusan. Sesungguhnya kebanyakan daripada kegiatan yang mempengaruhi alam sekitar di negara ini adalah di bawah bidang kuasa Kerajaan Negeri dan Kerajaan Tempatan. Secara global, isu-isu berhubung dengan kesan rumah hijau, pertukaran iklim dan seumpamanya dijangka mendapat perhatian yang lebih di tahun-tahun 1990-an.*

### ABSTRACT

*The paper highlights some of the major features of the current environmental situation in Malaysia and their outlook for the 1990s. It is noted that while the present "mixed bag" situation is likely to continue into the 1990s, a great deal will also depend on the kind of commitments to be made by Governments (both Federal and State) and the different sections of the communities with respect to environmental conservation and sustainable development. Indeed, many activities affecting the environment in this country are within the purview of the State and Local Governments. Globally, the greenhouse effect, climate change and related issues are likely to receive greater attention in the 1990s.*

### INTRODUCTION

As a nation, Malaysia is well endowed with natural resources. However, the exploitation of these resources has been extremely rapid especially after Independence in 1957. While such exploitation and utilization have been helpful in raising the living standards of Malaysians, there are nevertheless negative environmental side-effects which need to be rectified from time to

time in order to ensure sustainability. This note provides a brief overview of the current state of the Malaysian environment and its management and the outlook for the 1990s.

## THE STATE OF THE ENVIRONMENT

The achievement in environmental conservation during the 1980s especially in the context of sustainable development has been somewhat of a "mixed bag". There are areas in which the achievement has been commendable; while in others we have not been too impressed. Indeed for specific locations, evidence of deterioration has been noted with concern.

**Forestry** One area in which there has been a great deal of concern during the last decade was the forestry sector. The total forest cover for the country was estimated to be about 20 million ha or 61% of the total land area (Table 1). The figure however varied from Peninsular Malaysia to East Malaysia; Sarawak had an estimated forest cover of 76.5% while Sabah and Peninsular Malaysia had each 59.5% and 46.9% respectively.

TABLE 1. Area under forest in Malaysia (million ha)

Region	Land Area	Forest Area	% of land under forest by region	% of land under fores
Peninsular Malaysia	13.20	6.19	46.9	30.7
Sabah	7.37	4.53	59.5	22.5
Sarawak	12.32	9.43	76.5	46.8
	32.89	20.15	61.3	100.0

Source: adapted from Yusuf Hadi 1988

Deforestation through logging, land development and shifting agricultural practices appeared to be the major causes for the depletion of forest land. The contribution of land development and logging to forest depletion has been previously summarised by several writers including Yusuf Hadi (1988), Sham (1988a & b), and Abdul Rashid Mat Amin (1985). An estimate of land area affected by shifting cultivation in Sarawak was

reported to be about 28.7% of the total land area of the State or approximately 3.5 million ha (Dimin 1988). A corresponding figure for the State of Perak was 25,000 ha (Ismail Talib et al. 1989).

The issue of deforestation through logging involving the Penans of Sarawak received international attention during 1989 followed by an international campaign against the export of tropical hardwood from Sarawak.

**Soil Erosion and River Siltation** Closely associated with land clearance and logging activities is the problem of soil erosion. The seriousness of soil erosion in Malaysia is reflected by the fact that most of our rivers are polluted largely by silts more than by any other pollutants. That land clearance either due to logging, land development or urbanization influences erosion rates has been demonstrated by several workers and are summarised by Morgan (1979). These indicate that on the average the rate of soil loss is least in forested areas and highest in mountain terrain used for agriculture and in areas where the original vegetation has been converted to mining or urban land use (Table 2). The Department of Environment (DOE) latest report (1990) shows that 36 rivers were seriously affected by soil erosion and siltation. The distribution of affected rivers according to regions is shown in Table 3 and Figure 1a & b.

TABLE 2. Land use and soil loss in Peninsular Malaysia

Land Use	Rate ( $\text{kg m}^{-2}\text{yr}^{-1}$ )*	Source
Rainforest	0.034	Shallow (1956) from Sg. Telom, Cameron Highlands.
Rainforest	0.004	Douglas (1972) from head-waters of Sg. Gombak.
Tea Plantation	0.673	Shallow (1956) from Sg. Bertam in Cameron Highlands.
Vegetables	1.009	Shallow (1956) from Sg. Kial in Cameron Highlands.
Mining	0.495	Douglas (1972) from Sg. Gombak north of Kuala Lumpur.
Urban	0.800	Douglas (1972) from Sg. Anak Ayer Batu, north of Kuala Lumpur.

\*An acceptable level of soil loss is approximately  $\text{kg m}^{-2}\text{yr}^{-1}$   
 Source: Morgan 1979: 71.

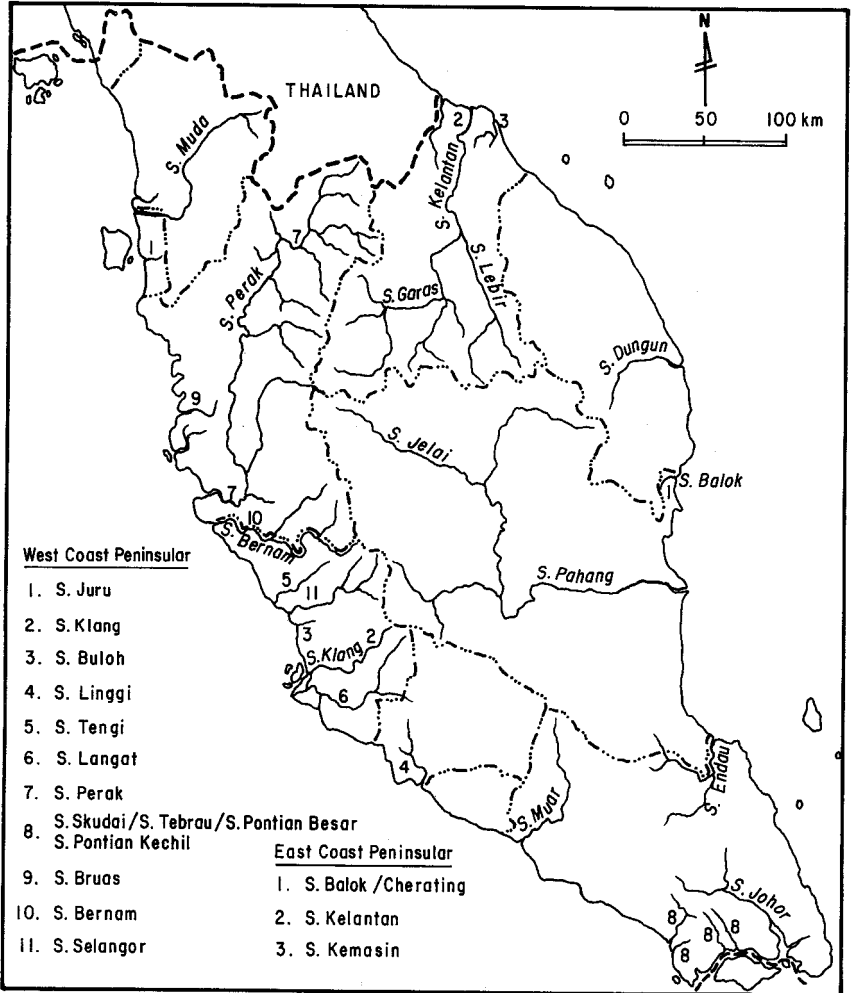


FIGURE 1a: Distribution of seriously affected rivers based on soil erosion and siltation (DOE 1989).

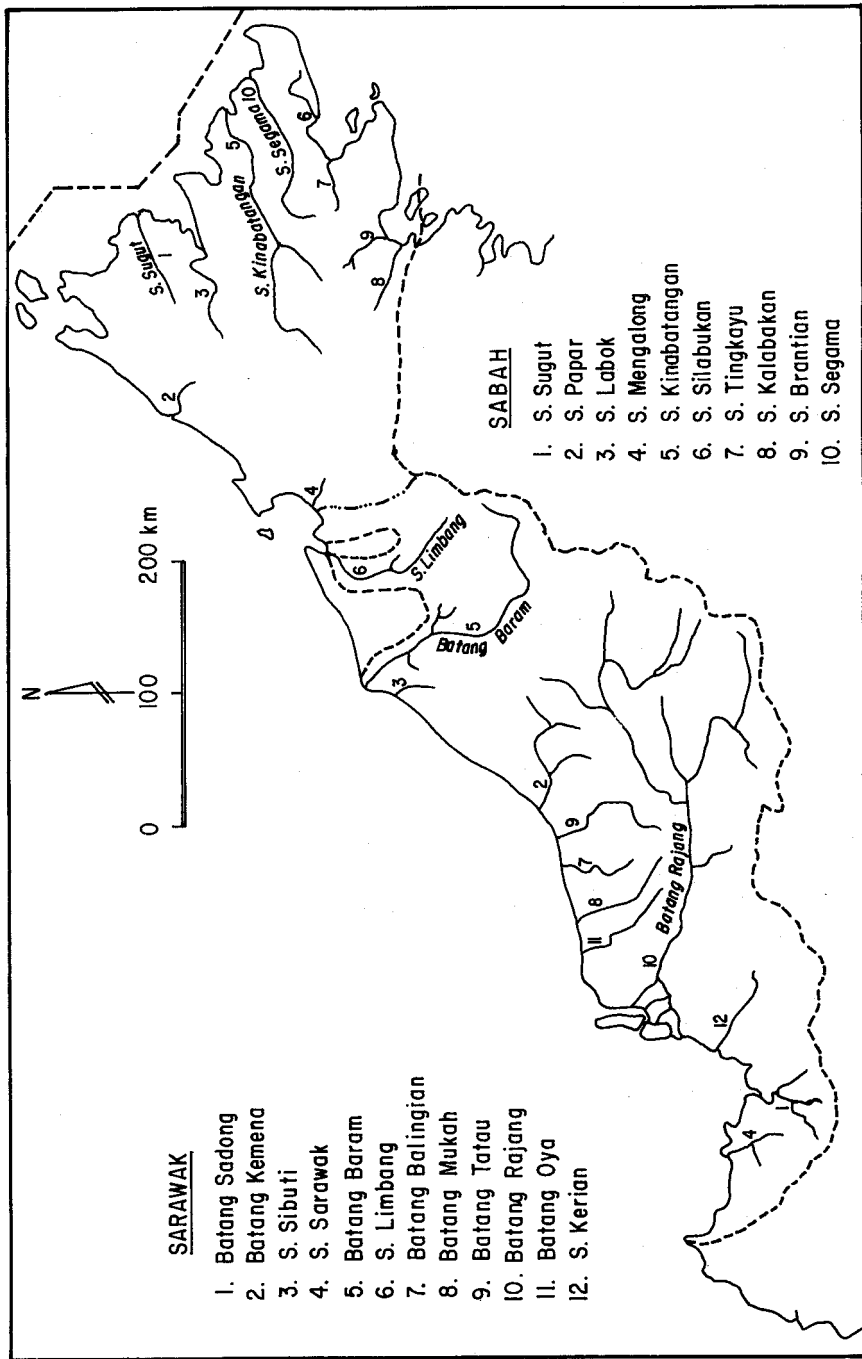


FIGURE 1b: Distribution of seriously affected rivers based on soil erosion and siltation (DOE 1989).

TABLE 3. Distribution of seriously affected rivers by soil erosion and siltation

Number	Region
11	West coast, Peninsular Malaysia
10	Sabah
12	Sarawak
3	East coast, Peninsular Malaysia
36	Malaysia

Source: Department of Environment 1989.

**Water Pollution** The DOE report shows that in 1988, three rivers were still seriously polluted by organics (based on BOD 5) largely due to industrialization and intensive pig farming activities. Ten rivers were classified by DOE as being moderately polluted including Sg. Perai, Sg. Melaka, Sg. Johor, Sg. Golok and Sg. Pahang.

In terms of pollution by sewage and animal waste (based on Ammoniacal-Nitrogen, NH<sub>3</sub>-N), the rivers in the west coast of Peninsular Malaysia were badly affected. The most seriously affected rivers include Sg. Perai, Sg. Juru, Sg. Buluh, Sg. Klang, Sg. Linggi, Sg. Melaka, Sg. Sepang, Sg. Sepetang, Sg. Jejawi and Sg. Merbok.

Heavy metals pollution was generally low for many rivers in the country, but for those flowing through urban-industrial areas, the levels of heavy metals could well be in excess of standards specified by the World Health Organization (WHO). The percentage of non-compliance is given in Table 4. Sg. Klang, Sg. Linggi, Sg. Melaka and Sg. Perak were among those highly affected.

**Coastal and Marine Pollution** Apart from pollution which affects streams and rivers, Malaysia's coastal and marine waters are also affected by pollution. Suspended solids, faecal coliform, oil and grease and heavy metals were among the most important pollutants involved.

The coastal waters of Sabah, Pahang and Melaka continued to be seriously affected by suspended solids. Similarly, faecal contamination was also on the increase in the coastal waters of Selangor, Negeri Sembilan, Kedah, Perlis and Johor.

With the exception of that of Pahang, all other coastal waters were also affected by oil and grease. The Department of Environment (1989)

reported that the situation in the coastal waters of Melaka, Negeri Sembilan, Selangor, Terengganu, Perak, Kelantan, Sarawak and Sabah had either deteriorated or continued to be affected by oil and grease. Some of the more popular beach resorts including Port Dickson, Tg. Keling, Pantai Kundur and Tg. Bidara along the west coast of Peninsular Malaysia were grossly affected.

The coastal waters of Kedah, Perlis and Pulau Pinang were still seriously affected by heavy metals especially cadmium, copper, mercury, nickel and lead. The Department of Environment (1989) reported that about 90% of the samples collected exceeded the recommended limits for conservation of marine aquatic resources.

In terms of faecal coliform, certain sites were reported to be exceedingly contaminated. These include Pantai Merdeka, Tg. Lembang, Pulau Langkawi, Pantai Telok Tempoyak and Pantai Gertak Sanggul both in Pulau Pinang.

TABLE 4. Heavy metals pollution: percentage of non-compliance, 1988

Heavy metals	% non-compliance
Arsenic (As)	15.0
Lead (Pb)	14.0
Mercury (Hg)	3.0
Copper (Cu)	5.0
Cadmium (Cd)	2.0
Zinc (Zn)	0.4

Source: Department of Environment 1989.

**Air Pollution** Air quality monitoring results released by the Department of Environment (1989) indicate that the annual concentration of total suspended particulates remained high in industrial and trafficked areas. The mean figures ranged from about 90 - 107  $\mu\text{g}/\text{m}^3$ . In the commercial and residential areas, the concentration was relatively lower in the order of 60 - 76  $\mu\text{g}/\text{m}^3$ . The rural stations recorded a mean concentration of 49  $\mu\text{g}/\text{m}^3$ . For new towns, pollution levels generally lie between those of rural and urban stations. In Bandar Baru Bangi, the median values range between 28 - 64  $\mu\text{g}/\text{m}^3$  (Sham 1987). August appears to have the highest level of pollution with a second peak occurring round about June. Minimum levels occur during December, September and March. The peak

and minimum periods of pollution appear to coincide well with the relatively dry and wet months respectively (Sham 1978, 1981).

The highest annual mean concentration of total suspended particulate in trafficked areas was  $163 \mu\text{g}/\text{m}^3$  recorded at Pudu, Kuala Lumpur. Pasir Gudang industrial area in Johor reported a maximum concentration of  $186 \mu\text{g}/\text{m}^3$ . The latest recommended Malaysian Guideline value of  $90 \mu\text{g}/\text{m}^3$  was exceeded by nine stations in 1988 - four in industrial areas and the rest in trafficked areas. Johor Port Authority, Johnson and Johnson in Petaling Jaya, Pudu, Bangsar Dental Clinic, Kajang and Police Headquarters in Pulau Pinang were among those which exceeded the Guideline.

In terms of lead pollution, trafficked areas continue to record the highest levels. Pudu and Bangsar in Kuala Lumpur already exceeded the recommended Malaysian Guideline value of  $1.5 \mu\text{g}/\text{m}^3$  (3 - month averages). In the case of Bangsar Dental Clinic, all of the ten 3 - month averages exceeded the Guideline while in Pudu, seven out of eleven 3 - month averages (64%) exceeded the Guideline.

Deterioration in air quality together with increases in potentially polluting activities is a cause for concern. This is becoming more disturbing particularly when the climate in this part of the world has been shown to have high potential for pollution (Sham 1980 and 1987).

**Urban Heat Island Effect** Observations carried out over the last 15 years especially over the Klang Valley urban region indicate that the commercial centres are generally several degrees warmer than the surrounding countryside (Sham 1973, 1980, 1987, 1989). On the average, the mean annual temperature difference between the city and the airport is in the order of  $1-2^\circ \text{C}$ . Under relatively calm and clear sky nights, the rural-urban temperature differential could exceed  $5^\circ$  (Sham 1984).

For some areas, the situation is made more complex by the proximity to the sea and the topography in which they are located. The Klang Valley Region is a good example. Here the land and sea breezes and the channelling effect of the Valley play quite a dominant role not only in determining the size and intensity of the heat island but also the pattern of pollution dispersion in the Valley (Sham 1987).

Recent studies show that extensive tree planting programmes can have a moderating effect on the extreme urban temperatures. Even a small park can reduce temperatures by as much as  $5^\circ \text{C}$  provided that there are sufficient shade trees (Sham 1986).

**Noise** The Department of Environment (1989) reports that there has been a marked increase in the number of complaints related to noise over the 1987-88 period - an increase of about 32%. Studies carried out by the



Department of Environment during 1988 showed that the traffic noise during non-peak hours in Kuala Lumpur ranged from 66 dB(A) to 81 dB(A). Nearly 90% of the sites surveyed were found to have values exceeding 70 dB(A).

**Toxic and Hazardous Wastes** The Department of Environment estimated that the Malaysian industries generated about 380,000 cubic metres of toxic wastes annually. The distribution of these wastes by type and distribution is shown in Tables 5 and 6. It is observed from the tables

TABLE 5. Distribution of toxic wastes by type (%)

Acids (possible heavy metals)	22.0
Sludge with heavy metals	15.4
Sludge with mineral	12.6
Asbestos	9.2
Paints, dye, ink, pigment	7.8
Dust, clinker, ashes	7.6
Alkali	7.3
Oil and hydrocarbon	5.4
Others	12.7

Source: Interview with Director-General DOE as reported in the *New Straits Times* 18.1.90.

TABLE 6. Distribution of toxic wastes by source (%)

Metal finishing	28.8
Textile	14.8
Gas Processing	14.2
Foundry and metal works	10.2
Asbestos	9.0
Film processing	2.4
Packing and printing works	2.2
Others	18.4
Total	100.0

Source: Interview with Director-General DOE as reported in the *New Straits Times* 18.1.90.

that wastes were mainly acids, heavy metal sludge, mineral sludge and asbestos accounting for 59.2%. The major sources of toxic and hazardous wastes were metal finishing industries, textile industries, gas processing, foundry and metal works and asbestos factories altogether accounting for 77%.

Although the Environmental Quality Act legislations on scheduled wastes, scheduled wastes treatment and disposal facilities came into effect in May last year (1989), they were not able to be implemented because there was no disposal site available for such wastes. The Government in the meantime has commissioned two foreign companies to do the final study on one of the identified disposal sites for consideration. The study is expected to be completed before end of 1990.

## THE MANAGEMENT OF THE ENVIRONMENT

The general approach adopted by the Government to achieve sustainable development with least disruption to the environment is illustrated in Figure 2. This shows that it places greater emphasis on preventive rather than curative approach. Apart from legislations, the preventive measures taken include the application of environmental impact assessment (EIA) procedures and the incorporation of environmental consideration into planning through specific guidelines prepared by the DOE and other relevant agencies.

The EIA is a mandatory requirement under section 34A of the Environmental Quality (Amendment) Act 1985. This section empowers the Minister in-charge of environment to prescribe any activity which is likely to have significant impacts on the environment, as "prescribed activity" and requires an EIA study. The EQA (Prescribed Activity) (EIA) Order, 1987 was gazetted on 5 November, 1987 and enforced as from April 1, 1988.

In addition to the three major strategies, the other major thrusts in the management of the environment include:

1. Monitoring and Assessment;
2. Research and Training; and
3. Creating Awareness through Public Education.

The emphasis on Monitoring and Assessment is well placed and timely. An essential component of any effective environmental management is the systematic monitoring and assessment of baseline information. Such data assists in the identification of the status of the environment in terms of emission sources, nature of pollutants, pollutant load and the assimilative capacity of the atmosphere, the land and aquatic ecosystems. The information helps to identify pollution trends, assists in the planning of

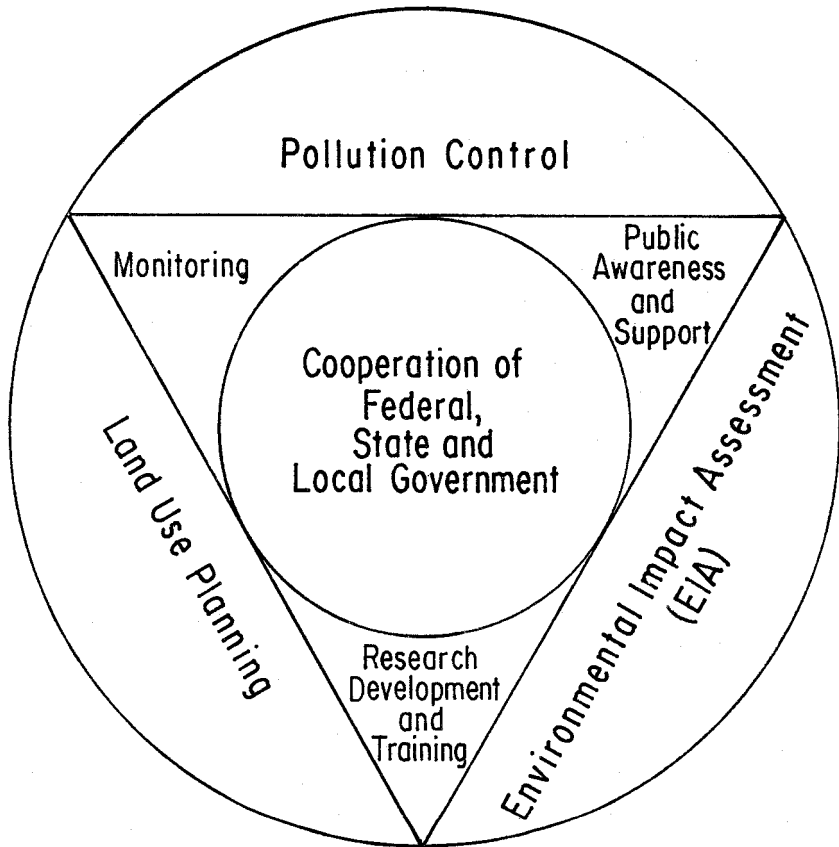


FIGURE 2: Environmental management strategies.

future development and provides a good measure of the extent to which pollution control strategies has been successful. Monitoring, assessment and research however require good support funds particularly for capital equipments and their maintenance. Without such support, the effectiveness of monitoring and research will be adversely affected.

While recognizing the importance of legislations and institutions in the administration of policies and programmes of environmental management, public support is essential in order to ensure the success of such programmes. No conservation programme, however good it may be designed, can be completely successful without public support. The latter can only be effected with well-informed citizens who are aware of the

problems, committed and willing enough to do something about it. To this end, the DOE is doing as much as it can but efforts to educate the public and disseminate environmental information need to be shared by all sections of the community. Since environmental education is basically aimed towards community actions, efforts to reach the different target groups must be varied involving not only governmental institutions but also a wide variety of professional groups, the private sectors and non-governmental organizations (NGOs).

One issue which needs to be resolved in an effort to implement the strategies illustrated in Figure 2 concerns the apparent conflict between State and Federal Authorities regarding environmental matters. Malaysia has a federal system of government in which the federal and state powers and functions are clearly defined in the Constitution. In the case of environmental conservation, it is the Federal Government which enacted the EOA in 1974; the management of the basic resources (land and water) still remains within the powers of the State. Under such circumstances, successful implementation of the EQA can be realised only if there is cooperation between Federal and State.

While the relevance of the EQA 1974 together with all the other environment-related legislations in resource management and the environment is obvious and formally recognized by all quarters, the effectiveness of implementation is still a major problem. The blame cannot solely be attributed to the DOE. Indeed, even the deterrant measures can be ineffective. The latest report by the DOE (1989) shows that although the maximum allowable fines are high, the actual amount paid for non-compliance is small. In 1988, a total of 28 cases were prosecuted and a fine of M\$48,850 was collected giving an average of M\$1,745. For compounded cases, a total of 87 compounds were issued and a sum of M\$33,000 was collected giving an average of M\$380.

## MAJOR GLOBAL ENVIRONMENTAL ISSUES

While concerned with local environmental quality and its management, Malaysia is also sensitive to global environmental issues. Two issues in which Malaysia has been involved include those of the chlorofluorocarbons (CFCs) and global warming due to greenhouse effects.

The question on CFCs and their likely contribution to the depletion of the stratospheric ozone was discussed by the scientific community as far back as the 1970s. But the Vienna Convention came about only in 1985 followed two years later by the Montreal Protocol. Many countries particularly those in the developing world were caught by surprise as there were several provisions within the Montreal Protocol which had trade implications. A more detailed review of the response to the Montreal

Protocol by the developing countries as provided by Sham (1989). Malaysia officially ratified the Protocol in 1989.

Closely related to CFCs and the Montreal Protocol is the issue of global warming due to greenhouse effect. Like many countries of the world, Malaysia's interest in atmospheric warming and climatic change is not purely academic. There are many practical reasons for which Malaysia must take an interest in climatic change and these are summarized in Table 7. This concern has been further reemphasized in the Langkawi Declaration signed during the Commonwealth Heads of Government Meeting (CHOGM) in October 1989. To date, a UNEP-sponsored project on the socio-economic impacts and policy responses resulting from climatic change is underway. It is coordinated on a country basis by the DOE and the Malaysian Meteorological Service (MMS). In addition, a working group is now being organized to look into this issue complementing and in some cases, strengthening and building around the already existing UNEP project. Malaysia is also making preparation for the 1992 Conference on "Environment and Development" scheduled to be held in Brazil. A number of issues are expected to be discussed at this conference to be followed by one or perhaps several international conventions and protocols on climatic change similar in nature to the Vienna Convention and the Montreal Protocol.

TABLE 7. Some major reasons for Malaysia's concerns over the global climatic change

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1. Malaysia being the world's largest producer of rubber and palm oil and the fifth largest producer of cocoa is concerned about the effect on crop production should significant shift in weather conditions occur within the next 50 years.
  2. With coastline of about 2000 km, Malaysia is concerned about the possible inundation of coastal mangroves areas which play an important role in coastal fisheries and aquaculture and coastal protection works should there be a rise in sea level.
  3. Large rice growing areas on flat coastal plains are likely to be threatened following sea level rise. In addition, erratic rainfall distribution also affects wet rice cultivation.
  4. Following sea level rise, there is also likely to be an increase in coastal erosion affecting major coastal towns.
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## OUTLOOK FOR 1990s

It is always a difficult exercise to forecast what is going to happen to the environment in the next 10 years. But on the basis of current situation, it may not be too presumptuous to say that a "mixed bag" situation will still prevail.

Despite reports that air pollution levels in certain areas indicate a slight decline (DOE 1989), for many major urban centres, these are expected to remain well above the Malaysian recommended Guidelines especially with respect to suspended particulates.

It is also noted that while dark smoke from motor vehicles is being controlled through Motor Vehicles (Control of Smoke and Gas Emissions) Rules, 1977 made under the road Traffic Ordinance, 1958, control of gas emissions is still not enforced. With increased number of vehicles, exhaust emissions are expected to increase especially in congested streets of major urban centres.

Research has shown that the heat island is an integral part of urban development. It is detected even in small towns (Sham 1988a; Kopec 1970). Planting of shade trees appears to be an effective measure in attempting to moderate temperatures in urban areas. Thus while urban development and the heat island are unavoidable, these can be minimized by sound tree planting programmes. Judging from the degree of environmental awareness prevailing among Malaysians and considering the relatively lower cost involved in tree planting programmes, there is likely to be an improvement in this direction.

It was noted earlier that most of our rivers were polluted largely by silts more than by any other pollutants and that these were related to forest clearance and physical development including those in urban areas. Future situation regarding water pollution by suspended solids will, in many ways, depend on the extent to which related activities may be controlled. A great deal of such activities comes under the purview of State and Local Governments.

Pollution by sewage and animal wastes is expected to remain unless central sewage system in many urban areas is installed and animal wastes especially those of pigs can be controlled. As both are expected to be somewhat slow in term of implementation, the problem is likely to remain.

In terms of pollution control, the DOE under the EQA, 1974 enforces 16 legislations (Table 8). The effective enforcement of such legislations depends, among others, on manpower and meaningful deterrants. If fines for offences are too small, they may not be very effective. Similarly, enforcement needs sufficient manpower support; without it, all the regulations will only be good on paper.

There are, however, two areas in which real progress can probably be

TABLE 8. Legislations enforced by DOE as at 31 December 1989

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1. EQA, 1974 and the Environmental Quality (Amendment) Act, 1985.
  2. Environmental Quality (Prescribed Premises) Crude Palm Oil) Order, 1977
  3. Environmental Quality (Prescribed Premises) (Crude Palm Oil) Regulations, 1977.
  4. Environmental Quality (Licensing) Regulations, 1977.
  5. Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Order, 1978.
  6. Environmental Quality (Clean Air) Regulations 1978.
  7. Environmental Quality (Compounding of Offences) Regulations, 1978.
  8. Environmental Quality (Sewage and Industrial Effluents) Regulations 1979.
  9. Environmental Quality (control of Lead Concentration in Motor Gasoline) Regulations, 1985.
  10. Environmental Quality (Motor Vehicle Noise) Regulation, 1987.
  11. Environmental Quality (Prescribed Activities) (EIA) Order, 1987.
  12. Motor Vehicles (Control of Smoke and Gas Emmissions) Rules, 1977 made under the Road Traffic Ordinance, 1958.
  13. Environmental Quality (scheduled wastes) Regulations, 1989.
  14. Environmental Quality (Prescribed Premises) (Scheduled Wastes Treatment and Disposal Facilities) Order, 1989.
  15. Environmental Quality (Prescribed Premises) (Scheduled Wastes Treatment and Disposal Facilities) Regulations, 1989.
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achieved, i.e. EIA and the creation of awareness through public education. The Environmental Quality (Prescribed Activities) (EIA) Order, 1987 came into effect on 1 April, 1988 and during the first year of its enforcement alone, a total of 18 EIA reports were processed and subject to review. This is certainly a good beginning and if EIA requirements are implemented systematically to all prescribed activities, the sustainability of the environment may likely be maintained. It needs to be noted, however, that EIAs should not be viewed as mere legal requirements. EIAs should be pursued in their entirety particularly with respect to the recommendations made. They should be open to public scrutiny and should be post-audited. On problem which is likely to arise as a result of a more strict and systematic screening procedure is the increase in the number of projects which are to be subjected to the EIA reports. This may cause a bottleneck

in the DOE which has limited resources and manpower. One possible solution that may be examined is to work out some form of privatization scheme in which private consulting companies (with close supervision by the DOE) are invited to be involved in the assessment and review of EIA reports.

Apart from EIAs, another area which need to be developed and has good potential for success is the creation of public awareness through environmental education. It was noted earlier that no conservation programme, however good it might be designed, could be completely successful without public support. The latter could only come from well-informed citizens who were aware and committed. These would include all sections of the community from administrators, politicians and the private sectors right down to ordinary people in the streets and school children. This is a mammoth task; the DOE cannot do it alone. The efforts need to be synchronized to include not only the Federal and State Governments but also the private sectors, the media and the NGOs.

In terms of global issues, the greenhouse effect, climatic change and related issues are likely to receive greater attention particularly with respect to research. Malaysia's ratification of the Montreal Protocol and the Langkawi Declaration by the Commonwealth Heads of Government last year (1989) all add to the momentum towards greater international cooperation on this global concern.

## CONCLUDING REMARKS

This brief note highlights some of the major features of the current environmental situation in Malaysia and their outlook for the 1990s. Generally, the "mixed bag" situation is forecast for the 1990s although a great deal will also depend on the kinds of commitments to be made by the Government (both Federal and State) and the different sections of the community. The EIA and public education programmes on environment are rated as areas which have the highest potential for development. Finally, the issues on global warming due to greenhouse effects and related questions are expected to receive greater attention.

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