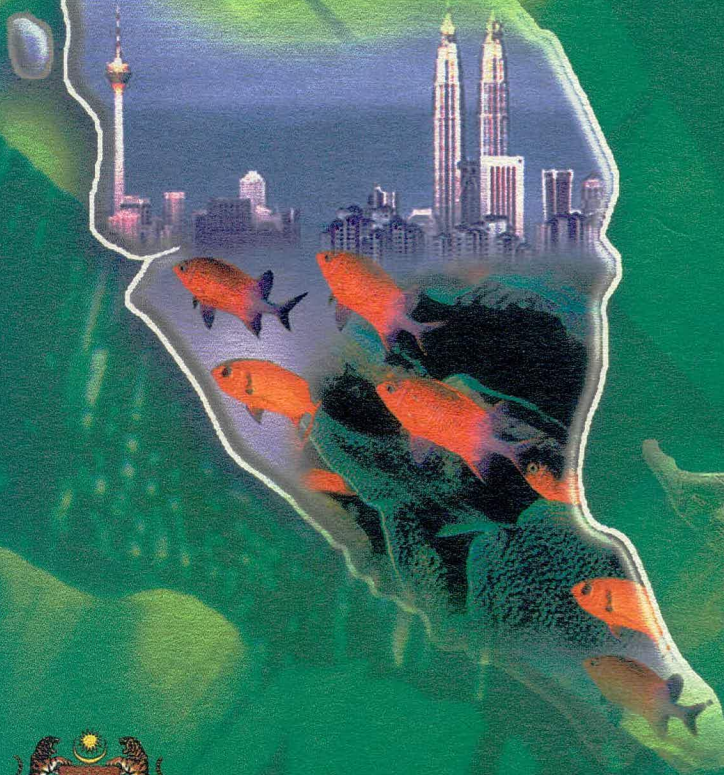


20 TAHUN

KECEMERLANGAN PENGURUSAN ALAM SEKITAR DI MALAYSIA (1975-1995)

20 YEARS ENVIRONMENTAL MANAGEMENT
EXCELLENCE IN MALAYSIA (1975-1995)



MALAYSIA



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This monograph consists of a compilation of views and
reflections on the environment in Malaysia between
1975-1995.

This book is printed on recycled paper.

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PRAKATA/FOREWORD

Saya begitu berbangga dan berbesar hati mendapat peluang ini untuk mengkuris mesej pendek bagi memperingati dua puluh tahun usaha Malaysia dalam pengurusan alam sekitar, terutama sekali dalam tempoh hampir sama penglibatan saya dalam bidang ini. Inilah masanya bagi mengimbaskan kejayaan dan juga pengajaran yang boleh diambil dua dekad berlalu.



Ianya telah menjadi polisi Kerajaan Malaysia bagi mengseimbangkan antara matlamat pembangunan sosio-ekonomik dan objektif alam sekitar yang mampan, sebagaimana yang telah digariskan dalam Rancangan Rancangan Lima Tahun Malaysia.

Di peringkat antarabangsa, Malaysia telah mendapat banyak penghargaan signifikan ke atas sumbangan alam sekitar tempatan dan global.

Kita telah memainkan peranan yang penting dalam merumus Deklarasi Langkawi mengenai Alam Sekitar pada tahun 1989, Deklarasi Kuala Lumpur mengenai Alam Sekitar dan Pembangunan pada tahun 1992 dan Pelan Tindakan Strategik ASEAN mengenai Alam Sekitar 1994-1998, menjadi beberapa detik bersejarah yang penting.

Dalam menuju ke alaf baru, Kerajaan akan terus menekankan kesedaran alam sekitar dalam agenda pembangunannya.

I am indeed proud and delighted to have this opportunity to pen a short message to commemorate twenty years of environmental management efforts in Malaysia, especially since my involvement in this field has also been as long. It is timely therefore to reflect on the achievements as well as lessons learnt over the past two decades.

It has always been the policy of the Government of Malaysia to strike a balance between the goals of socio-economic development on one hand and the objectives of environmental sustainability on the other, and this has been reflected in the Five Year Development Plans.

In the international arena, Malaysia, has also gained significant recognition for our environmental contributions both locally and globally.

We have played a pivotal role in the formulation of the Langkawi Declaration on the Environment in 1989, the Kuala Lumpur Declaration on Environment and Development in 1992 and the Asean Strategic Plan of Action on the Environment 1994-1998, to mention a few notable ones.

The Government will continue to emphasize environmental awareness in its development agenda as we approach the new millennium.

A large, stylized handwritten signature in black ink, appearing to read 'Law Hieng Ding'.

DATUK LAW HIENG DING
Menteri Sains, Teknologi Dan Alam Sekitar, Malaysia
Minister of Science, Technology And The Environment, Malaysia

PRAKATA/FOREWORD

Dalam konsep pembangunan mampan, kita bertanggungjawab melaksanakan pembangunan tanpa perlu mengorbankan sumber-sumber yang ada sama sekali. Sumber diterokai pada kadar dan dengan kaedah yang tidak memusnahkannya langsung; juga pada tahap pencemaran minimum.

Wawasan 2020 menghendaki tanah terus produktif, subur dan kaya dengan kepelbagaian alam, udara sentiasa bersih dan cerah dan air tidak tercemar. Untuk menyempurnakan tanggungjawab ini, Jabatan Alam Sekitar melaksanakan beberapa pendekatan pengurusan alam sekitar, sudah lebih dua dekad yang lalu; antaranya pencegahan dan kawalan pencemaran, input alam sekitar untuk perancangan dan pembangunan, penilaian kesan kepada alam sekeliling, pendidikan, latihan dan penyebaran maklumat alam sekitar.

Walaupun banyak ranjau-ranjau yang telah dilalui demi mengekalkan konsep pembangunan mampan, namun kita boleh berbangga dalam 20 tahun pengurusan alam sekitar, kita telah dapat meningkatkan kesedaran di kalangan orang ramai di negara ini betapa pentingnya alam sekitar kita dipulihara dan bahawa ianya adalah tanggungjawab kita bersama.

Saya amat berbangga dengan penerbitan buku Dua Dekad Kecemerlangan Pengurusan Alam Sekitar. Adalah diharapkan supaya buku ini akan dapat memberi gambaran ringkas kejayaan negara serta detik-detik bersejarah dalam pengurusan alam sekitar negara kita.

MALAYSIA BOLEH!

“ALAM SEKITAR BERKUALITI KE ALAF BARU”.



HAJAH ROSNANI IBRAHIM
Ketua Pengarah Alam Sekitar, Malaysia
Director General of Environment Malaysia



The concept of sustainable development implies a responsibility to carry out development without damaging at all the resources that sustain it in the first instance; such resources to be exploited at a pace and in a manner that is non-destructive thus ensuring minimum environmental degradation.

Vision 2020 envisages a land that will remain productive and fertile, rich in biodiversity, the atmosphere clear and clean and the water unpolluted. In fulfilling this responsibility over the past 2 decades, the Department of Environment has implemented various environmental management approaches which included, *inter alia*, prevention and pollution control, environmental impact assessment, education, training and dissemination of environmental information.

Though there have been many obstacles in promoting the concept of sustainable development, we nevertheless take pride that after 20 years of environmental management in the country, we have managed to raise public consciousness on the importance of environmental protection and that it is our collective responsibility to do so.

I am indeed proud to be associated with the publication of “20 Years Environmental Management Excellence in Malaysia”. It is hoped that this publication will depict our country’s environmental achievements and highlight the historical milestones of environmental management in our country.

MALAYSIA BOLEH!

“ALAM SEKITAR BERKUALITI KE ALAF BARU”.



DEPARTMENT OF ENVIRONMENT CONCEPTION, BIRTH AND MATURITY

By

Tan Sri Datuk Ong Kee Hui

Minister of Local Government & Environment (1974-1976)

Minister of Science, Technology & Environment (1976-1982)

A message from Tan Sri Datuk Ong Kee Hui, under whose Ministry - the Ministry of Local Government- the Department of Environment first took root. Pollution from oil slicks in the Straits of Malacca, the threat to our rivers from palm oil mill effluent and air pollution were some of the early problems tackled by the department.

In June 1972, the United Nations convened an International Conference on the Human Environment in Stockholm. As a signatory to the declaration made at the conclusion of the Conference, Malaysia started to carry out its commitments. An officer of the General Planning Unit, Encik Hamzah Majid, in the Prime Minister's Department was assigned to look after the subject. On 13th August 1973, after the sudden death of Tun Dr. Ismail, Deputy Prime Minister and Minister of Interior, Trade and Industry on 2nd August 1973, Tun Abdul Razak reorganised his Cabinet and appointed two Ministers with Special Functions, one of them, Mr. Michael Chen, having responsibility for the Centre for Nuclear Research and environmental matters.

A general election was held on August 24th 1974 and in the reorganised Cabinet of Tun Abdul Razak, I was sworn in as Minister of Local Government and Environment on 5th September 1974.

The groundwork for giving government the power to exercise control over the environment had been prepared by the General Planning Unit in the Prime Minister's Department. An Act of Parliament called the Environmental Quality Act was approved by Parliament, gazetted on 14th March and came into force on 15th April 1974.

When I was given the portfolio of environment in my Ministry of Local Government, Tun Abdul Razak told me that I could second or transfer from any department or agency of Government any officer who was needed to quickly set up this division of my Ministry.

First I had Encik Hamzah Majid transferred from the General Planning Unit in the Prime Minister's Department to the Environment Division of my Ministry and he was made Ketua Pengarah Alam Sekitar (Director-General of Environment) on 16th December 1974.

The appointment of Encik Hamzah Majid as Director-General of Environment on 16th December 1974 was very timely. At 5:40am on 6th January 1975, barely three weeks after his formal appointment, the Showa Maru, a 237,600 ton super oil tanker ran aground near Pulau Sabarok, about five miles off Singapore.

This accident occurred at the southern end of the Straits of Malacca and therefore posed a possible threat to our territorial waters in the Straits, as about a million gallons of oil had leaked from the ruptured tanks of the tanker, forming an oil slick of about one and a half miles wide. It was feared that the wind and tide might cause the slick to flow into the Straits of Malacca and its adjacent waters, thus polluting our sea, beaches and mangrove swamps, and damaging the ecosystem of our marine life, killing fishes, etc. and seriously affecting an important source of protein for our people.

Encik Hamzah Majid was able to initiate action immediately when the Showa Maru accident occurred. He got in touch with the Ministry of Foreign Affairs as the accident would affect the territorial waters of both Singapore and

Indonesia, then alerted the Malaysian Navy, the Marine Department and the Johor State Government. A close watch was kept over the oil spill, but fortunately, Malaysia did not sustain much damage.

Besides the threat of pollution by ships in the Straits of Malacca, we faced urgent river pollution problems from effluent discharged by palm oil mills in various parts of the country. The untreated oily sludge from these mills was either allowed to flow or was drained into some streams or rivers in the rural areas, and not only affected the water supply of kampungs but also killed the fish and other aquatic life in the rivers, thus depriving the people living there of an essential part of their food supply.

The Division of Environment was officially established in the Ministry of Local Government and Environment from 15th September 1975, and steps were taken to recruit staff. This however took longer than expected.

Mr. Goh Kiam Seng was transferred from the Drainage and Irrigation Department, as we needed someone with experience to deal with the pollution of our rivers.

Field inspection and assessment of the pollution problem posed by the palm oil mills indicated that the solution required treatment of the effluent from the palm oil mills. We had to find someone with the expertise to work out a new technology to treat the palm oil mill effluent before it was released into our rivers.

I came to know that the Dewan Bandaraya had a sewage treatment plant which dealt with sludge from septic tanks, nightsoil, etc. under the management of Mr. A. Maheswaran. Maheswaran was transferred to the Division of Environment on 23rd June 1976.

The Division of Environment set to work immediately and with the co-operation of the larger palm oil mills introduced a system of storage of the effluent in ponds into which the discharges from the mills were drained.

In the first pond anaerobic fermentation took place breaking down the oily part of the sludge and in a second pond, the sludge was aerated by pumps causing the breakdown through oxidation of the other components and sedimentation of the solid waste.

Through trial and error, the method of treatment was refined so that by the time the effluent was discharged from the final pond, the water was clean and one of the experts involved in the experiment offered to drink it to prove its quality!

To get the mills throughout the country to adopt the relevant technology, required the licensing of all palm oil mills and the imposition of certain conditions which must be complied with before the licences were issued.

The conditions were the installation of an acceptable system of control or treatment of effluent discharged from the mills so that the pollution did not exceed a bio-oxygen demand (B.O.D.) of the maximum limit stated in the licence (expressed in parts of pollutant per million parts of discharged effluent).

The allowable limit of pollution was achievable by most mills in the first year but became more and more stringent in the following years until the final allowable standard was achieved. On 1st January 1979 regulations pertaining to effluent discharged from industries other than

palm oil and rubber made under the Environmental Quality Act were gazetted and came into force on the same day.

The problem of pollution of the Straits of Malacca by ships passing through secretly discharging bilges or oily water proved more difficult to control. A far more serious cause for concern was the large number of ships passing through the narrow straits, some of which were supertankers carrying oil from the Middle East.

The danger of collision was ever present and in one such accident on 24th January 1976, the Diego Silang, a 100,748 ton oil tanker, collided with the 9455 ton Soviet freighter Vysotsk, then collided with an empty 300,000 ton supertanker Brazilian Faith, which was being towed from Penang to Singapore for repairs.

The Diego Silang was carrying a full load of crude oil from the Persian Gulf, and two of its tanks were ripped open and its bow damaged. The Malaysian Navy which was alerted turned out with several ships immediately to battle the oil slick.

The tanker was lying about 14 miles off Batu Pahat and a five mile long slick drifted to within 3-5 miles off the coast. The Malaysian Navy succeeded in sinking or dispersing most of the oil leaked, but as the Navy ships could not reach the shallow water, patches of slick were washed ashore northwest of the coast. Once more the Department was fortunately able with the help of the Navy, Marine Department, Airforce etc. to avert what could have been an disaster to our marine environment.

It however brought home to us how vulnerable and ill-equipped we were to deal with an accident of this nature. We lacked the essential equipment and personnel to cope with such an emergency. After the Diego Silang accident, steps were taken to introduce a traffic separation scheme in the Straits of Malacca to prevent the collision of ships.

Indonesia, Singapore and Malaysia had attempted since 1971 to jointly regulate navigation in the Straits for the sake of safety. Indonesia had offered the Straits of Lombok as a safer alternative route for supertankers, but it was not taken up by countries like Japan which preferred the shorter route through the Straits.

Certain safety measures such as avoiding night passage whenever possible, doubling the watch at night, slowing down to 10-12 knots, better training by using simulators for navigators, etc. were agreed upon particularly by Japan after the Showa Maru accident. As the Diego Silang accident occurred just over six months after the Showa Maru went aground off Singapore, the danger of an oil spill was ever present.

A Contingency Plan to deal with such an accident was worked out with all the agencies involved and some equipment necessary was purchased with money paid for the Diego Silang as compensation to enable the Department to be better able to cope with such a situation should it occur again.

An Environment Quality Council was appointed on 12th April 1977 with Tan Sri Hamzah Sendut as Chairman, with representatives of industries in the private sector, and various Government departments and agencies to advise the Minister on the implementation of the

Environmental Quality Act 1974. The Council was to act as a “watch dog” to protect the interests of both the community and industries.

Despite numerous Cabinet reshuffles, until my retirement as a Minister in April 1982, I was happy that I was able to retain the Environment as one of my portfolios. It was a challenging job but the continuity of my Ministry over the changes which were inevitable under three successive Prime Minister, enabled the Department of Environment to make steady progress despite the many constraints and opposition encountered.

Water pollution was, however, not the only urgent problem facing the Department of Environment. The attention of the department was also drawn to increasing air pollution problems, particularly in the urban areas, caused by rapid development and the increasing motor vehicular traffic especially in Kuala Lumpur and the Klang Valley.

Emission of smoke from factories, open burning of refuse, poorly maintained motor vehicles were the main factors responsible for the polluted air that manifested itself as a haze over Kuala Lumpur. As a result, the Clean Air Regulations 1978 under the Environment Quality Act was gazetted on 29th August 1978 and came into force on 1st October 1978.

Armed with all these regulations, the Department could only function effectively if it

had the required personnel to enforce them. Qualified staff with knowledge and experience of environmental science were recruited and by the time I retired as Minister of Science, Technology and Environment, the Department of Environment had matured and was elevated into a full fledged Department, and no longer merely a Division. Over the years the Department has grown in strength and stature. During my retirement, I have followed its successes and achievements with both pride and pleasure.

In recent years, the environment has attracted worldwide attention, and consequently the Department of Environment has often been called upon to assume not only a national role but regional and international roles as well.

Nationally, the problems faced by the department were more complex than those we ever faced in the past due to our rapid development. Some of our development have received criticisms and even opposition from within and from abroad and the department had more than its fair share of criticisms and ill-advised opposition. I am confident that under wise, competent leadership and its dedicated staff, the department will continue to play its vital role in safeguarding the environment of this country in the years to come.

In commemoration of 20 years of achievement and progress, I send you greetings, my heartiest congratulations and best wishes.



MANAGING OUR ENVIRONMENT

By

A. Maheswaran

Director, Water Pollution Control, DOE (1976-1983)

Director-General of Environment (1984-1987)

SINCE independence 38 years ago, Malaysia has progressed from a primarily rural society to a modern, progressive country. The fast pace of economic development has drawn heavily on Malaysia's resource base. The Government has tried to ensure a gradual transition from an exploitative resource-based economy to one that is more balanced.

Numerous heavy industries have emerged in the last two decades. The rapid development and structural changes of the economy brought in its wake several problems. One was the compelling need to manage the environment because Malaysia's economy would continue to be dependent on renewable resources. These resources are limited, fragile and in dire need of comprehensive protection.

A study of past projects indicated that many development projects had significant impacts on the natural environment. Development, therefore, cannot confer lasting benefit unless environmental considerations and related ecosystems become an integral part of development planning and decision making.

The rise in environmental costs of industrialization and urbanization led the Government to incorporate environmental considerations into planning and investment decisions. This was done by formulating appropriate policies and programmes to ensure that economic development would proceed hand in hand with sound management of the environment. A legislation in the form of the Environmental Quality Act was passed by Parliament in 1974 followed by the establishment of the Division of Environment (now the Department of Environment) to administer the Act.

ENVIRONMENTAL MANAGEMENT STRATEGY

The Department of Environment adopted a three-pronged strategy encompassing short-medium-and long-term measures designed to ensure that development projects avoided costly remedial measures at a later stage.

Short-term measures were adopted during the first decade of environmental management in Malaysia. They aimed at controlling the discharges and emissions from existing and new sources by implementing several comprehensive environmental legislations. Priority was given to containing and dealing with environmental problems that had accumulated over the years while developing strategies to forestall future problems.

Sustained environmental improvement efforts during the first decade helped overcome the most chronic sources of water pollution from agro-based industries, namely, palm oil and rubber industries which accounted for 90% of the pollution load.

Measures to curb pollution by these industries had a dramatic effect in restoring the quality of several rivers. These industries have since been making serious efforts to move on to the desirable target of "zero discharge".

To this end, research efforts have been stepped up to tap the ample potential for conversion of these wastes into useful by-products such as animal feed, fertilizer, as well as a source of energy. Other forms of pollution, including air and marine pollution, were controlled through enforcement of appropriate regulations.

During the first five years of the first decade, pollution control was the main activity which successfully dealt with the environmental problems at source. This achievement did not by any means represent the complete answer in tackling the whole gamut of environmental issues.

Malaysia has a Federal System of Government and the management of basic resources, such as land and water, remains very much within the powers of the State. Developmental activities have been carried out by a number of agencies with little or no co-ordination. This brought to the fore environmental problems of a different nature which were both vast and complex. The Environmental Quality Act, unfortunately, was not comprehensive enough to tackle these broad issues.

As a result, the medium-term strategy was aimed at incorporating an environmental component as an integral element in the medium term development planning process. In this regard, legislation containing suitable provisions for dealing with the environmental problems of development and enforcement had to be resorted to with the help of appropriate guidelines developed from time to time by the Department of Environment.

During the second five years of the first decade therefore, efforts of the Department of the Environment were concentrated on developing Federal-State co-operation in environmental management through the establishment of more regional offices. Efforts were also made to inculcate a greater understanding of the close relationship between development and environment.

The third strategy, which was a long-term measure, was to ensure that environmental quality including the quality of the physical environment and the quality of life of the people affected by the project, was taken into account in development. This would mean a development strategy which would include an integrated approach entailing advanced or forward planning in all environment-related activities.

In order to implement the above strategy, new concepts, improved techniques and approaches were formulated to meet the challenges of the second decade of environmental management. These included the following:

- Provision of a Chapter on Environment in the Fifth Malaysian Plan Document outlining the new environmental management strategy to be adopted incorporating the integrated development approach;
- Enlargement of the existing machinery for planning to incorporate environmental dimension in an integrated way into development planning through multi-sectoral and inter-departmental consultation, coordination and joint planning.
- Amendment of the Environmental Quality Act to improve its scope and effectiveness and include provisions requiring environmental impact assessment for all projects and activities prescribed by the Minister-in-charge of the Environment as having significant environmental impact;
- Establishment of Environmental Committees and development of environment

management capabilities at State level to enable definite commitment of State Governments towards an integrated development approach and joint enforcement action leading to environmental management becoming an integral part of economic development;

- Restructuring of the existing organisation of the Department of Environment to facilitate the smooth implementation of the new environmental management strategy;
- Environmental training of personnel involved in decision-making on projects, programmes, policies and plans with emphasis on cause and effect relationship which exists between an individual's environment and his health;
- Development of an action plan to enhance environmental awareness of target groups and to introduce a stronger general environmental theme into school and university syllabi;
- Development of a comprehensive environmental information system to facilitate decision-making; and
- Technical training for staff engaged directly in the work of the Department of Environment and in environment programmes of other agencies.

It was indeed heartening to note that the Department of Environment successfully implemented the above during the second decade of environmental management which is evident from the following:

- The activities of the Department focussed increasingly on pollution prevention than on curative measures. This was clearly seen in the number of projects screened under the mandatory environmental impact assessment (EIA) procedure; environmental inputs provided to landuse planning, natural resources development projects, regional, structural and other master plans; advisory services provided at MIDA; presiting evaluation of projects; and the development of the "Directory of Environmentally Sensitive Areas in Malaysia."

It is heartening to note that these efforts seem to have paid off. But many more challenges await us in the decades to come.

CHALLENGES AHEAD

For the future, Malaysia has to take a serious look at its resource limitations, especially renewable resources, and tailor development efforts accordingly.

This does not imply sacrificing development itself. Instead patterns of resource development and use have to be restructured by adopting policies which are innovative and imaginative, and which treat the environment as an important parameter.

Further, since the development of natural resources will be a continuing process in Malaysia, it must be accompanied by conscious efforts to guide these environmental changes so that there is sustained economic growth. This task must be carried out through a proper long-term management of the resources by maintaining an equilibrium between the modes of resources and the rising needs.

In this regard, a more expedient approach used by Malaysia has been to adopt the environmental impact assessment (EIA) process by which individual projects are carefully examined for environmental implications. The EIA requirement has indeed been the most powerful tool used by Malaysia for influencing development decisions.

The EIA process concentrates on individual projects, although occasional attempts have been made to conduct EIAs for overall development programmes. The EIA process could not be expected to pay adequate attention to regional environmental needs. Past experience has shown that despite the use of environmental impact assessments and other techniques, major economic development projects have caused unacceptable environmental degradation.

Detailed environmental investigation is usually only possible at the appraisal stage, often in conjunction with a feasibility study. Quite commonly, the environmental specialist is given inadequate time to prepare an EIA for a multi-million dollar project. Thus the environmental input is too little or too late and by that time such a project would have been included in the national development plan and/or annual budget and it becomes difficult to prevent the project from proceeding.

Therefore the challenge ahead for the Department of Environment in the coming decades is the adoption of a better planning technique known as the Economic-cum-Environmental (E-c-E) planning. When development planning is done on this basis, the role of the EIA can be limited to local environmental effects but the EIA process is no substitute for proper regional planning.

The objectives of integrated economic-cum-environmental planning is to prepare “good plans” which direct wise investment decisions, thus contributing to sustainable development. A good plan is one which enables economic, social, natural resource and environmental objectives to be satisfied and identifies development projects which are consistent with and facilitate the stated objectives and strategies.

In the next decade, the DOE must address the question of technology development. There is growing evidence in Malaysia of the efforts by industry to shift from the conventional pollution - control approach to pollution - prevention approach. This means eliminating the causes of pollution before spending money and resources to clean up afterwards.

It also means learning to create valuable resources from pollutants. The advantages are evident as one considers the natural resources, manpower and money consumed to build a pollution control facility and more to operate the facility on a continuing basis.

Resolute steps must be taken by industries to minimize the amount of waste that originate in the industrial process through such proper in-plant measures as:

- Modification or replacement of raw material input and production processes;
- Segregation of strong waste streams;
- In-plant recirculation of water;
- Changing product output.

This should be followed by measures to limit the entry of certain waste materials or waste contaminants into the effluent streams, especially those waste materials that are difficult

or expensive to remove or treat once they have become part of the final waste streams.

The next step should be to reduce wastes generation through materials recovery and recycling, by-product production, waste utilization and effluent re-use.

In this regard, DOE should direct its research and development efforts towards this area. At the same time it should formulate appropriate regulations to compel industries to adopt the above steps, in their own interest, as has been successfully done in the palm oil industry.







INTELLECTUAL REORIENTATION FOR SUSTAINABLE DEVELOPMENT

Speech by
Tan Sri Razali Ismail
Malaysia's Permanent Representative to the United Nations
at
CETDEM's 10th Anniversary Dinner, 29 July 1995

MALAYSIA is probably one of the few countries in the world that has actively tried to balance environmental conservation with economic development. This has not been easy given the fact that we are a nation struggling with issues of managing change while ensuring a fair and equitable distribution of the nation's wealth.

Our greatest strength has been our willingness to be transparent in our approach to environmental management and self-critical of our standards and practices. (Here Tan Sri Razali Ismail argues for the establishment of a policy framework that closely weaves environmental consideration into every aspect of development.)

"Intellectual reorientation" appears to be the essential thrust of the Seminar that just ended. I would like to argue that there needs to be orientation first and a lot more intellectual input! One can ask the question whether there already exists a comprehensive development policy to reorientate from.

One could argue that Federal and State government, public and private sectors all appear to be in need of integrated, long-term policies on natural resource management, urban and transport policy, energy policy, pollution and waste control, and possibly, social policy. However this argument takes us into the unclear and at times painful relationship between Federal and State jurisdiction over land, etc.

It strikes me as rather ironic that Malaysia has voiced overseas our concerns for balancing the needs of development with the environment at Rio and all the UNCED spin-offs, and yet

Agenda 21 is unknown to the majority of government departments, has not been translated into Bahasa and is not available in bookshops.

It is not certain whether Agenda 21 has had any role in local, state or federal planning albeit as merely a moral blueprint for sustainable development. At the very least, Agenda 21 should be a part of the national school curriculum.

The Malaysian economy has made great strides over the last eight years, and the rewards of economic development have clearly benefitted most sectors of Malaysian society. However, we may ask ourselves whether the results of such rapid economic growth are cause for both celebration and concern. While poverty has been eradicated dramatically, can we say that the state of health care in marginal sectors of society, such as the orang asli and plantation workers, has also significantly improved.

Some development projects have also been implemented with such haste that many sectors of Malaysian government and civil society are beginning to question the direction and costs of uncontrolled development. The recent landslide in Genting Highlands, the power failure in Penang and manifestations of certain social tendencies amongst Malaysian youth are a few examples that illustrate the critical need to factor environmental and social sustainability into the modelling and implementation of development policies in Malaysia. We have to match social and environmental concerns with sustainable and concrete actions if we are not to be accused of merely paying lip-service.

“Sustainable development” was initially defined by the Brundtland Commission, whose findings led to the Earth Summit in 1992. By this definition, human society must learn “to meet the needs of the current generation without jeopardising the ability of future generation to meet theirs”. While this has set Government and international institutions a lofty goal, it does not suggest how that goal can be accomplished.

Since Rio, there have been many discussions about the need to develop sustainable patterns of consumption and production, and to align social and economic development more closely with principles of sustainable development. Inevitably the debates remain dead-locked over the relationship between “sustained economic growth” and “sustainable development”.

At international conferences, topics such as a code of conduct for transnational corporations are proposed, but eventually deleted, as are attempts to overhaul the system of structural adjustment and the more destructive aspects and practices of the international financial institutions. At the same time, the aim of increasing global trade, deregulation and market liberalisation is reaffirmed and prioritised, despite acknowledgement of the negative impacts of globalisation.

Unfortunately, there has not been a parallel recognition of the need to build and protect sustainable communities and environment as a national or international priority, equal to that of expanding trade and promoting deregulation. While many innovative ideas and programmes aimed at achieving people-centred development are proposed and sometimes implemented, the long-term success of these efforts is ultimately

threatened by the inability of governments to move beyond short-term thinking and values.

Malaysia, as a newly industrialised country with growing economic and political influence in the region, and as an advocate of South-South assistance, has the capacity and resources to design and implement a model of development sensitive to the needs and cultural values of developing countries. Economic growth is a part of development, but it cannot be a goal in itself; it cannot go on indefinitely.

The goal of sustainable development requires a reconceptualisation of principles by which industrial society has been organised. Tenets such as continuing economic growth (the orthodox GDP/GNP indices), efficiency, productivity and standard of living in predominantly material terms, need to be reassessed in the light of natural resource depletion, growing contamination of the environment, and terrible socio-economic problems. Unsustainable patterns of consumption and linear growth models of production damage the environment.

Economic development should not be at the expense of other groups or later generations. Environmental sustainability, social equity and a culture that allows for the fulfilment of human needs must replace the culture of materialism. Modern consumer society is rooted in an economic system that requires increasing consumption so that production and profits can keep rising.

Advertising has moved almost completely away from product information to the hard sell of one value: to buy and consume more. Malaysian

consumption patterns are rapidly catching up with those of developed countries, a pattern already acknowledged to be unsustainable and destructive to the environment and to the fabric of society.

To counter the consumer culture, people need to regard reducing consumption not as a sacrifice, but as a substitution for the intangible factors that enhance quality of life, such as friendship, good family relations, community spirit and a harmonious relationship with the environment.

In order to re-orientate our development priorities so that they encompass environmental and social sustainability, many more sectors of Malaysian society should be invited to contribute to and participate in the planning, approval, implementation and monitoring of development projects, on equal terms.

The private and business sectors are not the only major stakeholders in the development equation. Instead, public participation should be encouraged and a diversity of opinions sought. Sustainable development, to be successful, requires the gradual and broad-based development of a culture of transparency, accountability and collective social responsibility.

In order to integrate environmental considerations into development policies, a national programme or body with the participation of all major stakeholders should be established to identify and prevent problems before they arise. Such a programme should be adaptive, continually redirecting its course in response to experience and to new needs.

This would require expertise and institutions capable of an integrated, cross-sectoral approach to policy making. It would also require strengthening our knowledge base about the socio-economic and environmental impacts of current and future economic activity by developing research capacities and establishing a comprehensive monitoring system. As a start, more resources should be invested and priority given to the implementation and enforcement of existing laws that safeguard the environment, human health and safety.

Economic growth and development need not be at the expense of the environment, and neither should it exclude the participation of affected communities. Policies that build sustainability into the structure of business, industry and commerce can be adopted without sacrificing large losses of profit, at least in the medium to long term. For example, it is well known that cleaning up or ameliorating the effects of environmental damage generally costs 10 to 100 times more than preventing it in the first place.

At the same time, it is essential that a culture of corporate and shareholder responsibility is encouraged. Corporations that are committed to the environment and sustainability could adopt standards of best practice and statements of ethics and good conduct. In addition, consumers have a right to expect that corporations will conduct all their operations (including all stages of the production, distribution and marketing process) in such a way that the interest of the consumer of the end product is considered at every stage.

Consumers also have the right to expect that all goods produced, distributed and marketed by corporations are done in such a manner that causes the least damage to the environment, both directly and indirectly.

Perhaps it is time that Malaysia considers developing a comprehensive system of environmental law based on the Precautionary Principle, that safeguards human safety and health, the interests of future generations and the productivity and diversity of natural resources. Economic incentives could also be used to achieve environmental sustainability through the “Polluter Pays” and “User Pays” principles. Finally, we should acknowledge that many environmentally and socially sound technologies already exist in the South and in Malaysia, and that “modern” technologies need to undergo more rigorous assessment.

In agriculture, water management, forest conservation, health care and housing (to name a few), time tested and effective technologies have evolved in indigenous communities in the South. Modernisation and commercialisation continue to destroy these technologies and the knowledge associated with them.

The often unquestioning acceptance of the Northern commercial sector’s modern technologies, from the nuclear and chemical revolution to the new biotechnologies, is responsible for even greater environmental and health hazards.

The search for “environmentally-sound” technologies in the post-UNCED period must therefore be a cautious one, without the public and government being misled into accepting repackaged, obsolete, dangerous or untested technologies. It is crucial that we begin to search for, and acknowledge the heritage of knowledge and experience in our respective societies, in our evolution towards genuinely appropriate technologies which contribute towards sustainability.

In short, an intellectual re-orientation needs a carefully reconstructed vision based on principles of environmental and social sustainability, equity and public participation which allows society to meet its physical, social, economic, political and cultural needs in a way that improves their security and quality of life, while maintaining and protecting the natural wealth and carrying capacity of the ecosystems upon which our survival and prosperity depend.





TRACKING THE COURSE OF ENVIRONMENTAL MANAGEMENT (1975-1995)

By

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SINCE achieving independence in 1957, Malaysia has seen remarkable improvement in its socio-economic development. From a principally agriculture-based economy in the fifties, it has diversified significantly and manufactured products now account for more than 60 percent of its exports. The quality of the environment was affected and mitigating measures were systematically put in place to balance development and conservation.

In the early days of abundant resources and negligible developmental pressures, little attention was paid to environmental issues, although some environmentally-related legislations pertaining to sectoral activities were in existence.

It was only in the mid-seventies, with the enactment of the Environmental Quality Act in 1974, and the subsequent formation of a regulatory agency, presently known as the Department of Environment under the Ministry of Science, Technology and the Environment, that environmental management in Malaysia took on a firmer footing.

ENVIRONMENTAL POLICY OBJECTIVES

Malaysia's overall environmental policy objectives since the Third Malaysia Plan (1976-1980) have been to '... balance the goals for socio-economic development and the need to bring the benefits of development to a wide spectrum of the population... against the maintenance of sound environmental conditions'.

In addition, the National Development Policy of the Second Outline Perspective Plan (1991-2000) categorically states that "adequate attention will be given to the protection of the

environment and ecology so as to maintain the long-term sustainability of the country's development".

Malaysia's Vision 2020 explicitly stated that in the pursuit of economic development, Malaysia will also "ensure that her invaluable natural resources are not wasted; the land remains productive and fertile; the atmosphere clear and clean; the water unpolluted; the forest resources capable of regeneration, able to yield the needs of the national development; the beauty of the land must not be desecrated for its own sake and for its economic advancement."

The underlying principles that harmonise economic development goals with environmental imperatives, are inter-related and mutually supporting. They are:

- Stewardship of the Environment.
- Conservation of Nature's Vitality and Diversity.
- Continuous Improvement in the Quality of the Environment.
- Sustainable use of natural resources.
- Integrated decision-making.
- Role of the private sector.
- Commitment and accountability.
- Participation in the community of nations.

ENVIRONMENTAL LAWS AND REGULATIONS

The principal strategies embodied in the Environmental Quality Act, 1974 are prevention, abatement and control of pollution and enhancement of environmental quality and purposes connected therewith. In addition, sector-based environmental regulations have been promulgated to deal with specific environmental issues.

CONTROL OF AGRO-BASED WATER POLLUTION

- Environmental Quality (Licensing) Regulations, 1977.
- Environmental Quality (Prescribed Premises) (Crude Palm Oil) Regulations, 1977.
- Environmental Quality (Prescribed Premises) (Raw Natural Rubber) Regulations, 1978.

CONTROL OF SEWAGE AND INDUSTRIAL WASTE WATER POLLUTION

- Environmental Quality (Sewage and Industrial Effluents) Regulations, 1979.
- Environmental Quality (Prohibition on the Use of Control Substance in Soap, Synthetic Detergent and Other Cleaning Agents) Order, 1995.

CONTROL OF INDUSTRIAL EMISSIONS

- Environmental Quality (Clean Air) Regulations, 1978.
- Environmental Quality (Compounding of Offences) Rules, 1978.

CONTROL OF MOTOR VEHICLE EMISSIONS

- Motor Vehicles (Control of Smoke and Gas Emission) Rules, 1977; made under the Road Traffic Ordinance 1958.
- Environmental Quality (Control of Lead Concentration in Motor Gasoline). Regulations, 1985
- Environmental Quality (Motor Vehicles Noise) Regulations, 1987.

CONTROL OF TOXIC & HAZARDOUS WASTE

- Environmental Quality (Scheduled Wastes) Regulations, 1989.
- Environmental Quality (Prescribed Premises) (Scheduled Wastes Treatment and Disposal Facilities) Order, 1989.
- Environmental Quality (Prescribed Premises) (Scheduled Wastes Treatment and Disposal Facilities) Regulations, 1989.

CONTROL OF MARINE POLLUTION

- Environmental Quality (Delegation of Powers on Marine Pollution Control) Order, 1993.

ENVIRONMENTAL ASSESSMENT

- Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order, 1987.

CONTROL OF SUBSTANCES THAT DEplete THE OZONE LAYER

- Environmental Quality (Prohibition on the use of Chlorofluorocarbon and Other Gases as Propellants and Blowing Agents) Order, 1993.

ASSOCIATED REGULATIONS

- Custom Duties (Amendment) (No. 35) Order, 1989 (made under the Customs Act 1967).
- Promotion of Investments (Promoted Activities and Products) (Amendment) (No. 10) Order, 1990 (made under the Promotion of Investment Act 1986).
- Customs (Prohibition of Import) (Amendment) (No. 2) Order, 1993.
- Customs (Prohibition of Export) (Amendment) (No. 3) Order, 1993.

- ❑ Sarawak Natural Resources and Environmental (Amendment) Ordinance, 1994.

ENVIRONMENTAL GUIDELINES

While effective enforcement was a requisite to ensure compliance with regulatory provisions and standards, other non-statutory measures were also essential to complement the legal framework as well as to provide the necessary environmental inputs for resource and development planning at Federal, State and Local Government levels. These measures are in the form of Environmental Guidelines and Codes of Practices.

EIA GUIDELINES

- ❑ A Handbook of EIA Guidelines, 1987 (revised 1995).
- ❑ Coastal Resort and Recreational Projects, 1994.
- ❑ Industrial Estate Development, 1994.
- ❑ Petrochemical Industries, 1994.
- ❑ Golf Course Development, 1994.
- ❑ Groundwater and/or Surface Water Supply, 1995.
- ❑ Drainage and/or Irrigation Projects, 1995.
- ❑ Dams and/or Reservoirs Projects, 1995.
- ❑ Thermal Generation and/or Transmission Projects, 1995.
- ❑ Fishing Harbours and/or Land-Based Aquaculture Projects, 1995.
- ❑ Industrial Projects, 1995.
- ❑ Toxic and Hazardous Waste Treatment and Disposal Projects, 1995.

- ❑ Development of Tourist and Recreational Facilities on Islands in Marine Parks, 1995.
- ❑ Development of Tourist and Recreational Facilities in National Parks, 1995.
- ❑ Development of Resort and Hotel Facilities in Hill Stations, 1995.
- ❑ Mines and Quarries, 1995.
- ❑ Municipal Solid Waste and Sewage Treatment and Disposal Projects, 1995.

LAND/INDUSTRIAL DEVELOPMENT GUIDELINES

- ❑ Siting and Zoning of Industries, 1976 (revised 1994).
- ❑ Prevention and Control of Soil Erosion and Siltation, 1978.
- ❑ Environmental Requirements: A Guide for Investors (1989); (revised 1992; 1994).
- ❑ Interim Guidelines for Controlled Burning of Felled Plant Materials and Combustible Solid Wastes from the Housing Industry in the Klang Valley, 1991.
- ❑ Code of Practice for Service Stations, 1980 (revised 1993).

OZONE-DEPLETING SUBSTANCES GUIDELINES

- ❑ Control Measures for Protection of Ozone Layer, 1994.
- ❑ Project Preparation under the Multilateral Fund, 1995.
- ❑ Prequalifying and Selection Criteria for Acceptable Alternatives of Ozone Depleting Substances in Malaysia, 1995.

WASTE MANAGEMENT GUIDELINES

- Air Pollution Control Measures in Palm Oil Mills, 1977.
- Erection of Fuel Burning Equipment, 1981.
- The Selection of Landfill Sites for Scheduled Wastes, 1985.
- Monitoring of Landfills for Scheduled Wastes, 1985.
- Scheduled Wastes Sampling, 1985.
- Recommended Code of Practice for the Disposal of Solid Waste on Land, 1985.
- Disposal of Asbestos Wastes, 1991 (revised 1995).
- Export of Scheduled Wastes, 1993.
- Storage of Scheduled Wastes, 1993.
- Interim Guidelines for the Transportation of Dangerous Goods (Chemicals Not Otherwise Controlled) 1993.
- Import of Scheduled Wastes, 1994.
- Zero Burning of Felled Plant Materials, 1994.
- Open Burning of Felled Plant Materials (Agricultural Wastes), 1981 (revised 1994).
- Management and Disposal of Wastes from Downstream Petroleum Industries, 1994.
- Management and Disposals of Wastes from Upstream Petroleum Industries, 1994.
- Notification and Control Procedure for Movement of Wastes between Singapore and Malaysia, 1995.
- Guidelines on the export, import and storage of scheduled wastes in Malaysia (CD ROM), 1995.

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

Since April 1988, environmental impact assessment became a mandatory requirement by virtue of an amendment to the 1974 Environmental Quality Act. The EIA Procedure requires proponents of 19 categories of projects, otherwise known as 'prescribed activities', to submit EIA Reports for approval by the Director-General of Environmental Quality Malaysia before project implementation.

The EIA process is designed to identify, predict, evaluate and communicate information about the potential impacts on the environment of a proposed activity. This is to optimise the total benefits of development by giving due consideration to the environmental aspects of an activity. It is essentially a planning tool and when integrated into the existing planning and decision-making machinery, provides additional information for better decision-making.

OTHER MAJOR PROGRAMMES

- Environmental Monitoring for water, marine and air quality.
- Promotion of Environmental Education and Awareness.
- Publication and dissemination of Environmental Information.
- Environmental Training.
- Environmental Research and Development.
- Oil Pollution Response and Preparedness.

CO-OPERATION & CO-ORDINATION

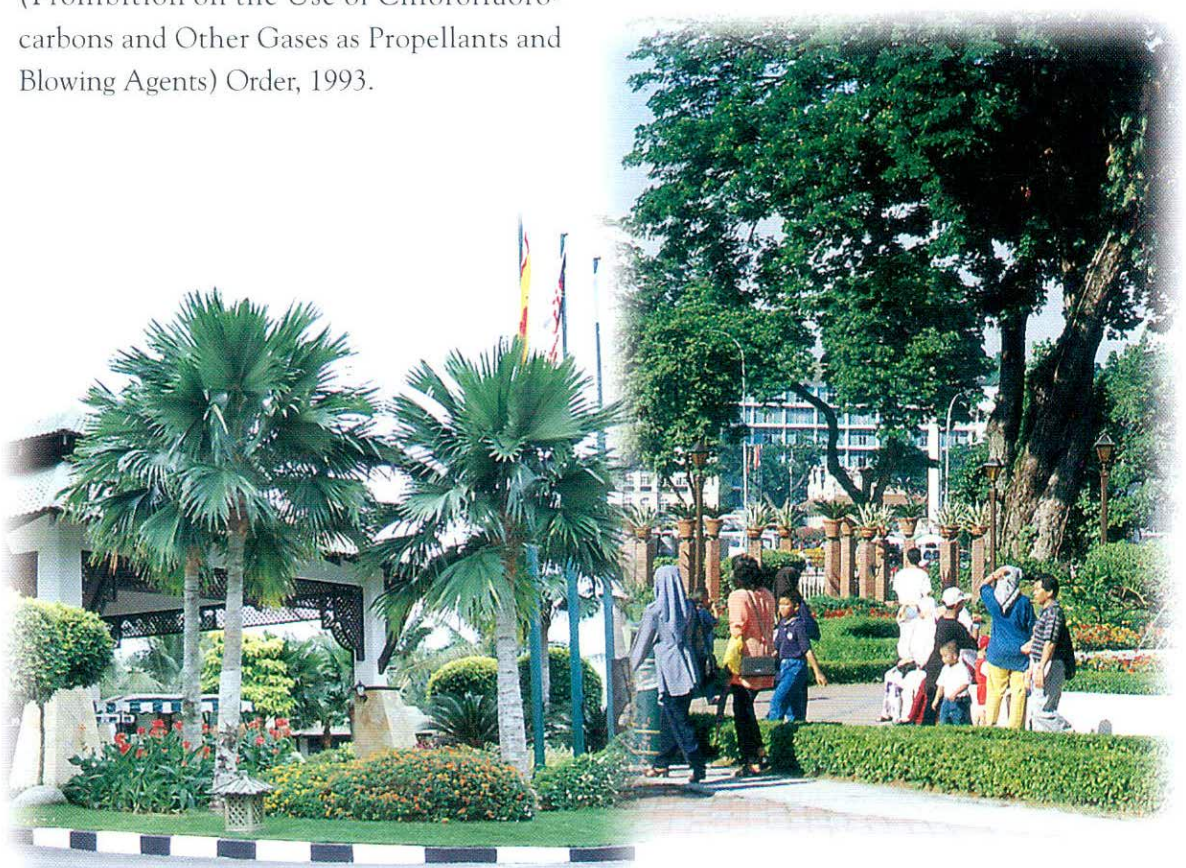
- Inter-agency and Federal-State Co-operation
 - Federal-State Liaison Committee.
 - Federal Heads of Department Meetings.
- Malaysia Incorporated: Public & Private Sector Consultations
 - Environmental Quality Council.
 - Environmental Non-Governmental Organisations.
- Federal/State/Local Authority Programme Co-ordination
 - Meetings of Ministers and State Executive Councillors Responsible for the Environment (MEXCOE).
 - State Environment Action Committees.
 - Local Authority Environment Committees.
- Bilateral Co-operation
 - Malaysia-Singapore Joint Committee on the Environment.
 - Malaysia-Indonesia Joint Committee on the Environment.
 - Malaysia-Thailand Joint Committee on Science, Technology and the Environment.
 - Malaysia-Brunei Co-operation on Standard Operating Procedure for Oil Spill Combat.
 - Malaysia-Japan Co-operation on Environmental Training.
 - Malaysia-Germany Technical Co-operation on Specific Environmental Projects.
 - Malaysia-Australia Co-operation on Specific Environment Projects.
 - Malaysia-New Zealand Co-operation on EIA Training.
 - Malaysia-Vietnam Joint Committee on Scientific, Technological and Environment Co-operation.
 - Malaysia-Denmark Co-operative Programme on Environment and Development (DANCED).
 - Malaysia-Canada Co-operative Programme on Environment.
 - Malaysia-US Environmental Improvement Projects.
- Regional Co-operation
 - ASEAN Ministerial Meeting on the Environment (AMME).
 - ASEAN Senior Officials on the Environment (ASOEN).
 - ASEAN Working Groups on
 - Environmental Management.
 - Environmental Economics.
 - Environmental Information, Public Awareness and Education.
 - Nature Conservation.
 - ASEAN Seas and Marine Environment.
 - Transboundary Pollution.
 - Revolving Fund Committee on the Safety of Navigation and Control of Oil Pollution in the Straits of Malacca and Singapore (RFC).
 - UNEP Action Plan on the Seas of East Asia (COBSEA).
 - IMO/GEF/UNDP Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas.
 - ASEAN Strategic Plan of Action on the Environment.
- International Co-operation
 - International Convention on Civil Liability for Oil Pollution Damage, 1969.
 - International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971.
 - UN Conference on the Human Environment, 1972.

- Vienna Convention on the Protection of Ozone Layer, 1985 and Montreal Protocol on Substances that Deplete the Ozone Layer 1987.
 - Commonwealth Heads of Government Meeting (CHOGM).
 - Langkawi Declaration on the Environment, 1989.
 - Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, 1989.
 - London Amendment to the Montreal Protocol on substances that deplete the Ozone Layer, 1990.
 - United Nations Conference on Environment and Development 1992.
 - Framework Convention on Climate Change; 1992.
 - Copenhagen Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, 1992.
- 21 October 1977
Gazettement of Environment Quality (Prescribed Premises) (Crude Palm Oil) Regulations, 1977.
 - 23 November 1978
Gazettement of Environment Quality (Prescribed Premises) (Raw Natural Rubber) Regulations, 1978.
 - 1 January 1979
Gazettement of Environment Quality (Sewage and Industrial Effluents) Regulations, 1978.
 - 28 May 1982
Gazettement of Environmental Quality (Prescribed Premises) (Crude Palm Oil) (Amendment) Regulations, 1982.
 - 1 September 1983
Division of Environment upgraded to Department status under the Ministry of Science, Technology and the Environment.

ENVIRONMENTAL MILESTONES

- 14 March 1974
Environmental Quality Act (Act 127) gazetted.
- 15 September 1975
Establishment of Division of Environment under Ministry of Local Government and Environment.
- March 1976
Division of Environment placed under the Ministry of Science, Technology & the Environment.
- 23 June 1976
Implementation of Oil Spill Contingency Plan for Straits of Malacca.
- 12 April 1977
Establishment of Environmental Quality Council (EQC) and First Meeting of EQC.
- 9 January 1986
Gazettement of Environmental Quality (Amendment) Act, 1985.
- 11 July 1986
Gazettement of Environmental Quality (Control of Lead Concentration in Motor Gasoline) Regulations, 1986.
- 16 July 1987
Gazettement of Environmental Quality (Motor Vehicle Noise) Regulations, 1987.
- 1 April 1987
Gazettement of Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order, 1987.
- 26 April 1989
First meeting of the Parties to the Vienna Convention for the Protection of Ozone Layer at Helsinki.

- 1 May 1989
Gazettement of Environmental Quality (Prescribed Premises) (Scheduled Wastes Treatment and Disposal Facilities) Regulations 1989.
- 19 June 1989
First Meeting of ASEAN Senior Officials on the Environment (ASEON).
- 21 October 1989
Signing of Langkawi Declaration on Environment and Development by Commonwealth Heads of Government.
- 4 June 1992
United Nations Conference on Environment & Development at Rio de Janeiro (Earth Summit).
- 25 October 1993
Gazettement of Environmental Quality (Prohibition on the Use of Chlorofluorocarbons and Other Gases as Propellants and Blowing Agents) Order, 1993.
- 6 August 1994
Launching of Library Computerization System "Columbia Library System".
- 18 December 1994
Gazettement of Environmental Quality (Delegation of Powers on Marine Pollution Control) Order, 1994.
- 8 April 1995
Gazettement of Environmental Quality (Prohibition on the Use of Controlled Substance in Soap, Detergent and Other Cleaning Agents) Order, 1995.
- 20 June 1995
DOE's 20th Anniversary Celebration.



PENILAIAN KESAN KEPADA ALAM SEKELILING

Oleh

Kalsom Abdul Ghani

Pegawai Kawalan Alam Sekitar (1981-1995)

Ketua Penolong Pengarah (sejak 1995)

Mashitah Darus

Pegawai Kawalan Alam Sekitar (sejak 1992)

Jabatan Alam Sekitar, Ibu Pejabat

SEJARAH PEMBENTUKAN PENILAIAN KESAN KEPADA ALAM SEKITAR (EIA)

“DALAM usaha menilai semua projek-projek yang berkaitan, penilaian kesan keseluruhan projek-projek ini ke atas alam sekitar akan juga dilakukan. Sebelum memulakan pelaksanaan projek-projek tersebut, Kementerian-Kementerian dan Jabatan-Jabatan serta sektor swasta akan dikehendaki menunjukkan kesemua kesan-kesan yang mungkin timbul ke atas alam sekitar dan juga cara bagaimana kesan-kesan tersebut boleh diatasi. Penilaian-penilaian ini akan diberi pertimbangan dalam pembentukan akhir projek-projek tersebut dan pelaksanaan seterusnya. Walau bagaimanapun perhatian akan diambil supaya langkah-langkah perlindungan alam sekitar akan sentiasa seimbang dengan kos-kos pembangunan”. RMK (1976-1980)

Seterusnya, Bahagian Alam Sekitar di bawah Kementerian Sains, Teknologi dan Alam Sekitar menubuhkan panel ad hoc yang dianggotai oleh 16 ahli dari agensi-agensi berkaitan bagi tujuan pembentukan prosedur EIA.

Pada bulan April 1978, panel ad hoc tersebut mengemukakan cadangan prosedur EIA kepada Jawatankuasa Perancangan Pembangunan Negara (JPPN) dan telah diterima pada dasarnya. Cadangan prosedur ini juga dikemukakan kepada Jawatankuasa Kabinet bagi Pelaburan.

Selanjutnya, Bahagian Alam Sekitar mendapat khidmat jururunding dari New Zealand (biayaan Colombo Plan) untuk jangkamasa satu tahun bagi membantu menyediakan garis panduan prosedur EIA. Draf buku garis panduan, “Environmental Impact Assessment Handbook: Procedure and Guidelines” disediakan dan

disokong pada dasarnya oleh Majlis Kualiti Alam Sekeliling. Perkara dasar yang diutarakan ialah Prosedur EIA diintegrasikan dalam prosedur perancangan dan kelulusan projek yang sedia ada.

Pada tahun 1985, peruntukan yang menjadikan EIA satu keperluan undang-undang disediakan. Parlimen meluluskan pindaan kepada Akta Kualiti Alam Sekeliling 1974, dengan peruntukan-peruntukan baru termasuk Seksyen 34A yang menjadikan kajian EIA mandatori bagi aktiviti-aktiviti yang ditetapkan.

Pada 9 Januari 1986, Akta Kualiti Alam Sekeliling (Pindaan) 1985 diwartakan. Menteri Sains, Teknologi dan Alam Sekitar diberi kuasa untuk menetapkan aktiviti-aktiviti yang dijangka menimbulkan kesan ketara ke atas alam sekitar sebagai “Aktiviti Yang Ditetapkan” (Seksyen 34(1)).

Dengan peng wartaan berkenaan, usaha menyediakan senarai aktiviti-aktiviti yang ditetapkan dimulakan dan input diperolehi daripada agensi-agensi berkaitan. Pada masa yang sama, draf Buku Garispanduan “EIA Handbook Procedure & Guidelines” dikemaskini dan maklumat berkaitan pelaksanaan prosedur EIA seperti senarai panel pengulas, buku-buku rujukan, jururunding EIA dan kawasan-kawasan sensitif alam sekitar dikumpul.

Senarai aktiviti-aktiviti yang ditetapkan yang dikemukakan kepada Majlis Kualiti Alam Sekeliling pada 3 Mac 1987 dipersetujui dan seterusnya Perintah Kualiti Alam Sekeliling (Aktiviti Yang Ditetapkan) (Penilaian Kesan Kepada Alam Sekeliling) 1987 diwartakan pada 5 November 1987. Perintah ini menyenaraikan

19 kategori utama aktiviti-aktiviti yang ditetapkan dan tertakluk kepada EIA.

Pada 30 November 1987 YB Menteri Sains, Teknologi dan Alam Sekitar ketika itu, Datuk Amar Stephen KT Yong melancarkan Buku Garis panduan “A Handbook of EIA Guidelines”. Untuk memperkenalkan konsep EIA dan prosedur yang perlu diikuti, beberapa siri seminar dan bengkel diadakan untuk pihak swasta dan agensi-agensi Kerajaan yang berkaitan. Pada 1 April 1988, Seksyen 34A dikuatkuasakan bagi aktiviti-aktiviti yang disenaraikan dalam Perintah EIA.

KEMAJUAN PELAKSANAAN EIA

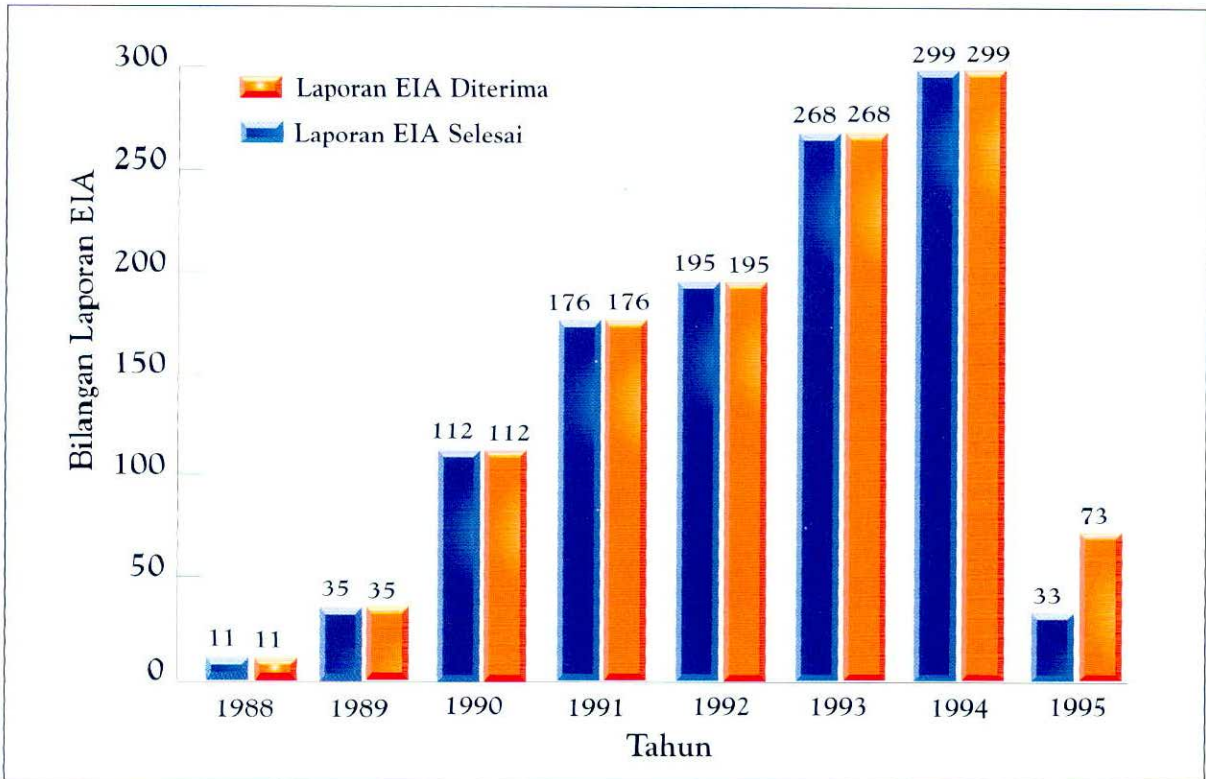
Dalam tempoh 1978-1988, laporan kajian EIA bagi sebilangan projek telah dikemukakan

kepada Jabatan Alam Sekitar (JAS) bagi memenuhi kehendak prosedur perancangan projek (Proses pentadbiran). Jenis projek yang telah menjalankan kajian EIA dalam tempoh ini ialah projek penjanaan kuasa hidroelektrik, industri kertas, estet perindustrian dan projek-projek berkaitan dengan petroleum dan gas. Antara projek yang dinilai dalam tempoh tersebut ialah:

- Kemudahan Penstoran Kekal Asian Rare Earth, Mukim Belanja, Perak.
- Kilang Pulpa dan Kertas, Sabah.
- Terminal LPG, Pelabuhan Kelang.

Rajah 1 menunjukkan bilangan laporan EIA yang diterima dan diselesaikan mengikut tahun pada 31 Mac 1995 sejak keperluan EIA mula berkuatkuasa. Jumlah laporan EIA yang diterima secara keseluruhan adalah sebanyak 1169.

RAJAH 1 : JABATAN ALAM SEKITAR – BILANGAN LAPORAN EIA YANG DITERIMA DAN DISELESAIKAN MENGIKUT TAHUN PADA 31 MAC 1995



Daripada jumlah tersebut sebanyak 1129 laporan telah dapat diselesaikan. Bilangan laporan yang dikemukakan kepada Jabatan Alam Sekitar (JAS) telah bertambah dari setahun ke setahun. Bilangan laporan yang diterima dalam tahun 1988 ialah 11 dan dalam tahun 1994 sahaja bilangannya telah meningkat kepada 299.

Daripada jumlah yang diselesaikan, 916 (81%) kelulusan telah diberi, 168 (15%) tidak diluluskan manakala 45 (4%) laporan lagi telah ditangguh/dibatalkan oleh penggerak projek sendiri. Bagi laporan EIA yang belum selesai (sebanyak 40), jumlah yang paling banyak ialah bagi projek-projek di Negeri Sarawak (8), Negeri Selangor (8) dan Negeri Johor (5) (sila rujuk Rajah 2).

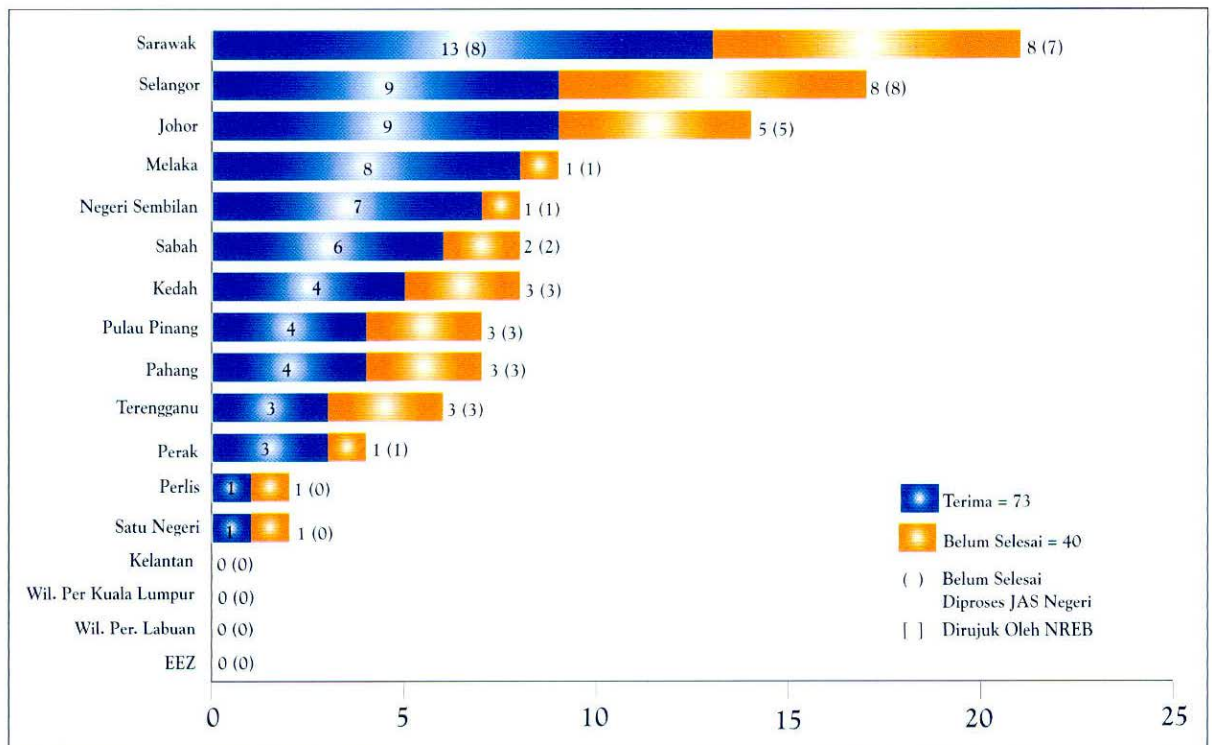
Dari segi pembahagian laporan EIA yang diterima dan diselesaikan mengikut negeri,

didapati jumlah laporan yang paling banyak diterima dan diluluskan ialah bagi Negeri Selangor, Johor, Negeri Sembilan dan Pulau Pinang (sila rujuk Rajah 3). Dari segi jenis aktiviti, Rajah 4 menunjukkan yang paling tinggi ialah rekreasi 206 (17.6%), projek infrastruktur khususnya kawasan perindustrian 182 (15.6%), diikuti dengan perumahan 155 (13.5%), kuari 147 (12.6%) dan industri 127 (10.9%).

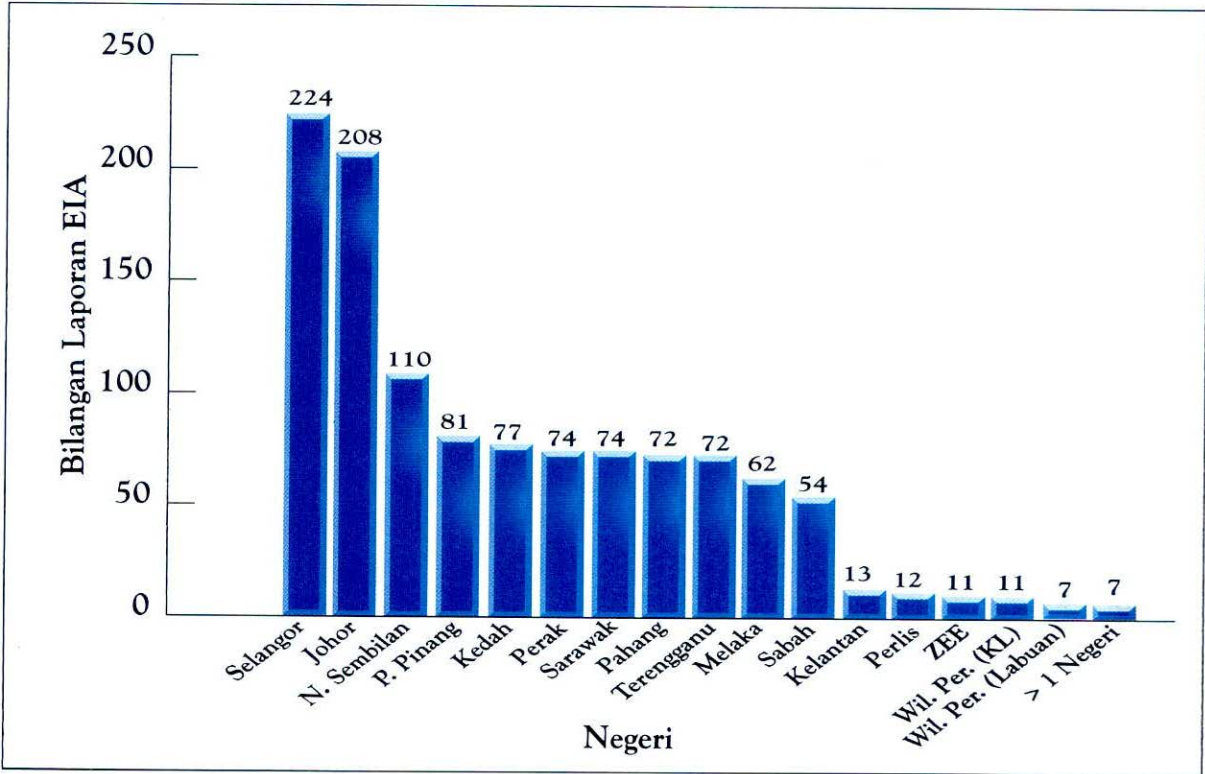
PENINGKATAN PELAKSANAAN EIA

Sejak dilaksanakan, masalah-masalah pelaksanaan khususnya proses penilaian laporan EIA mengambil masa yang lama dibangkitkan di beberapa forum. Untuk menyelesaikan masalah-masalah yang ditimbulkan, Kementerian Sains, Teknologi dan Alam Sekitar dan MAMPU di Jabatan Perdana Menteri dengan dibantu oleh Jabatan Alam Sekitar telah menjalankan kajian

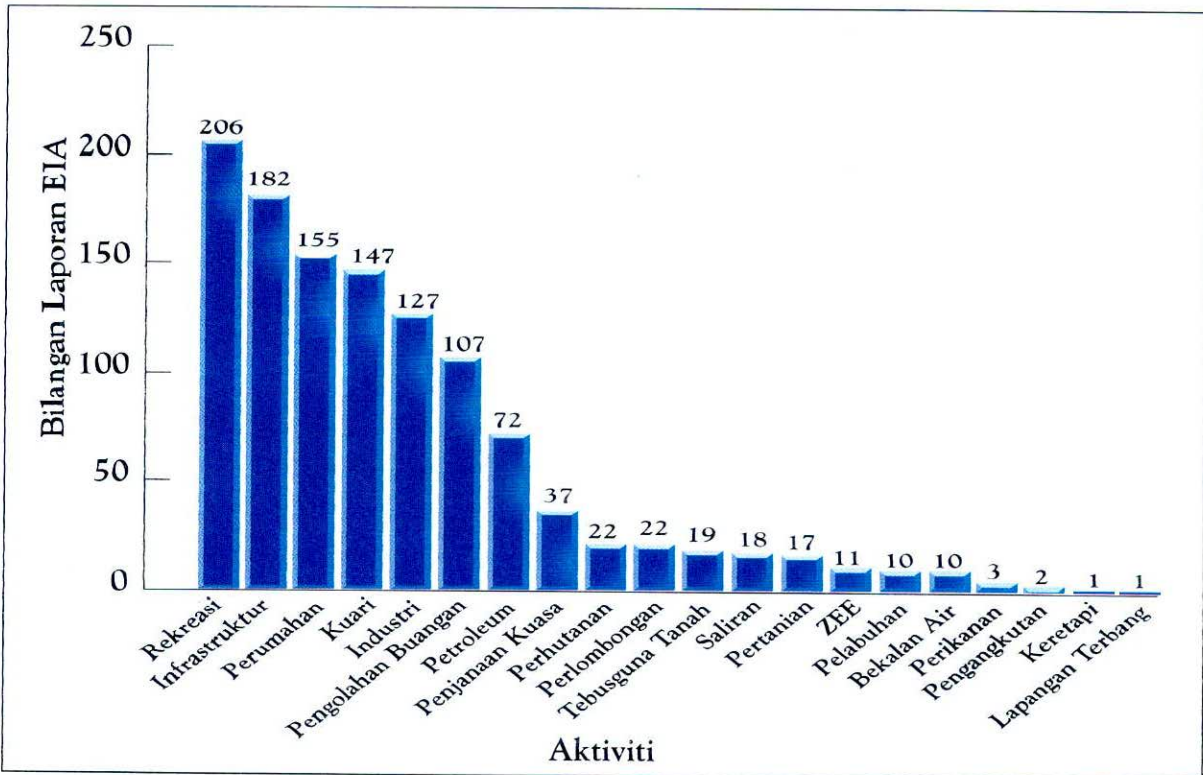
RAJAH 2 : JABATAN ALAM SEKITAR – LAPORAN-LAPORAN EIA YANG DITERIMA BERBANDING DENGAN YANG BELUM SELESAI MENGIKUT NEGERI/WILAYAH PADA 31 MAC 1995



RAJAH 3 : JABATAN ALAM SEKITAR – BILANGAN LAPORAN EIA YANG DITERIMA NEGERI PADA 31 MAC 1995



RAJAH 4 : JABATAN ALAM SEKITAR – BILANGAN LAPORAN EIA YANG DITERIMA MENGIKUT AKTIVITI PADA 31 MAC 1995



ke atas prosedur dan pelaksanaan EIA di seluruh negara semenjak bulan Jun 1991, dan satu laporan mengenainya telah dikemukakan kepada Panel untuk Memajukan Pentadbiran Awam yang dipengerusikan oleh YBhg Tan Sri Dato' Seri Ahmad Sarji bin Abdul Hamid, Ketua Setiausaha Negara, pada 30 Jun 1992.

Laporan MAMPU ini mengenalpasti dua masalah utama dalam sistem dan prosedur menilai dan meluluskan laporan EIA iaitu:

- Penilaian dan kelulusan laporan EIA mengambil masa; dan
- Laporan EIA dikemukakan tidak mengikut peringkat yang ditetapkan di dalam Seksyen 34A, Akta Kualiti Alam Sekeliling, 1974. Laporan tersebut juga menggariskan sembilan perakuan untuk memastikan laporan EIA mengandungi maklumat yang lengkap, kerja memproses lebih efisien dan untuk memastikan keperluan EIA dipatuhi oleh penggerak-penggerak projek.

Jemaah Menteri di mesyuaratnya pada 9 Disember 1992 telah bersetuju dengan sembilan perakuan yang dikemukakan oleh Panel itu melalui MAMPU dan Jabatan Perdana Menteri seperti berikut:

Sebagai susulan kepada ketetapan Jemaah Menteri, Mesyuarat ke-46 Jawatankuasa Perhubungan Antara Kerajaan Persekutuan dengan Kerajaan-Kerajaan Negeri, di mesyuarat pada 8 Februari 1993, telah:

- Mengambil maklum akan sembilan perakuan berkenaan khususnya Perakuan 8 dan 9, untuk diberi perhatian dan dilaksanakan oleh Pihak-Pihak Kerajaan Negeri dan Pihak-Pihak Berkuasa Tempatan; dan

- Menetapkan supaya Ketua Pengarah Alam Sekitar membuat kunjungan khas kepada semua YAB Menteri-Menteri Besar dan Ketua-Ketua Menteri.

PENINGKATAN PRESTASI MEMPROSES LAPORAN EIA

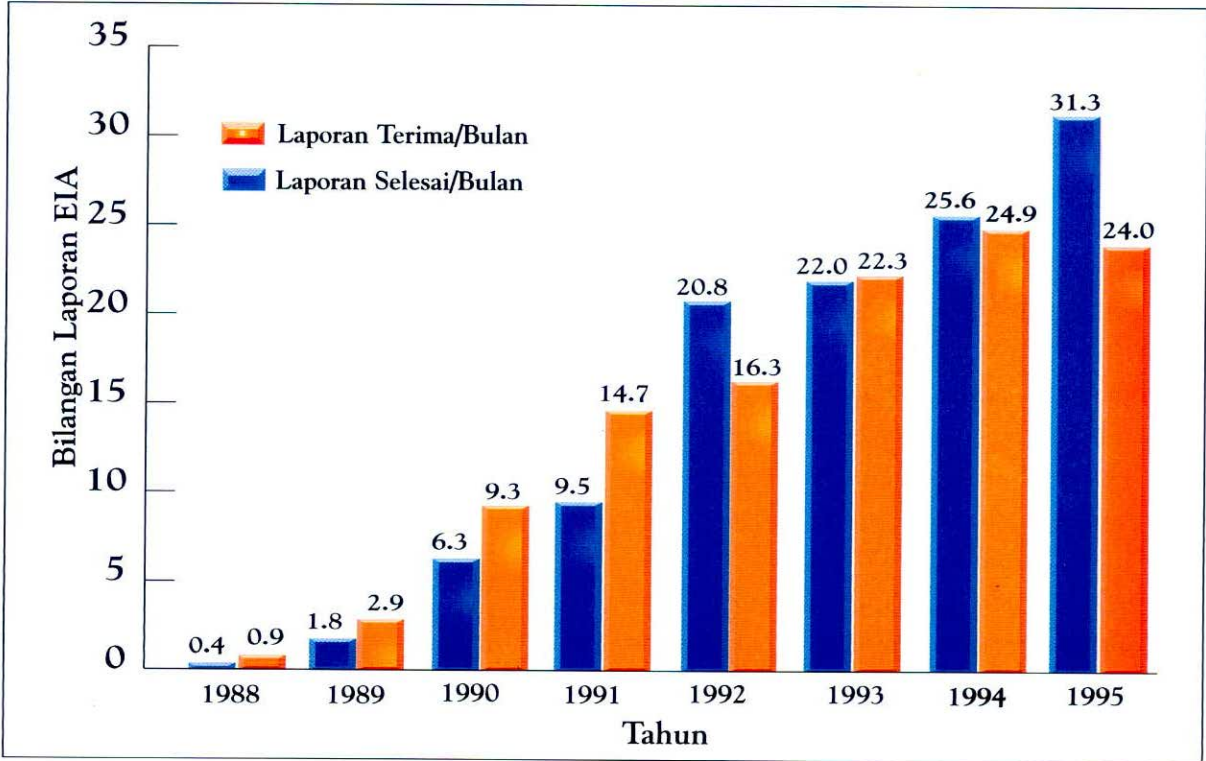
Bilangan Laporan Yang Selesai Dalam Sebulan Sejak tahun 1992, Jabatan Alam Sekitar telah melaksanakan beberapa perubahan untuk mempertingkatkan keberkesanan prosedur EIA amnya dan mempercepatkan tempoh pemprosesan laporan EIA khususnya. Pada tahun 1994, bilangan purata laporan yang dapat diselesaikan dalam satu bulan meningkat 25 laporan berbanding dengan 22 pada tahun 1993. Dalam tahun 1992, jumlah laporan yang telah diselesaikan (termasuk baki tahun 1991) telah melebihi bilangan purata laporan yang diterima dalam sebulan iaitu 16. Pada tahun 1993 dan 1994 secara purata bilangan laporan yang diterima menyamai bilangan yang diselesaikan (sila rujuk **Rajah 5**).

Tempoh Masa Kelulusan

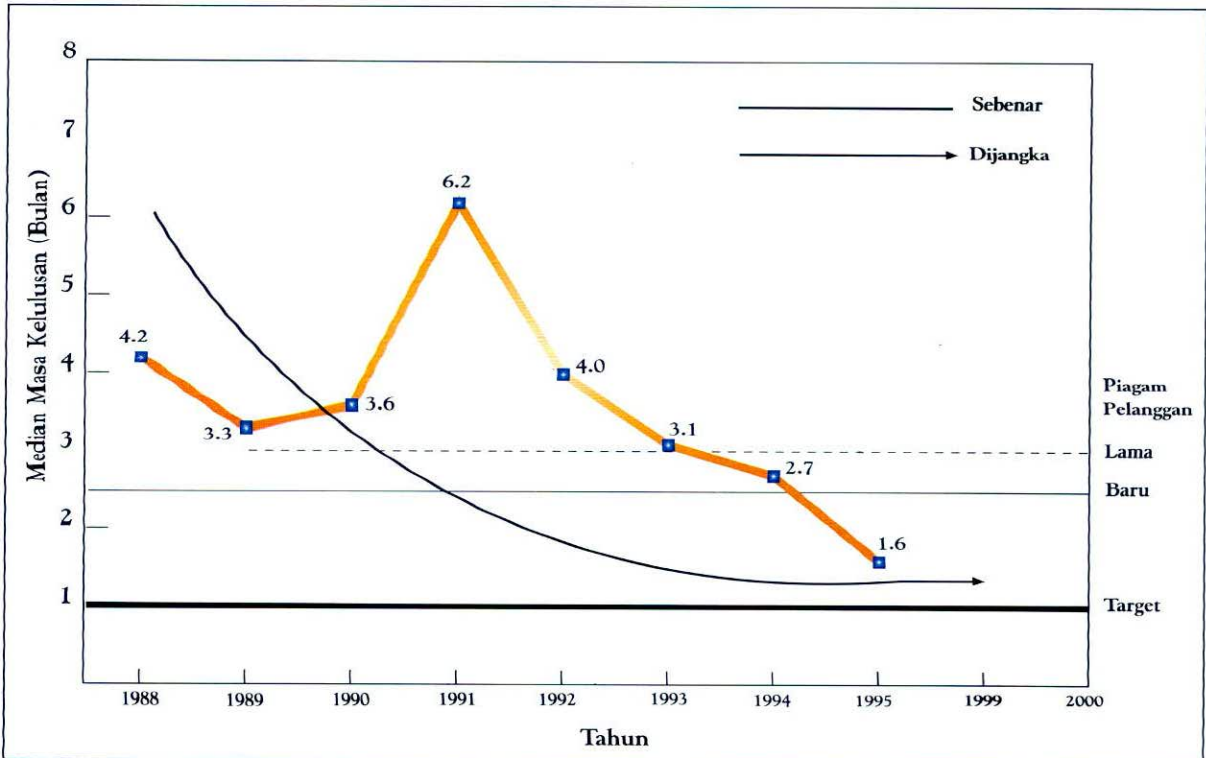
Tempoh masa bagi kelulusan laporan EIA diperbaiki lagi pada tahun 1994 walaupun bilangan laporan yang perlu diproses bertambah. Sehingga 31 Mac 1995, median masa kelulusan ialah 1.6 bulan (sila rujuk **Rajah 6**). Ini ialah pencapaian yang sangat menggalakkan berbanding dengan tempoh 6.2 bulan yang diambil pada tahun 1991. Pada tahun 1994 tempoh masa kelulusan EIA telah dapat dicapai kepada kurang dari 3 bulan standard Piagam Pelanggan EIA.

Berdasarkan pencapaian tempoh masa memproses dan membuat keputusan ke atas laporan EIA pada tahun 1994, mulai 1 Mac 1995

RAJAH 5 : JABATAN ALAM SEKITAR – BILANGAN LAPORAN EIA YANG DITERIMA DAN DISELESAIKAN SETIAP BULAN MENGIKUT TAHUN PADA 31 MAC 1995



RAJAH 6 : JABATAN ALAM SEKITAR – TARGET TEMPOH MASA KELULUSAN EIA MENGIKUT TAHUN PADA 31 MAC 1995



Piagam Pelanggan bagi tempoh tersebut dipendekkan kepada 2.5 bulan atau 10 minggu. Tempoh yang diambil untuk memproses laporan EIA didapati berbeza bagi aktiviti yang berlainan. **Rajah 7** menunjukkan median masa memproses laporan bagi kebanyakan aktiviti termasuk dalam kategori “memuaskan” dan laporan bagi aktiviti lapangan terbang, keretapi, perikanan dan bekalan air mengambil masa yang lebih panjang (median melebihi 6 bulan).

Pengurangan Laporan Tertunggak

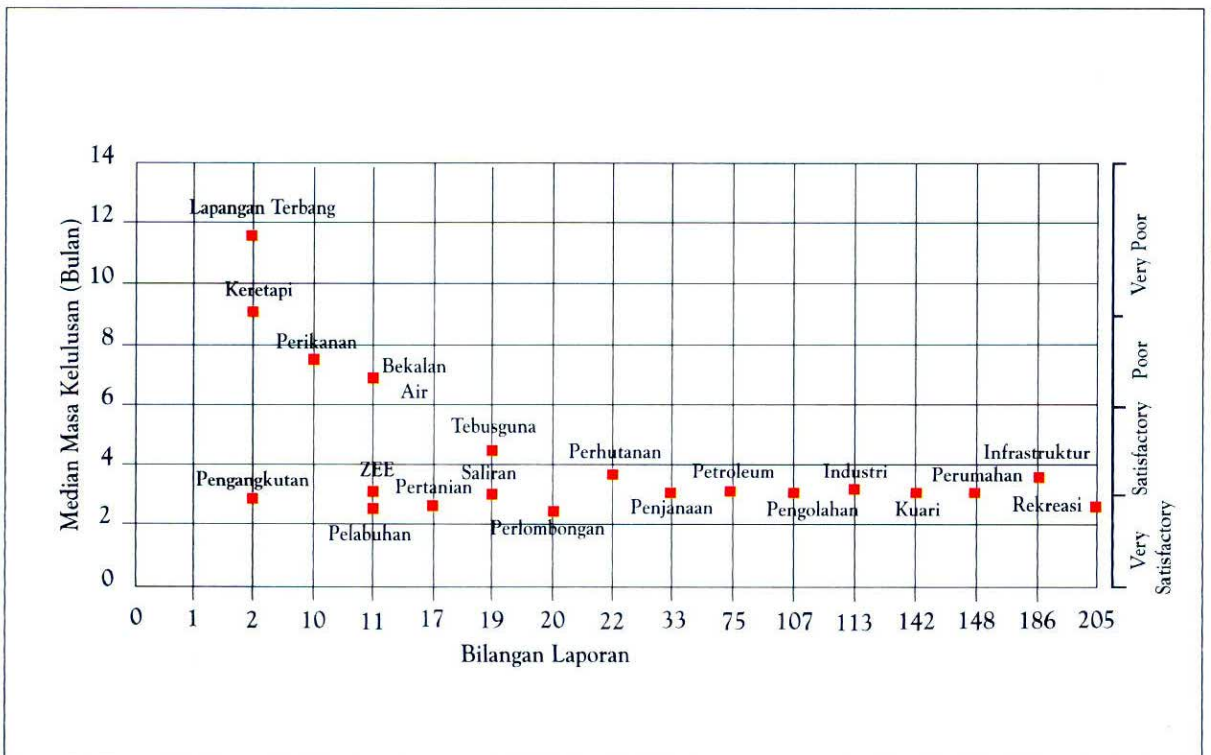
Usaha untuk mempercepatkan masa mengeluarkan keputusan mengenai laporan EIA dipergiatkan dan hasilnya sangat menggalakkan. Pada bulan Januari 1995, lebih kurang 55 peratus daripada 69 laporan yang belum diselesaikan terdiri daripada laporan yang diterima lebih daripada tiga bulan sebelumnya (laporan tertunggak). **Rajah 8** menunjukkan

status laporan EIA yang belum selesai mengikut tempoh masa sejak laporan diterima pada 31 Mac 1995. **Rajah 8** juga menunjukkan tidak ada laporan tertunggak yang melebihi 2.5 bulan (Piagam Pelanggan EIA mulai 1 Mac 1995).

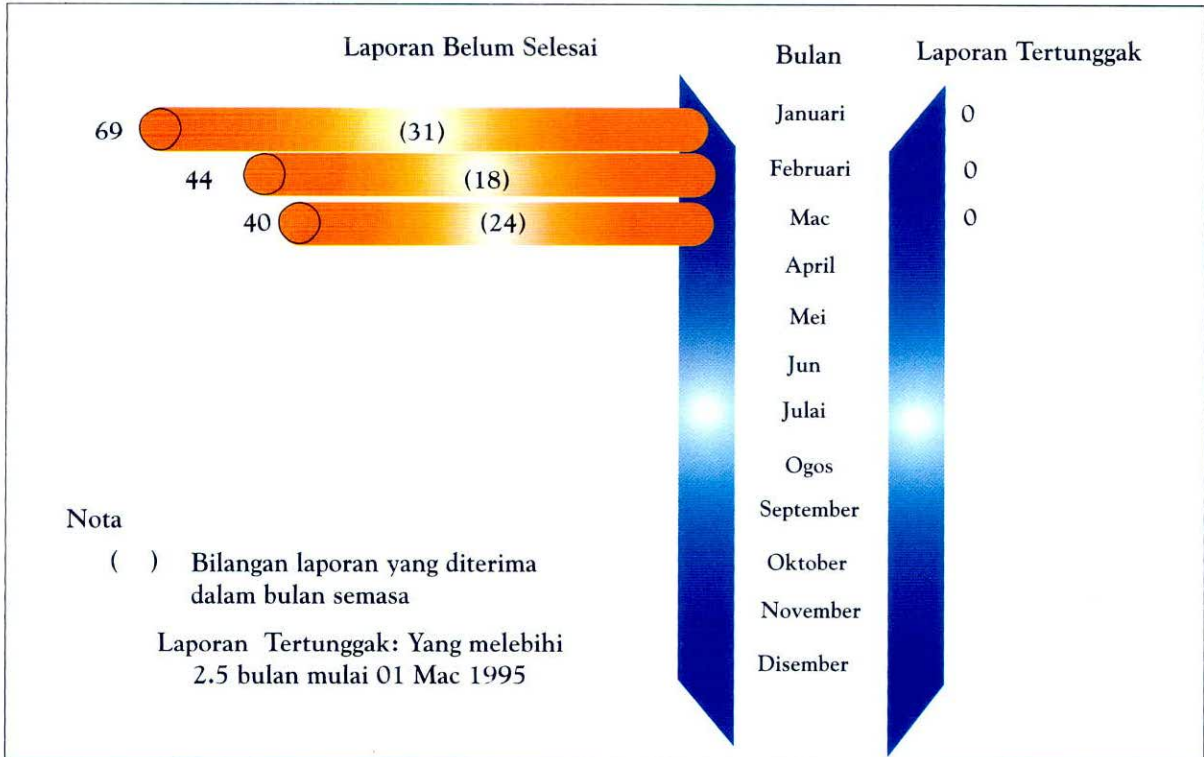
Desentralisasi

Dalam pada itu, Jabatan Alam Sekitar telah memulakan proses desentralisasi tugas memproses laporan EIA. Mulai Januari 1993, laporan-laporan EIA diproses dan diluluskan oleh Pejabat-Pejabat Jabatan Alam Sekitar di lima negeri iaitu Pulau Pinang, Perak, Selangor dan Wilayah Persekutuan Kuala Lumpur, Johor dan Sarawak. Proses desentralisasi ini telah dapat mempercepatkan pemprosesan laporan EIA. Pada 31 Disember 1993, lebih kurang 55 peratus daripada laporan EIA yang diterima diproses oleh kelima-lima pejabat ini. Pada tahun 1994 proses desentralisasi ini dipanjangkan lagi kepada Pejabat-Pejabat

RAJAH 7 : JABATAN ALAM SEKITAR – TARGET TEMPOH MASA KELULUSAN EIA MENGIKUT BILANGAN AKTIVITI PROJEK PADA 31 MAC 1995



RAJAH 8 : JABATAN ALAM SEKITAR – STATUS LAPORAN EIA YANG BELUM SELESAI MENGIKUT TEMPOH MASA SEJAK LAPORAN DITERIMA PADA 31 MAC 1995



Jabatan Alam Sekitar Negeri Melaka/Negeri Sembilan, Sabah dan Pahang.

Pada Januari 1995 laporan EIA telah diproses sepenuhnya oleh Pejabat-Pejabat Jabatan Alam Sekitar Negeri yang terdiri daripada tiga belas negeri iaitu Johor, Melaka, Negeri Sembilan, Selangor, Pahang, Pulau Pinang, Sabah, Sarawak, Terengganu, Kelantan, Wilayah Persekutuan Kuala Lumpur dan Kedah/Perlis.

Kos dan Tempoh Penyediaan Laporan EIA

Berdasarkan maklumbalas yang diterima daripada 328 responden, JAS mendapati dakwaan bahawa penyediaan laporan EIA sangat membebankan pemaju tidak berasas. Kos laporan EIA didapati dalam julat 0.001 hingga 1.9 peratus berbanding dengan kos projek. Secara purata, kos penyediaan laporan EIA

hanyalah 0.2 peratus daripada kos projek. Bagi projek-projek rekreasi dan infrastruktur, purata kos EIA ialah 0.1 peratus daripada kos projek.

Dari segi 'man-month', maklumbalas daripada responden yang sama menunjukkan bahawa masa yang diambil untuk menyediakan laporan EIA sangat berbeza; minimum ialah satu 'man-month' dan maksimum ialah 387 'man-month'. Bagi projek-projek rekreasi, infrastruktur dan industri, masa yang diperlukan ialah lebih kurang 7 'man-month'.

Pada tahun 1993, sebanyak 24 sesi taklimat telah diadakan di mana penggerak projek dan jururunding yang dilantik memberi penerangan mengenai projek dan hasil kajian EIA. Sessi-sesi taklimat ini juga bertindak sebagai 'one-stop agency' di mana jabatan-jabatan yang berkaitan

dijemput hadir sama dan dapat memberi ulasan dan pandangan mengenai cadangan projek. Taklimat dan 'one-stop agency' juga berfungsi dalam mempercepatkan lagi pemprosesan laporan EIA kerana segala kemusykilan dan penjelasan mengenai projek dan ulasan daripada agensi dapat diperolehi dengan segera.

PENGAWASAN PELAKSANAAN

Prosedur EIA tidak lengkap sekiranya tiada langkah-langkah menilai keberkesanannya. Penilaian ini dilaksanakan melalui pengawasan kesan alam sekitar dan pengawasan pematuhan syarat kelulusan laporan EIA serta undang-undang yang berkaitan. Selaras dengan Seksyen 34A(7) Akta Kualiti Alam Sekeliling 1974, penggerak-penggerak projek bertanggungjawab menunjukkan bukti pematuhan syarat-syarat kelulusan serta pelaksanaan langkah-langkah kawalan pencemaran dan tebatan yang dihuraikan dalam laporan EIA. Di samping itu pejabat-pejabat negeri JAS juga menjalankan pengawasan dan penyiasatan tapak dari semasa ke semasa.

Tindakan Mahkamah

Sehingga 31 Mac 1995 sebanyak 10 kes EIA telah dikenakan tindakan mahkamah. Pada tahun 1993, untuk pertama kalinya tindakan mahkamah diambil bersangkutan dengan Seksyen 34A, Akta Kualiti Alam Sekeliling 1974. Dua pemaju telah dihadapkan ke mahkamah kerana memulakan kerja tanpa memperolehi kelulusan terlebih dahulu daripada Ketua Pengarah Kualiti Alam Sekeliling. Sebuah kuari di Sabah telah didenda RM9,000.00 dan pemaju projek peranginan di Negeri Sembilan didenda RM5,000.00 setelah mereka mengaku bersalah.

KETETAPAN-KETETAPAN JEMAAH MENTERI MENGENAI PELAKSANAAN PROSEDUR EIA

Ketetapan 1

Satu format laporan EIA yang seragam perlu disediakan. Format laporan ini hendaklah dalam bentuk soal jawab. Format seperti ini hendaklah disediakan oleh Jabatan Alam Sekitar bagi setiap aktiviti yang disenaraikan dalam Perintah Kualiti Alam Sekeliling 1987.

Ketetapan 2

Jabatan Alam Sekitar hendaklah menyediakan Senarai Semak yang menjelaskan maklumat-maklumat yang perlu dikandungkan dalam laporan EIA. Senarai Semak seperti ini hendaklah disediakan bagi setiap aktiviti yang disenaraikan dalam Perintah Kualiti Alam Sekeliling 1987.

Ketetapan 3

Jabatan Alam Sekitar hendaklah mengkaji dan mengemaskinikan Garispanduan Penyediaan Laporan EIA supaya ianya lebih sesuai dengan keperluan semasa.

Ketetapan 4

Jabatan Alam Sekitar hendaklah mewujudkan satu sistem bagi mendaftarkan semua jururunding yang layak menyediakan laporan EIA, bagi memastikan laporan yang disediakan mencapai tahap kualiti yang diperlukan.

Ketetapan 5

Jabatan Alam Sekitar perlu mengamalkan prosedur baru seperti di Rajah 6 dalam laporan kajian untuk memproses dan meluluskan laporan EIA. Dengan prosedur baru ini, satu Jawatankuasa Penilaian yang berfungsi seperti



Pusat Serenti (One-Stop Agency) hendaklah diwujudkan untuk memberi kelulusan.

Ketetapan 6

Jabatan Alam Sekitar melantik Panel Pengulas yang dianggotai oleh Pakar-Pakar Alam Sekitar untuk menilai laporan EIA dan mengemukakan syor-syor untuk keputusan muktamad Ketua Pengarah Alam Sekitar.

Ketetapan 7

Jabatan Alam Sekitar hendaklah mengaturkan program-program berikut sebagai usaha meningkatkan pengetahuan dan pengalaman Pegawai Penilai:

- menempatkan Pegawai Penilai di Pejabat Wilayah atau industri-industri tempatan untuk satu jangkamasa tertentu bagi mendapatkan pengalaman praktikal;
- mengaturkan lawatan ke industri-industri tempatan dari semasa ke semasa dengan tujuan meningkatkan pengalaman dan pendedahan kepada teknologi moden dan terkini;
- menghantar Pegawai Penilai ke luar negeri untuk kursus jangkapendek atau kursus lepasan ijazah atau program latihan sambil bekerja dalam bidang-bidang yang berkaitan. Program ini perlu dirancang dan dimasukkan dalam anggaran belanjawan tahunan;
- mendapatkan perkhidmatan kepakaran dari luar negeri dalam bidang-bidang yang masih kekurangan kepakaran. Pakar-pakar dari luar negeri ini bolehlah dibawa ke negara ini bagi melatih pegawai-pegawai Jabatan Alam Sekitar. Di samping itu, Jabatan-jabatan lain

yang berkaitan bolehlah dijemput menyertai program ini dengan tujuan meningkatkan kesedaran mereka terhadap alam sekitar.

Ketetapan 8

Pihak-pihak Kerajaan Negeri dan Pihak-pihak Berkuasa lain yang memberi kelulusan terhadap pelaksanaan projek hendaklah menjadikan kelulusan EIA dari Jabatan Alam Sekitar sebagai salah satu kriteria dalam mempertimbangkan projek-projek yang dicadangkan oleh Penggerak Projek. Ini boleh dilaksanakan dengan

- memastikan Penggerak Projek mengemukakan kelulusan ke atas laporan EIA bersama-sama permohonan; atau
- memberikan kelulusan bersyarat dan meminta Penggerak Projek mendapatkan kelulusan ke atas laporan EIA yang akan disediakan, sebelum memberi kelulusan muktamad.

Ketetapan 9

Kerajaan Negeri dan pihak Berkuasa Tempatan hendaklah menetapkan supaya Wakil Jabatan Alam Sekitar dilantik sebagai salah seorang ahli tetap dalam Jawatankuasa-jawatankuasa di agensi-agensi peringkat negeri dan daerah yang mengkaji kesesuaian projek-projek yang dicadangkan oleh Penggerak Projek. Perakuan ini hendaklah dilaksanakan dengan memberikan tumpuan kepada negeri-negeri yang mempunyai bilangan projek yang banyak dan pelaburan yang besar.

PENGURUSAN ALAM SEKITAR MALAYSIA:

PENILAIAN ALAM SEKELILING

Oleh

Ahmad Kamarulnajib Che Ibrahim

Pegawai Kawalan Alam Sekitar (1983-1995)

Pengarah Alam Sekitar Melaka (sejak 1995)

Jabatan Alam Sekitar

KEMEROSOTAN kualiti alam sekitar negara pada dekad 60-an bolehlah dianggap meruncing terutamanya masalah-masalah yang berpunca akibat dari kegiatan pembangunan tanah dan sumber-sumber asli serta pembuangan sisa atau bahan buangan ke alam sekitar. Masalah-masalah alam sekitar ini mencerminkan teras pembangunan ekonomi dan sosial negara dalam tempoh tersebut. Kegiatan-kegiatan tersebut termasuk perlombongan, pembalakan, pembukaan tanah rancangan pertanian, pembangunan bandar dan pembangunan infrastruktur umum telah menyumbang berbagai masalah alam sekitar seperti mengganggu ekosistem sungai serta banjir.

Pada awal tahun 70-an proses perindustrian pula telah meningkatkan bilangan industri di negara kita. Industri-industri ini telah menyumbangkan pertambahan bilangan punca pencemaran melalui pengeluaran sisa atau bahan buangan yang mencemarkan air, udara dan tanah. Justeru itu, masalah-masalah alam sekitar yang kian meningkat ini telah menggerakkan kerajaan melaksanakan pelan pengurusan alam sekitar di negara ini yang mana termasuk:

- Meluluskan Akta Kualiti Alam Sekeliling 1974 yang dikuatkuasakan pada 15 April 1975;
- Menggubal polisi-polisi dan strategi-strategi alam sekitar dalam rancangan lima tahun negara;
- Menubuhkan Bahagian Alam Sekitar pada 15 September 1975 (kini dinaikkan taraf kepada Jabatan Alam Sekitar) di bawah Kementerian Sains, Teknologi dan Alam Sekitar; dan
- Membuat pelbagai peraturan alam sekitar di bawah Akta Kualiti Alam Sekeliling 1974.

Sehingga awal 1988, Jabatan Alam Sekitar telah menumpukan program-program dan strategi-strategi pengurusan alam sekitar lebih kepada strategi jangka-masa pendek dan sederhana melalui beberapa peraturan telah digubal di bawah Akta Kualiti Alam Sekeliling 1974. (Lihat jadual 1).

JADUAL 1: PERATURAN-PERATURAN KUALITI ALAM SEKELILING

- Peraturan-Peraturan Kualiti Alam Sekeliling (Perlesenan), 1977.
- Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan) (Minyak Kelapa Sawit Mentah), 1977.
- Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih), 1978.
- Peraturan-Peraturan Kualiti Alam Sekeliling (Mengkompaun dan Effluen-effluen Perindustrian), 1979.
- Peraturan-Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan) (Getah Asli Mentah), 1978.
- Peraturan-Peraturan Kualiti Alam Sekeliling (Kumbahan dan Effluen-effluen Perindustrian), 1979.
- Peraturan-Peraturan Kualiti Alam Sekeliling (Kawalan Kepekatan Plumbum dalam Gasolin Motor), 1985.
- Kaedah-kaedah Kereta Motor (Kawalan Pelepasan Asap dan Gas), 1977.

Strategi Pemeliharaan Alam Sekitar

Strategi-strategi jangka masa sederhana menumpu kepada penyerapan unsur-unsur alam sekitar dalam perancangan dan pelaksanaan projek-projek pembangunan melalui penyediaan dan penggunaan garis panduan-garis panduan iaitu "Garis panduan Perletakan dan Pengezonan

Industri”, Garispanduan Pelupusan Sisa-sisa Pepejal, Garispanduan Pencegahan dan Pengawalan Hakisan Tanah dan Kelodakan.

Dalam hal ini, Jabatan Alam Sekitar melangkah setapak lagi dengan memberi perhatian kepada hubungan di antara kegiatan pembangunan dengan kesan alam sekitar. Oleh itu timbulnya satu kaedah yang dikenali sebagai Penilaian Kesan Kepada Alam Sekeliling (Environmental Impact Assessment or EIA). Tujuan-tujuan utama dimajukan untuk memperkenalkan EIA di Malaysia adalah disebabkan peningkatan skim-skim pembangunan sumber dan perindustrian serta kesan-kesannya kepada alam sekitar fizikal dan penduduk yang tidak dapat diabaikan lagi dan teknik-teknik penaksiran tradisional tidak mencukupi menangani pelbagai isu alam sekitar dan sosial terutamanya yang membawa kesan-kesan jangka masa panjang.

Perkembangan EIA di Malaysia

Dasar kerajaan Malaysia mengenai kesan kepada alam sekeliling diberi penekanan yang ketara dalam semua dokumen Rancangan Malaysia sejak tahun 1976. Secara ringkasnya, “Penilaian kesan keseluruhan projek ke atas alam sekitar akan dilakukan. Sebelum memulakan pelaksanaan projek, Kementerian-Kementerian dan Jabatan-Jabatan serta sektor swasta dikhendaki menunjukkan kesemua kesan yang mungkin timbul ke atas alam sekitar dan juga cara bagaimana kesan-kesan tersebut boleh diatasi...”. Di samping itu, keperluan EIA terhadap projek-projek yang mempunyai potensi merosakkan alam sekitar akan dikuatkuasakan sepenuhnya.

Berbagai tindakan telah dilakukan untuk merealisasikan dasar ini. Usaha awal ialah

dengan menubuhkan satu panel ad hoc oleh Bahagian Alam Sekitar dalam bulan Mac 1977 untuk memberi nasihat kepada Kementerian Sains, Teknologi dan Alam Sekitar tentang penyediaan prosedur penilaian kesan-kesan alam sekitar. Seramai 18 wakil Kementerian dan agensi menganggotai panel ini.

Susulan daripadanya, dua seminar pada peringkat kebangsaan mengenai alam sekitar telah dianjurkan. Prosedur EIA yang disyorkan oleh panel ad hoc ini telah dibentangkan dalam seminar yang kedua. Dalam bulan Januari 1978, prosedur tersebut berserta dengan rancangan pelaksanaannya dibentangkan kepada Jawatankuasa Perancangan Pembangunan Kebangsaan untuk dipertimbangkan. Mesyuarat jawatankuasa yang diadakan pada bulan April 1978 telah menerima prosedur serta rancangan pelaksanaannya dan telah mengarahkan supaya cadangan tersebut dikemukakan kepada Jawatankuasa Pelaburan Kabinet untuk kelulusan.

Dalam bulan Januari 1979, John O’Brien (seorang pakar runding dari New Zealand) telah dilantik di bawah Rancangan Colombo untuk membantu Malaysia menyediakan buku panduan prosedur EIA. Buku panduan ini dikenali sebagai “A Handbook of Environmental Impact Assessment Guidelines”, telah disiapkan pada bulan Julai 1979. Buku panduan ini telah diterima oleh Majlis Kualiti Alam Sekeliling. Objektif buku ini adalah untuk membantu pemaju projek pembangunan menyediakan laporan EIA.

Dalam tempoh 1980 hingga 1987, prosedur EIA telah dilaksanakan secara informal (tidak diwajibkan di bawah undang-undang) dan

laporan EIA dirujuk kepada Jabatan Alam Sekitar untuk ulangkaji. Oleh itu, Jabatan Alam Sekitar mengenakan EIA secara pentadbiran untuk projek-projek tertentu melalui amalan biasa perancangan dan kelulusan projek di negara ini ketika itu.

Penguatkuasaan Undang-Undang

Pendekatan pelaksanaan EIA di Malaysia telah berubah apabila Akta Kualiti Alam Sekeliling 1974 dipinda dan dikuatkuasakan pada Januari 1986. Akta Kualiti Alam Sekeliling (Pindaan) 1985 ini mewajibkan kegiatan-kegiatan pembangunan yang terdiri daripada beberapa kategori menyediakan laporan penilaian kesan alam sekeliling (EIA).

Justeru itu, Seksyen 34A, Akta Kualiti Alam Sekeliling (Pindaan) 1985 memberi kuasa kepada menteri (Menteri Sains, Teknologi dan Alam Sekitar), setelah berunding dengan Majlis Kualiti Alam Sekeliling, menetapkan apa-apa aktiviti yang berpotensi mendatangkan kesan yang bererti (signifikan) pada alam sekeliling sebagai "aktiviti yang ditetapkan". Aktiviti-aktiviti ini disenaraikan di dalam perintah dan dikenali sebagai Perintah Kualiti Alam Sekeliling (Aktiviti Yang Ditetapkan) (Penilaian Kesan Kepada Alam Sekeliling) 1987, P.U. (A) 362/1987. Aktiviti-aktiviti berkenaan dikelaskan kepada 19 kategori iaitu pertanian, lapangan terbang, pengairan dan perparitan, tebusguna tanah, perikanan, perhutanan, perumahan, industri, infrastruktur, pelabuhan, perlombongan, petroleum, janakuasa elektrik, kuari, keretapi, pengangkutan, pembangunan tempat perangan dan rekreasi.

Setelah kajian EIA selesai, laporan EIA ini diserahkan kepada Ketua Pengarah Kualiti Alam

Sekeliling untuk pemeriksaan dan beliau boleh meminta penerangan lanjut jika perlu. Jika Ketua Pengarah berpuashati dengan laporan tersebut dari segi kajian yang dijalankan, langkah-langkah diambil untuk mengelak, mengurang atau mengawal kesan-kesan yang akan timbul dan laporan tersebut disediakan mengikut kehendak-kehendak garis panduan EIA maka laporan tersebut boleh diluluskan sama ada bersyarat atau tanpa syarat. Sebaliknya, jika Ketua Pengarah tidak berpuashati, beliau boleh tidak meluluskan laporan tersebut. Dalam keadaan ini, pemaju projek dikehendaki menjalankan semula kajian dan menyerahkan laporan yang telah dibaiki kepada Ketua Pengarah. Ketua Pengarah hendaklah melaporkan keputusannya sama ada laporan tersebut diluluskan atau tidak kepada pemaju projek dan pihak-pihak berkuasa meluluskan projek berkenaan. Ketua Pengarah juga boleh meminta lebih dari satu laporan EIA. Projek hanya boleh dilaksanakan setelah laporan EIA diluluskan oleh Ketua Pengarah.

Peruntukan Seksyen ini juga memerlukan pemaju mematuhi keperluan-keperluan yang disyaratkan bersama dengan kelulusan yang diberikan. Segala langkah pencegahan dan pengawalan kesan-kesan alam sekitar yang dicadangkan mestilah dilaksanakan. Sesiapa yang didapati melanggar peruntukan Seksyen ini boleh didenda RM10,000 atau dua tahun penjara atau kedua-duanya sekali dan denda tambahan RM1000 bagi tiap-tiap kesalahan itu diteruskan selepas dimaklumkan oleh Ketua Pengarah.

Prosedur Formal EIA sebelum tahun 1993

Prosedur penilaian kesan-kesan alam sekitar di Malaysia merangkumi penilaian awal dan

penilaian terperinci. Sejak penguatkuasaan EIA pada 1 April 1988 hingga 1993, laporan Penilaian Awal dan Terperinci EIA termasuk Laporan Analisa Risiko diperiksa di peringkat Ibu Pejabat Jabatan Alam Sekitar.

Penilaian Awal

Penilaian awal adalah peringkat pertama dalam prosedur EIA apabila penilaian dibuat ke atas kesan-kesan yang berpotensi akan timbul daripada sesuatu aktiviti yang ditetapkan. Di peringkat ini, pilihan-pilihan projek dikenalpasti dan kesan-kesan ketara dilaporkan.

Penilaian Terperinci

Terdapat dua keadaan di mana penilaian terperinci diperlukan. Pertama ialah projek-projek yang telah dikenalpasti melalui penilaian awal akan membawa kesan-kesan signifikan ke atas alam sekitar ataupun kesan-kesan alam sekitarnya masih belum boleh diketahui melalui penilaian awal. Kedua ialah projek-projek yang belum melalui penilaian awal tetapi berdasarkan pengalaman projek tersebut dijangka akan memberikan kesan-kesan signifikan yang memerlukan penilaian terperinci. Objektif penilaian terperinci ialah:

- Untuk memperihalkan kesan-kesan berbaki yang dijangka dari cadangan akhir projek;
- Untuk menentukan langkah-langkah kawalan dan pencegahan dalam cadangan akhir projek; dan
- Untuk mengenalpasti kos dan faedah projek tersebut kepada masyarakat.

Kajian terperinci EIA dibuat berdasarkan bidang rujukan yang disemak oleh Panel Pengulas ad hoc yang dilantik oleh Ketua Pengarah Kualiti

Alam Sekeliling. Laporan EIA ini seterusnya disemak oleh Panel Pengulas ad hoc tersebut dan dipengerusikan oleh Ketua Pengarah Kualiti Alam Sekeliling.

Ulasan-ulasan mengenai laporan ini dikemukakan kepada pihak berkuasa meluluskan projek untuk keputusan muktamad. Mengikut Piagam Pelanggan EIA Jabatan Alam Sekitar, tempoh mengkaji laporan EIA dan mengeluarkan keputusan ialah tiga bulan. Jabatan Alam Sekitar menyimpan senarai pakar-pakar untuk dilantik menganggotai Panel Pengulas yang ditubuhkan. Pemilihan pakar-pakar ini bergantung kepada bentuk kesan alam sekitar yang akan dikaji dan jenis projek. Pengumuman awam juga dijalankan pada peringkat pemeriksaan laporan terperinci untuk memberi peluang kepada orang ramai untuk membuat komen.

Apabila proses ini selesai, Panel Pemeriksaan akan mengeluarkan Laporan Pemeriksaan Penilaian Terperinci. Berdasarkan nasihat daripada Panel Pemeriksaan, pihak berkuasa meluluskan projek akan membuat keputusan sama ada meluluskan atau tidak meluluskan projek yang dicadangkan. Pihak Berkuasa Meluluskan Projek ialah agensi kerajaan yang mempunyai kuasa membuat keputusan sama ada sesuatu projek dilaksanakan atau tidak. Pihak-pihak ini termasuk:

- Jawatankuasa Perancangan Pembangunan Negara (JPPN), bagi projek-projek yang dibiayai oleh Kerajaan Persekutuan;
- Majlis Mesyuarat Kerajaan Negeri (MMKN), bagi projek-projek yang dibiayai oleh Kerajaan Negeri.

- Pihak Berkuasa Tempatan (PBT) atau Lembaga Kemajuan Wilayah (LKW) untuk kelulusan perancangan di dalam kawasan masing-masing; dan
- Kementerian Perdagangan dan Perindustrian Antarabangsa atau MIDA, bagi projek-projek perindustrian.

Pelaksanaan EIA selepas tahun 1993

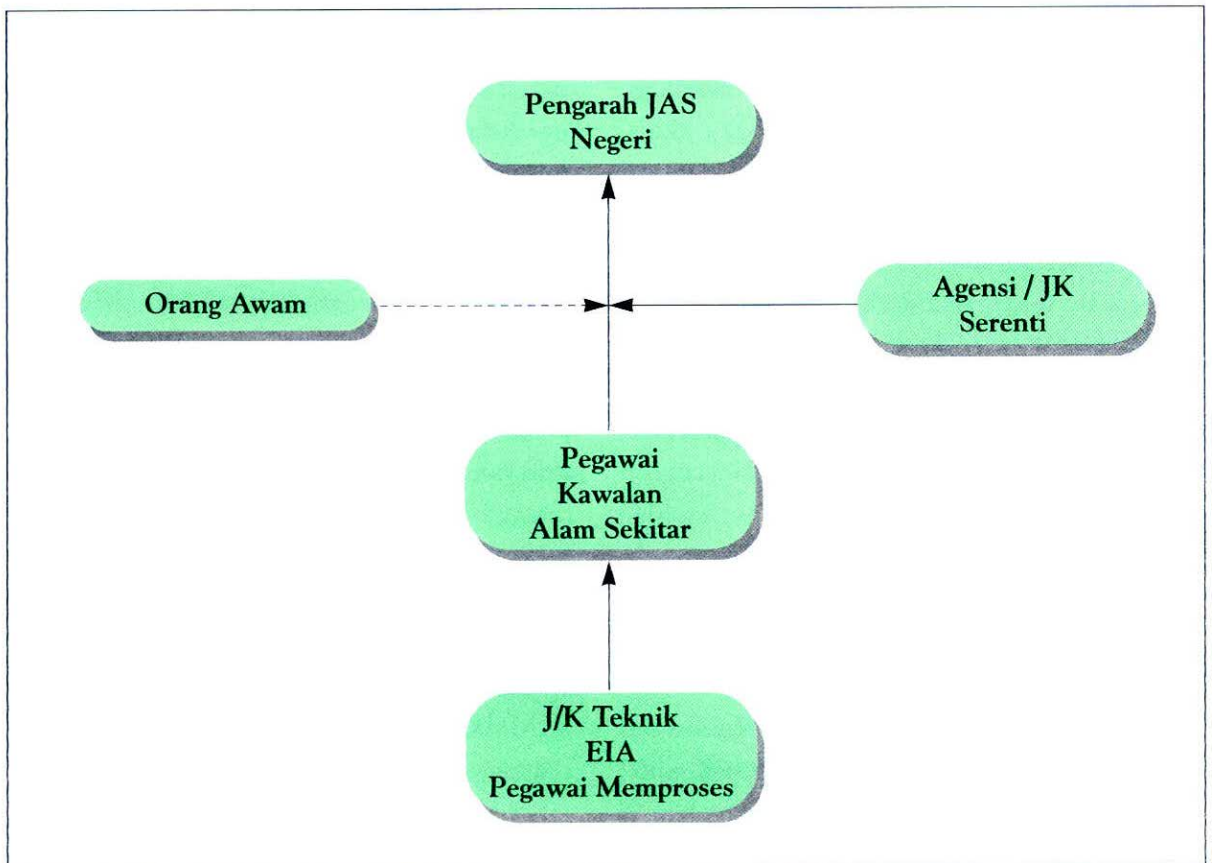
Bermula 1 Januari 1993, semua laporan Penilaian Awal EIA diproses dan diluluskan oleh Pejabat Negeri Jabatan Alam Sekitar kecuali bagi Negeri Kedah dan Perlis. Laporan EIA bagi projek-projek di Kedah dan Perlis, dan untuk kes-kes yang tidak tertakluk kepada mana-mana negeri seperti kes dalam kawasan

EEZ dan yang melibatkan lebih daripada satu negeri masih lagi diproses dan diluluskan oleh Ibu Pejabat Jabatan Alam Sekitar. Bagi Laporan Terperinci EIA, semua kes diproses oleh Ibu Pejabat.

Proses Pemeriksaan Laporan Awal EIA Peringkat Negeri

Rajah 1 menerangkan secara am, prosedur memproses dan meluluskan Laporan Penilaian Awal EIA oleh Jabatan Alam Sekitar Negeri yang mengetuai organisasi di peringkat negeri dan bertanggungjawab untuk meluluskan atau tidak laporan EIA bagi pihak Ketua Pengarah Kualiti Alam Sekeliling Malaysia. Mesyuarat Jawatankuasa Serenti (one-stop agency) dengan jabatan/agensi lain yang berkaitan diadakan

RAJAH 1: PROSES PEMERIKSAAN LAPORAN PENILAIAN AWAL EIA PERINGKAT PEJABAT ALAM SEKITAR NEGERI



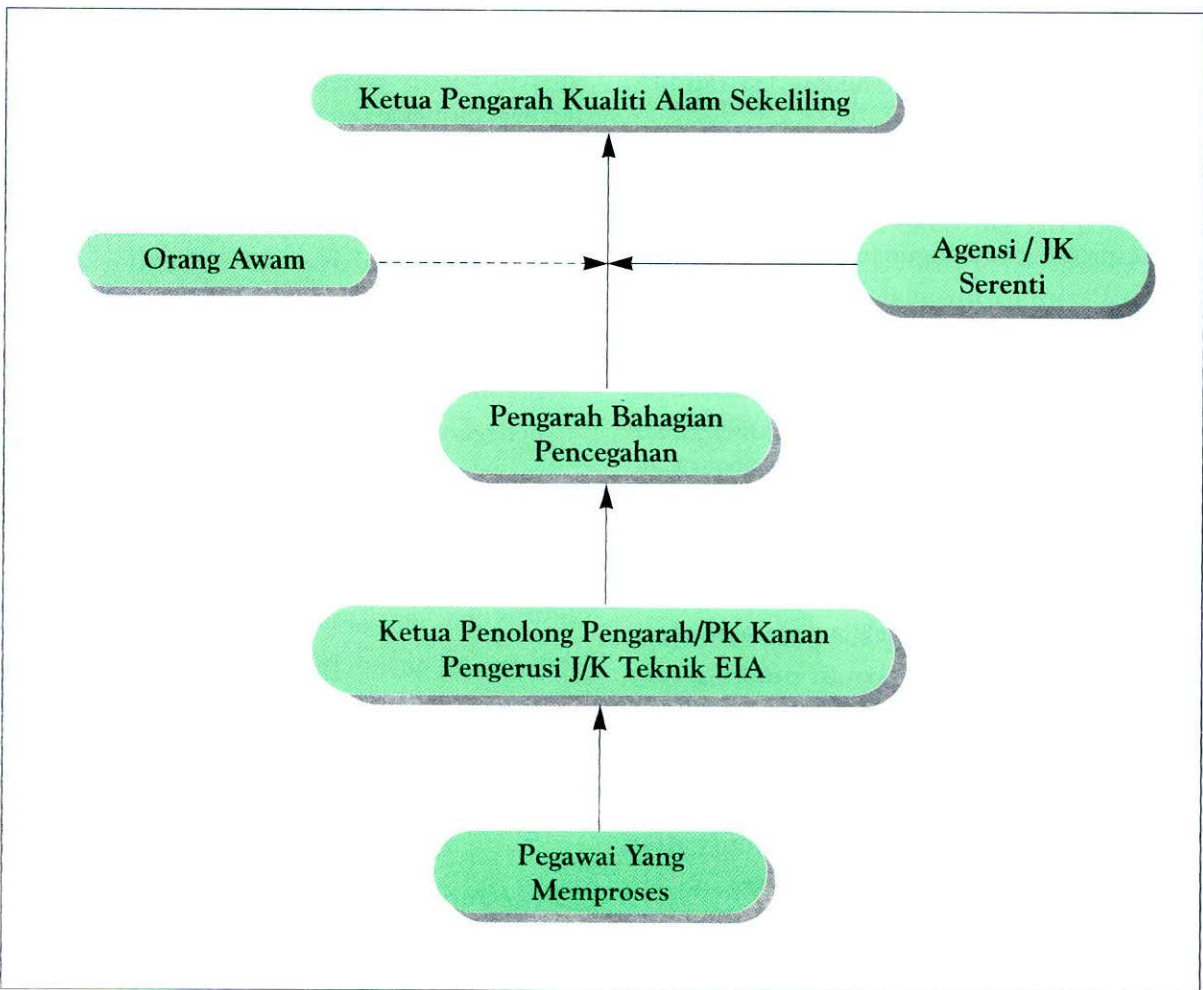
apabila perlu. Ulasan dan verifikasi juga diperolehi daripada mereka bagi kesan-kesan tertentu. Pengarah dibantu oleh Pegawai Kawalan dan Penolong Pegawai Kawalan untuk memproses laporan EIA berkenaan.

Proses Pemeriksaan Laporan Awal EIA Peringkat Ibu Pejabat

Rajah 2 menunjukkan struktur organisasi prosedur memproses dan meluluskan Laporan Penilaian Awal EIA bagi kes yang dikendalikan oleh Ibu Pejabat Jabatan Alam Sekitar. Pengarah Bahagian Pencegahan mengetahui struktur organisasi dengan dibantu oleh Ketua

Penolong Pengarah (EIA) dan Pegawai-Pegawai Kawalan (Kanan) yang mempengerusikan mesyuarat Jawatankuasa Teknik EIA. Jawatankuasa Teknik EIA adalah Jawatankuasa dalaman yang menilai laporan awal. Jawatankuasa ini mengadakan mesyuarat jawatankuasa serenti dengan jabatan/agensi lain yang berkaitan apabila perlu. Ulasan dan verifikasi juga diperolehi daripada mereka bagi kes-kes tertentu. Ahli Jawatankuasa Teknik EIA akan membuat perakuan atau syor kepada Pengarah Bahagian Pencegahan bagi membuat keputusan mengenai laporan awal.

RAJAH 2: PROSES PEMERIKSAAN LAPORAN PENILAIAN AWAL EIA BAGI KES YANG DIKENDALIKAN OLEH IBU PEJABAT JABATAN ALAM SEKITAR



Pelaksanaan EIA di Negeri Sarawak

Proses EIA yang telah desentralisasikan daripada Ibu Pejabat Jabatan Alam Sekitar kepada Pejabat-Pejabat Jabatan Alam Sekitar negeri pada 1 Januari 1993 telah melalui perubahan khususnya di Negeri Sarawak. Perubahan ini disebabkan oleh pindaan kepada Ordinan Sumber Asli (Pindaan) 1993 yang diluluskan oleh Dewan Undangan Negeri Sarawak pada November 1993. Dengan pindaan tersebut, proses EIA yang sebelum ini dipertanggungjawabkan oleh Kerajaan Persekutuan Malaysia melalui Jabatan Alam Sekitar (Negeri Sarawak) telah dipindahkan kepada pentadbiran Kerajaan Negeri Sarawak melalui Lembaga Sumber Asli Dan Persekitaran (Aktiviti-Aktiviti Yang Ditetapkan) 1994. Lembaga ini dipengerusikan oleh Ketua Menteri dan ahli-ahlinya termasuk wakil-wakil Jabatan-Jabatan Negeri relevan. Kelulusan laporan EIA diputuskan oleh Lembaga ini.

Kategori Projek

Projek-projek pembangunan yang tertakluk di bawah Perintah ini adalah terdiri daripada beberapa kategori projek berteraskan sumber asli. Kategori-kategori projek yang tertakluk dibawah Perintah Sumber Asli dan Persekitaran 1994 Negeri Sarawak dikelaskan secara am kepada tujuh kategori iaitu pembangunan pertanian; pembalakan; pembangunan estet perindustrian komersial dan perumahan; aktiviti-aktiviti yang boleh mencemarkan air daratan atau memberi kesan punca-punca bekalan air; perikanan yang boleh membahayakan marin atau hidupan akuatik, tumbuhan-tumbuhan air daratan dan hakisan tebing sungai; pembesaran dan penggalian bahan-bahan batu dan perlombongan; dan mana-mana aktiviti yang boleh membahayakan atau yang mempunyai kesan ketara kepada

kualiti alam sekitar atau sumber-sumber asli negeri.

Walau bagaimanapun, selain daripada kategori aktiviti-aktiviti berteraskan sumber asli tersebut, terdapat beberapa kategori aktiviti-aktiviti pembangunan khususnya yang melibatkan kesan kesihatan awam seperti industri, petroleum dan pengolahan dan pelupusan buangan masih tertakluk di bawah Perintah Kualiti Alam Sekeliling (Aktiviti Yang Ditetapkan) (Penilaian Kesan Kepada Alam Sekeliling) 1987 yang dikuatkuasakan oleh Jabatan Alam Sekitar.

Inovasi Amalan Proses EIA

Selain daripada perkembangan-perkembangan atau perubahan-perubahan proses EIA yang telah diterangkan sebelum ini, beberapa inovasi khusus telah dilaksanakan oleh Jabatan Alam Sekitar. Antara inovasi-inovasi yang kini sudah tercapai diringkaskan seperti berikut:

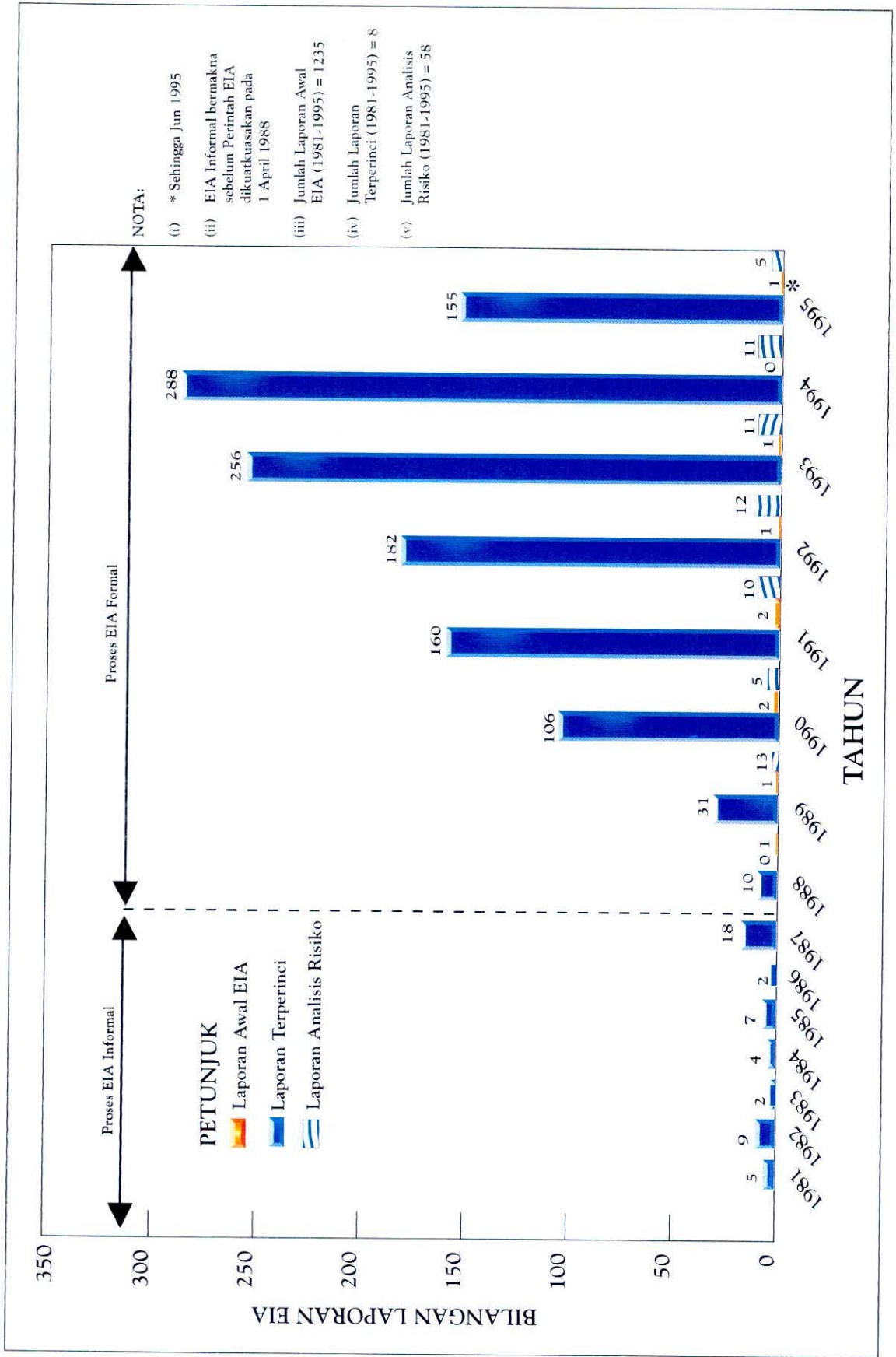
- Amalan merekod statistik EIA secara ad hoc sebelum penguatkuasaan EIA telah mendorong Jabatan Alam Sekitar supaya mempertingkatkan kaedah merekod yang lebih sistematik dengan mewujudkan sistem rekod berpusat untuk kes-kes EIA melalui penggunaan komputer. Keberkesanan sistem ini telah mengukuhkan pelaksanaan prosedur EIA negara sehingga kini;
- Menghasilkan berbagai garis panduan spesifik EIA dan majalah-majalah untuk membantu pemaju, juruperunding dan pihak-pihak relevan serta orang ramai dalam melaksanakan prosedur EIA dengan tujuan untuk meningkatkan kawalan mutu proses EIA;
- Mewujudkan sistem pendaftaran juruperunding EIA secara tidak formal bagi membantu pemaju-pemaju;

- Mempercepatkan proses pemeriksaan laporan EIA dengan memperketatkan tempoh Piagam Pelanggan Pemeriksaan EIA daripada tiga bulan kepada 2 1/2 bulan;
- Meningkatkan program-program kefahaman prosedur EIA dan gunapakai perundangan EIA kepada kumpulan sasaran tertentu seperti kerajaan-kerajaan negeri, pemaju-pemaju projek, juruperunding-juruperunding, ahli-ahli politik, orang-orang awam dan kakitangan Jabatan Alam Sekitar;
- Menubuhkan Bilik Sumber EIA untuk kegunaan orang ramai;
- Menjalankan pengawasan dan penguatkuasaan terhadap projek-projek tertakluk kepada EIA.
 - ◆ melalui susulan proaktif Notis - EIA di peringkat Pra-Kemuka Laporan
 - ◆ mengawasi peringkat kemuka laporan EIA berbanding Kitaran Perancangan Projek
 - ◆ menjalankan pemeriksaan pematuhan syarat-syarat EIA di peringkat Selepas Kemuka Laporan;
- Mempertingkatkan proses kawalan kualiti laporan-laporan EIA semasa peringkat kemuka laporan; dan
- Menjalankan penyelidikan mengenai hubungan kos laporan EIA dengan kos projek.

Rajah 3 menunjukkan kemajuan bilangan laporan EIA yang dirujuk kepada Jabatan Alam Sekitar untuk diproses sejak tahun 1981 hingga Jun 1995. Dalam tempoh ini, sejumlah 1301 laporan EIA diterima; 1235 laporan awal, dan 8 laporan terperinci serta 58 laporan analisa risiko. Rajah ini juga menerangkan bahawa pada peringkat EIA informal, bilangan laporan EIA yang dirujuk kepada Jabatan Alam Sekitar adalah kecil. Perubahan ini hanya ketara pada peringkat formal EIA khususnya selepas tiga tahun menguatkuasakan prosedur secara perundangan.

Usaha Malaysia melaksanakan strategi jangka masa panjang pengurusan alam sekitar melalui memperkenalkan EIA berjaya dijalankan dengan lancar. Beberapa langkah telah diambil untuk meningkatkan keberkesanan prosedur EIA sejak ianya diperkenalkan pada tahun 1977. Pada fasa pertama, EIA dilaksanakan secara informal sehingga tahun 1987. Pada tahun 1988, EIA mula diwajibkan di bawah undang-undang Akta Kualiti Alam Sekeliling 1974. Semasa peringkat formal EIA ini, pelaksanaan awal telah dijalankan oleh Ibu Pejabat Jabatan Alam Sekitar untuk pemeriksaan laporan awal EIA dan didesentralisasikan kepada Pejabat Jabatan Alam Sekitar Negeri pada tahun 1993 dan pada tahun 1994, prosedur EIA dikuatkuasakan berasingan di Negeri Sarawak. Walau bagaimanapun beberapa inovasi untuk meningkatkan kawalan kualiti pelaksanaan EIA telah dibuat untuk menjadikan kaedah ini berkesan dalam pengurusan alam sekitar jangka masa panjang.

RAJAH 3: BILANGAN LAPORAN EIA DAN ANALISIS RISIKO DIRUJUK KEPADA JABATAN ALAM SEKITAR (1981- JUN 1995)







PERANAN PENTING ALAM SEKITAR SEBAGAI INPUT PEMBANGUNAN

Oleh

Choong Mei Chun

Pegawai Kawalan Alam Sekitar (1980-1996)

Ketua Penolong Pengarah (sejak 1996)

Jabatan Alam Sekitar, Ibu Pejabat

SEKSYEN Input Pembangunan memainkan peranan untuk memastikan fakta alam sekitar diambilkira dalam semua perancangan pembangunan. Antara lainnya ialah gunatanah, pelan induk, pelan struktur, pelan tempatan, pelan-pelan berasas sumber dan sebagainya. Di samping itu, seksyen ini memberi input alam sekitar kepada projek pembangunan sumber dan projek-projek perancangan pembangunan kawasan khususnya pada peringkat awal perancangan, agar langkah-langkah untuk mengatasi kesan buruk dapat dikenalpasti dengan lebih awal.

Unit ini menyediakan laporan-laporan alam sekitar bagi sesuatu kajian, projek-projek yang berasaskan pembangunan sumber, perancangan pembangunan kawasan dan mengkaji dan mengulas laporan-laporan yang tidak tertakluk di bawah Perintah Kualiti Alam Sekeliling (Aktiviti Ditetapkan) (Kesan Kepada Alam Sekeliling) 1987.

Pembangunan Sumber

Fungsi utama unit ini adalah untuk mengkaji dan mengulas laporan atau projek yang berasaskan sumber. Di samping itu, unit ini juga memberi input alam sekitar berasaskan sumber kepada agensi kerajaan dan unit-unit lain dalam Jabatan ini. Untuk menjalankan tugas tersebut dengan lebih berkesan, sistem maklumat geografi (GIS) juga digunakan sama untuk memperolehi maklumat sumber dengan lengkap dan terperinci.

Sistem Maklumat Geografi (GIS)

Unit ini ditubuhkan bagi membantu JAS dalam melaksanakan fungsi-fungsinya dengan lebih cekap dan berkesan. Dengan kewujudan unit ini, keupayaan JAS dapat dipertingkatkan lagi

dalam penilaian pelan-pelan pembangunan bagi memastikan fakta-fakta alam sekitar diserap dalam perancangan pembangunan.

Kajian Pelan

Secara umumnya, unit ini memberi input kepada semua jenis laporan projek dan perancangan yang tidak tertakluk kepada EIA. Antara aktiviti-aktiviti yang berkaitan adalah seperti rancangan struktur, pelan induk, pemetungan dan perparitan, tebatan banjir dan sisa-sisa pepejal. Semua laporan yang diterima dikaji, diulas dengan teliti dan seterusnya memastikan dimensi alam sekitar diambilkira dengan serius.

Penilaian Awal Tapak

Tugas-tugas utama unit ini telah diambilalih oleh JAS negeri masing-masing. Oleh yang demikian tugas kini unit ini adalah semata-mata untuk menyelaras maklumat seperti permohonan mendirikan kilang baru, kebenaran bertulis bagi rawatan effluen dan alat pembakaran bahanapi seluruh negara.

Sejarah Penubuhan Unit-unit di Bawah Seksyen Input Pembangunan

Unit Penilaian Awal Tapak

Unit ini telah mula ditubuhkan dalam tahun 1979, di bawah Seksyen Kawalan Pencemaran Udara bertepatan dengan permulaan penguatkuasaan Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 1978. Dalam pendekatan mengawal pencemaran udara, keperluan yang mesti dipatuhi ialah mendapatkan kelulusan bertulis untuk pemasangan alat pembakaran bahanapi. Dalam hal ini juga, semua penempatan kilang-kilang baru diberi pertimbangan yang sewajarnya sebelum kilang dibenarkan beroperasi.

Unit ini kemudiannya telah berkembang apabila 2 unit ditubuhkan di bawah Seksyen Kawalan Kualiti Udara dan Seksyen Kawalan Air dalam tahun 1980. Penubuhan unit baru di bawah Seksyen Kawalan Air bertujuan memproses permohonan baru untuk memasang alat kawalan pencemaran air yang diperlukan untuk mendapat kebenaran bertulis daripada Ketua Pengarah Alam Sekitar di bawah Peraturan-Peraturan Kualiti Alam Sekeliling (Kumbahan dan Effluen-Effluen Perindustrian) yang telah mula dikuatkuasakan pada tahun 1979.

Dalam tahun 1985, Unit Penilaian Awal Tapak telah ditempatkan di bawah Seksyen Pembangunan, Bahagian Perancangan dan Pembangunan. Pemprosesan permohonan seperti kilang kelapa sawit, kilang getah dan industri yang tidak diproses di pejabat negeri telah dihantar ke Ibu Pejabat untuk diproses. Permohonan tapak dan keperluan kawalan alam sekitar pada waktu ini telah mula diproses oleh pejabat-pejabat wilayah yang berkaitan.

Manakala, dalam tahun 1989, permohonan penilaian awal tapak, kelulusan bertulis untuk kawalan pencemaran udara dan kebenaran bertulis untuk kawalan pencemaran air telah diproses sepenuhnya oleh pejabat-pejabat negeri.

Dua tahun selepas itu, Unit Penilaian Awal Tapak telah ditukarkan kepada Unit Penyelarasan PAT di bawah Seksyen Input Pembangunan, Bahagian Pencegahan.

Unit Kajian Pelan dan Pembangunan Sumber

Unit ini mula dikenali sebagai Unit Pengawasan Pengurusan Sumber yang telah ditubuhkan dalam tahun 1980. Unit ini telah terlibat dalam memberi input untuk beberapa kajian rancangan wilayah dan projek yang berasaskan sumber.

Dalam masa yang sama juga, satu unit telah ditempatkan di DARA, Pahang dan KETENGAH, Terengganu bagi membantu semasa pelaksanaan projek-projek pembangunan memastikan faktor-faktor alam sekitar diambilkira.

Dalam tahun 1981, unit ini telah ditempatkan di bawah Bahagian Penilaian Kesan Kepada Alam Sekeliling. Lima tahun kemudiannya, unit ini ditempatkan di bawah Seksyen Penilaian, Bahagian Perancangan dan Pembangunan.

Dalam tahun 1987, kerja-kerja mengulas dan memberi input alam sekitar kepada projek-projek pembangunan, seperti infrastruktur, rancangan struktur dan projek-projek yang berasaskan sumber telah diberikan perhatian yang khusus dengan terbentuknya 2 unit dikenali sebagai Unit Input Pembangunan dan Unit Penilaian Sumber Semulajadi, di bawah Seksyen Penilaian, Bahagian Perancangan dan Penilaian. Lima tahun kemudiannya, kedua-dua unit ini telah ditempatkan di bawah Seksyen Input Pembangunan, Bahagian Pencegahan dengan dikenali sebagai Unit Kajian Pelan dan Unit Pembangunan Sumber.

Unit GIS (Geographical Information System)

Unit ini telah mula ditubuhkan dalam tahun 1991 apabila Jabatan Alam Sekitar telah mengenalpasti keperluan unit ini untuk membantu dalam proses perancangan alam sekitar dan membuat keputusan dalam projek-projek pembangunan. Dalam tahun yang sama, pihak MAMPU telah meluluskan cadangan perolehan perkakasan dan perisian GIS dan penggunaan alat ini telah mula beroperasi pada awal tahun 1992.

Pencapaian Seksyen Input Pembangunan

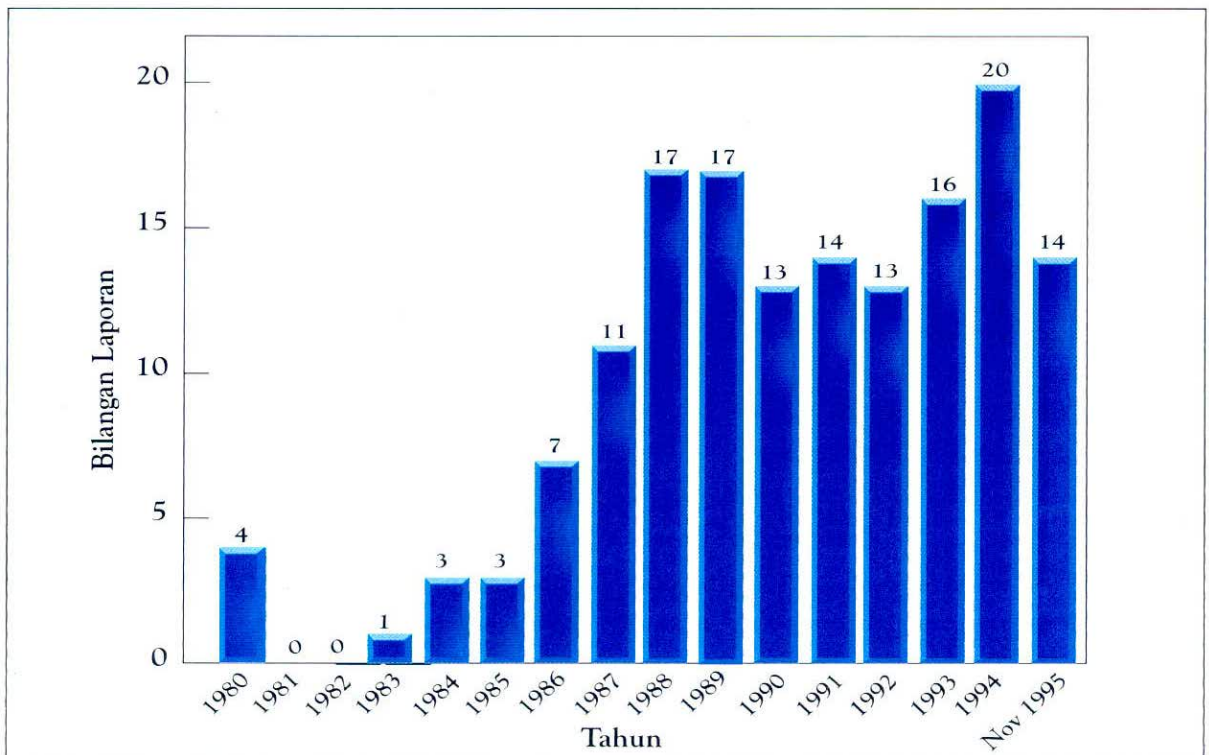
Pencapaian bagi Unit Pembangunan Sumber bagi tempoh 1980 hingga November 1995. Di dalam tahun 70an, ditunjukkan dalam Rajah 1, bilangan laporan yang diterima adalah tidak ketara, tetapi di dalam tahun-tahun 80an dan 90an terdapat peningkatan di dalam jumlah laporan yang diterima oleh JAS. Laporan yang diterima diulas memastikan faktor-faktor alam sekitar diambil kira di dalam projek-projek yang berasaskan sumber alam semulajadi. Bagi pencapaian Unit Kajian Pelan, tren yang sama boleh dilihat dalam Rajah 2. Peningkatan yang ketara boleh dilihat di mana diakhir-akhir tahun 80an dan awal 90an, jumlah bilangan laporan yang diterima oleh JAS bertambah dengan banyak sekali. Rajah 3, menunjukkan pencapaian Unit Penilaian Awal Tapak (PAT). Permohonan-permohonan untuk mendirikan kilang-kilang baru, permohonan untuk

mendirikan sistem pengolahan effluen dan kelulusan untuk alat pembakaran bahan api di proses oleh PAT. Jumlah permohonan yang diterima meningkat setiap tahun di mana sehingga tahun November 1995 sebanyak 7,791 permohonan telah diterima oleh JAS.

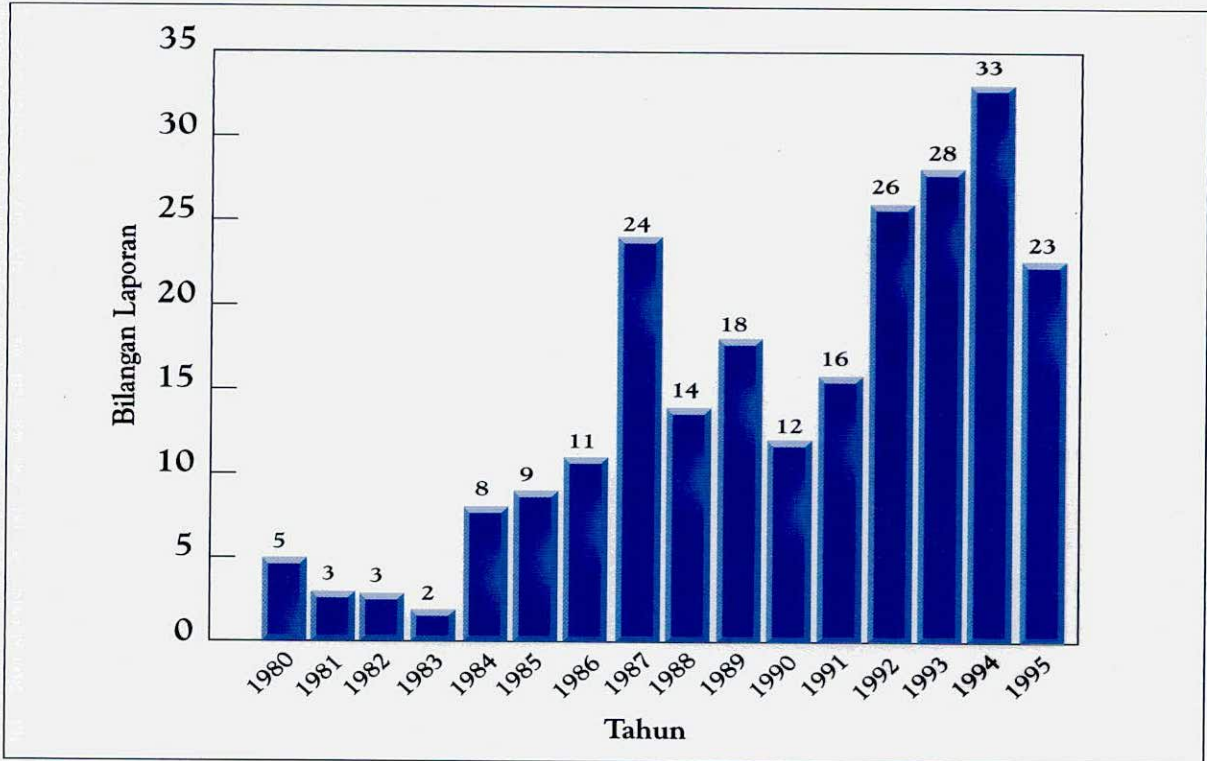
Pada keseluruhannya, peningkatan di dalam bilangan permohonan juga laporan yang diterima oleh JAS menjadi petanda bahawa kesedaran oleh pihak-pihak penggerak projek untuk mengintegrasikan aspek-aspek alam sekitar ke dalam semua jenis projek pembangunan telah terus meningkat.

Bagi unit sistem maklumat geografi, tahun 1993 merupakan tahun penekanan kepada membangunkan pangkalan data, mengenalpasti keperluan data, menjalankan dan menghadiri latihan dan membangunkan prosedur kerja. Satu

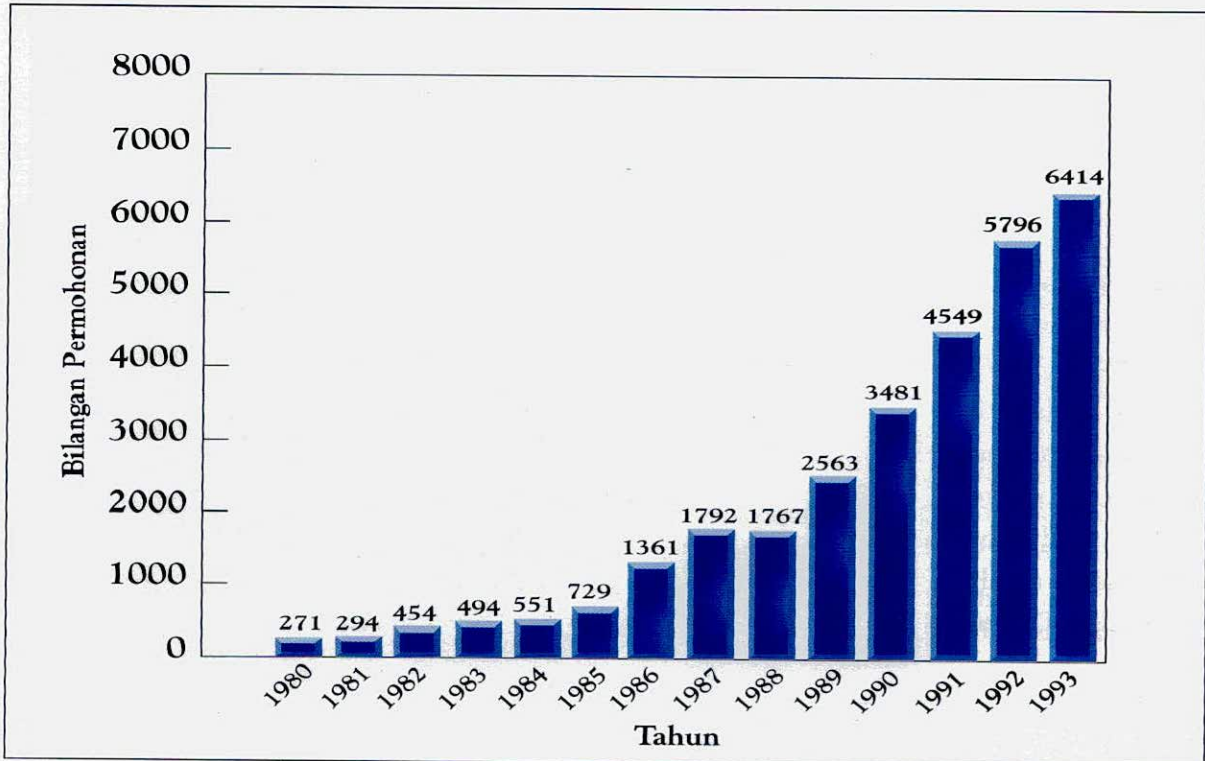
RAJAH 1: MALAYSIA – BILANGAN LAPORAN PROJEK PEMBANGUNAN BERASASKAN SUMBER ALAM SEMULAJADI 1980 - 1995



RAJAH 2: MALAYSIA – BILANGAN LAPORAN KAJIAN-KAJIAN PELAN 1980 SEHINGGA NOVEMBER 1995



RAJAH 3: MALAYSIA – BILANGAN PERMOHONAN PENILAIAN AWAL TAPAK, KEBENARAN BERTULIS DAN ALAT PEMBAKARAN BAHANAPI 1980-1993



pangkalan data berdigit telah dibangunkan untuk Negeri Sembilan selaras dengan Pelan Induk Alam Sekitar untuk Negeri Sembilan, yang dimulakan oleh Unit Perancang Ekonomi Negeri. Pangkalan data berkenaan juga akan menjadi model yang pertama (proto-type) untuk negeri-negeri lain dan mengandungi beberapa maklumat lapisan tematik seperti:

- Sempadan negeri, daerah dan mukim.
- Rangkaian jalan-jalan utama.
- Sistem sungai dan perparitan.
- Gunatanah semasa.
- Hutan simpan.
- Kawasan sensitif alam sekitar.
- Taburan kilang.
- Lokasi takat pengambilan air minuman.
- Kawasan tadahan air.
- Taburan projek-projek yang memerlukan EIA mengikut aktiviti.
- Rangkaian stesen-stesen pengawasan kualiti air.
- Sumber-sumber air empangan yang sedia ada dan yang dicadangkan.
- Cadangan klasifikasi sungai mengikut kegunaan yang berfaedah.
- Klasifikasi keupayaan tanah untuk pertanian mengikut jenis tanah.

Pangkalan data tersebut juga mengandungi peta topografi yang telah diimbas dan image satelit dari landsat TM dan

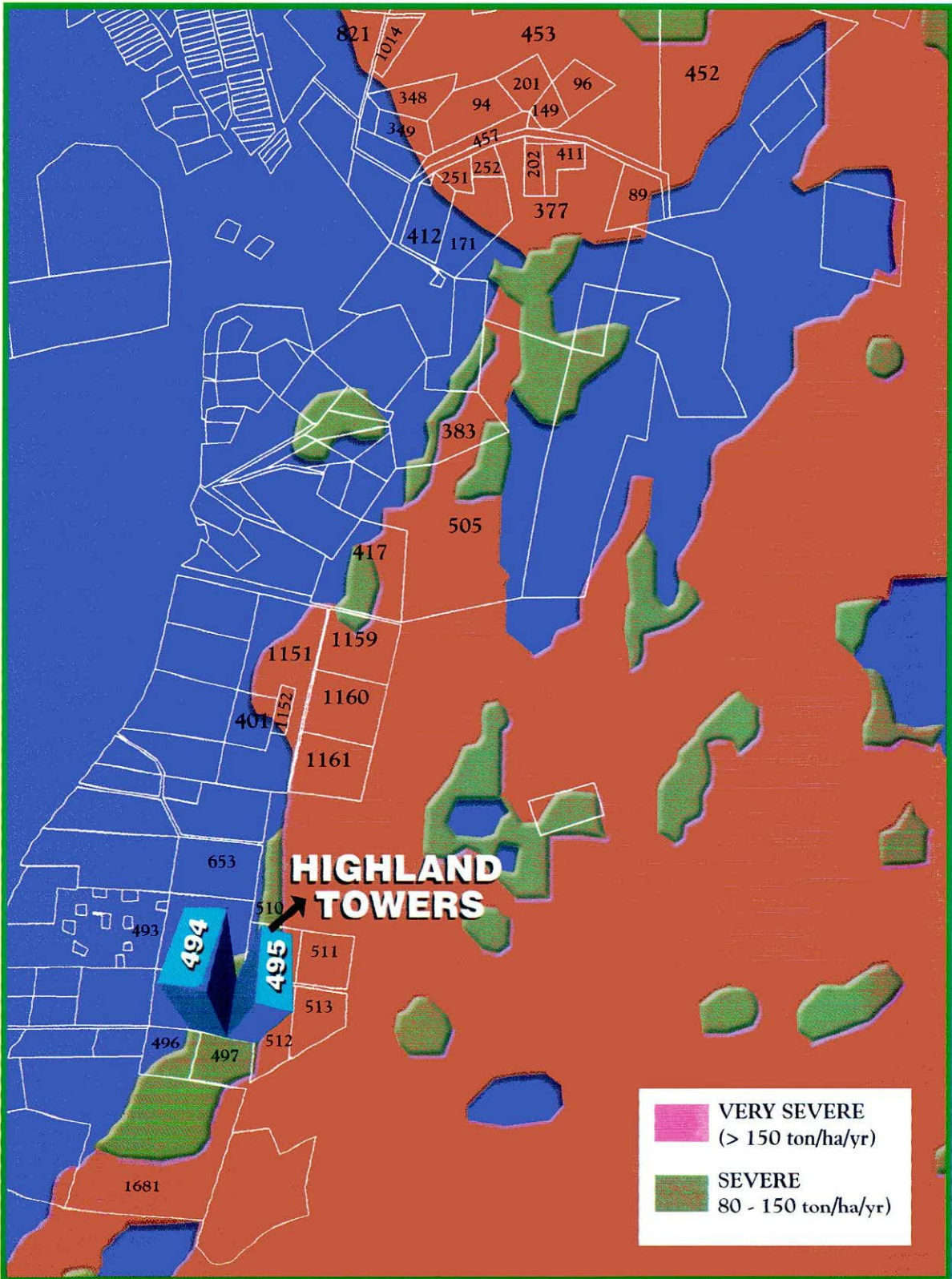
SPOT. Pembangunan pangkalan data berdigit tersebut telah dipercepatkan melalui pemindehan format raster ke vektor oleh syarikat biro perkhidmatan GIS.

Unit ini juga telah menjalankan kerja-kerja usahasama dengan agensi kerajaan yang lain seperti Pusat Remote Sensing Negara, Jabatan Pertanian, Jabatan Parit dan Saliran, Jabatan Ukur dan Pemetaan Negara dan Jabatan Perkhidmatan Kajicuaca untuk pemetaan kawasan risiko hakisan tanah yang berpotensi tinggi bagi kawasan Hulu Lembah Kelang. Peta risiko hakisan tanah berpotensi tinggi telah digunakan untuk ilustrasi perlunya kawalan pembangunan projek di lereng bukit seperti tragedi "Highland Towers".

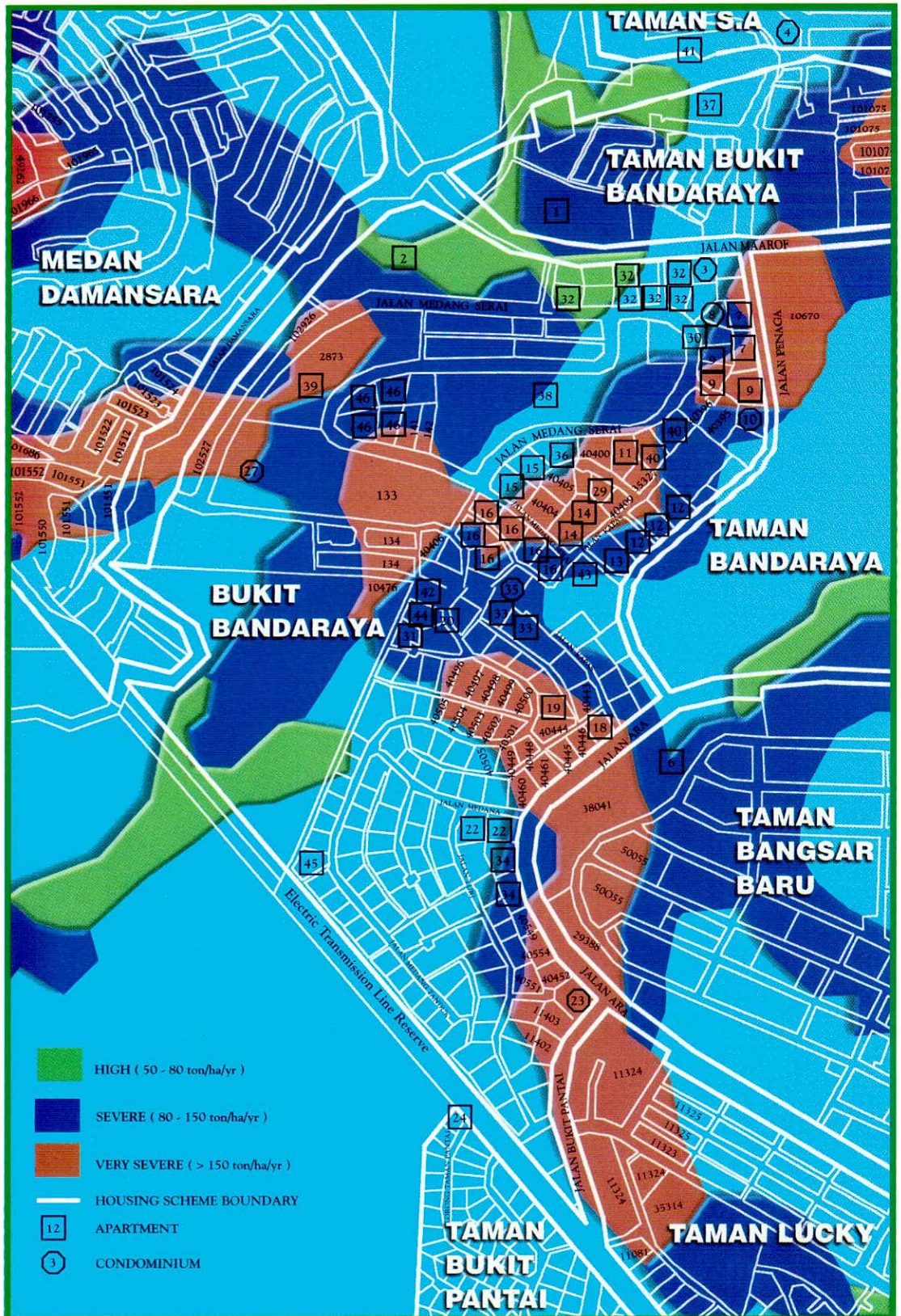
Rajah 4 dan 5 adalah contoh hasil keluaran dari Unit GIS.



RAJAH 4: MALAYSIA – PELAN LOKASI HIGHLAND TOWERS DALAM PETA RISIKO HAKISAN TANAH



RAJAH 5: MALAYSIA – PENINDIHAN PETA HAKISAN TANAH DENGAN KAWASAN PEMBANGUNAN DI SEKITAR KAWASAN BANGSAR DAN DAMANSARA







PERANAN INDUSTRI DI DALAM PEMULIHARAAN ALAM SEKITAR

Oleh

Rahani Hussin

Pegawai Kawalan Alam Sekitar (1980-1994)

Ketua Penolong Pengarah (sejak 1994)

Che' Asmah Ibrahim

Pegawai Kawalan Alam Sekitar (1986-1995)

Ketua Penolong Pengarah (sejak 1995)

Jabatan Alam Sekitar, Ibu Pejabat

SELAMA dua dekad, Jabatan Alam Sekitar (JAS) telah melaksanakan tanggungjawabnya sebagai agensi penguatkuasaan bagi Akta Kualiti Alam Sekeliling, 1974 untuk mengawal dan mencegah pencemaran alam sekitar di negara ini. Dalam melaksanakan amanah ini, JAS telah berhadapan dengan arus pembangunan negara yang begitu pesat dalam pelbagai sektor terutamanya sektor perindustrian. Sektor perindustrian negara telah secara langsung dan tidak langsung menjadi punca utama pencemaran alam sekitar negara.

Adalah agak sukar untuk menguatkuasakan Akta Kualiti Alam Sekeliling, 1974 sepenuhnya ketika negara sedang berusaha mengukuhkan ekonominya di samping mewujudkan peluang pekerjaan sebanyak mungkin. Di satu pihak JAS hendaklah memastikan supaya alam sekitar negara terpelihara manakala di pihak yang lain pula prestasi pembangunan ekonomi negara hendaklah juga dilindungi agar tidak terjejas.

Dalam menghadapi situasi yang rumit ini, JAS mula memikirkan satu strategi pengurusan alam sekitar yang bersesuaian dan berkesan bagi sebuah negara yang sedang membangun seperti negara ini. Salah satu dari strategi yang telah dikenalpasti ialah untuk melibatkan pihak industri dalam penjagaan alam sekitar. JAS yakin bahawa sekiranya pihak industri bertanggungjawab untuk mengawal pencemaran berasaskan mereka sendiri dengan baik, sebahagian dari tanggungjawab JAS telah dapat disempurnakan.

Berdasarkan kepada strategi ini, JAS telah mula mengorak langkah untuk mewujudkan kesedaran di kalangan para industri akan kepentingan pemuliharaan alam sekitar. Proses rundingan dua hala di antara JAS dengan pihak

industri telah diadakan dari semasa ke semasa bagi mendapatkan maklumbalas mengenai keupayaan teknologi dan pencapaian mereka dalam pemuliharaan alam sekitar. Hasil dari usaha sama ini, banyak pengalaman yang telah dapat dikongsi bersama di antara kedua pihak untuk menghasilkan satu sistem pengurusan alam sekitar yang lebih mantap.

Di antara kejayaan yang telah diperolehi dari usaha ini ialah pengawalan pencemaran daripada industri kelapa sawit. Pada tahun tujuh puluhan, ekonomi negara amat bergantung kepada industri kelapa sawit. Pada masa yang sama, pemprosesan kelapa sawit bagi menghasilkan minyak sawit mentah merupakan satu proses yang mencemarkan dan pada ketika itu merupakan punca utama pencemaran air di negara ini. Melalui usahasama di antara JAS, PORIM dan industri kelapa sawit, pencemaran dari industri ini telah berkurangan dan berjaya dikawal di samping terus berkembang sehingga berupaya menjadikan Malaysia sebagai pengeluar utama minyak kelapa sawit mentah di dunia.

Kini teknologi memproses buah kelapa sawit terus berkembang sejajar dengan teknologi pengawalan pencemarannya. Pengurusan hasil buangan tidak lagi dilihat sebagai sesuatu yang tidak mendatangkan hasil tetapi sebaliknya melalui penggunaan semula hasil buangan, pihak industri telah berjaya menjimatkan kos operasi. Industri ini telah meraih kejayaan dengan pengiktirafan di peringkat antarabangsa di mana telah menerima anugerah di Persidangan Dunia di Rio pada tahun 1992. Kejayaan sedemikian tidak akan terhasil tanpa kerjasama erat di antara JAS dengan pihak industri.

Penubuhan Petroleum Industry Malaysia Mutual Aid Group (PIMMAG) adalah merupakan satu lagi kejayaan hasil kerjasama pihak industri dan kerajaan. PIMMAG merupakan sebuah pertubuhan bukan kerajaan yang dianggotai oleh industri-industri petroleum di negara ini dan ditubuhkan untuk membantu JAS dalam melaksanakan tanggungjawabnya. Ia juga menunjukkan sikap keprihatinan sektor swasta ke atas alam sekitar.

JAS telah mengorak selangkah lagi ke hadapan dengan berusaha untuk menggalakkan pihak industri mewujudkan polisi dan sistem pengurusan alam sekitar sendiri. Dengan adanya polisi alam sekitar di peringkat industri, maka pengurusan dan pencapaian pihak industri dalam memulihara alam sekitar akan dapat dipertingkatkan dari semasa ke semasa. Kaedah ini juga akan menggalakkan pihak industri menuju ke arah "self-regulation" yang menjadi matlamat JAS.

Bagi mempertingkatkan pengurusan alam sekitar negara, JAS sentiasa mengamalkan sikap

terbuka dan terus berusaha untuk mendapatkan penyertaan pihak industri. Pelaksanaan Dasar Persyarikatan Malaysia, usaha-usaha ini dijangka akan dapat dipertingkatkan lagi. Di bawah Dasar ini, sejak tahun 1990 JAS telah menempatkan seorang pegawai di Pusat Khidmat Nasihat, Lembaga Kemajuan Perindustrian Malaysia (MIDA). Sebagai wakil JAS, pegawai tersebut adalah bertanggungjawab untuk memberi khidmat nasihat kepada para pelabur dari dalam dan luar negara mengenai keperluan-keperluan perundangan alam sekitar di negara ini. Dengan ini pihak pelabur akan lebih memahami kaedah pengurusan alam sekitar di negara ini dan berusaha bagi mencapai pematuhannya.

Di samping kejayaan yang telah dicapai, masih banyak lagi perlu dilaksanakan oleh kedua-dua pihak iaitu JAS dan pihak swasta dalam pemuliharaan alam sekitar negara. Oleh itu JAS akan terus berusaha dengan pihak swasta ke arah menuju kecemerlangan dalam pengurusan alam sekitar negara.





**EXPPELLING OZONE DEPLETING
SUBSTANCES FROM THE
ENVIRONMENT: MALAYSIA'S
COMMITMENT TO THE MONTREAL
PROTOCOL**

By

Ismail Ithnin

Environmental Control Officer (1985-1997)

Principal Assistant Director (since 1997)

Department of Environment, Head Office

The Depletion of the Ozone Layer

Few people had even heard of the ozone layer, let alone understood its role in preserving life on this planet, until scientists discovered that we were in danger of losing it. The world has suddenly been made very aware of the fragility of this layer of stratospheric ozone 15 - 60 km above the Earth. Yet we need this layer intact if we are to remain protected from the harmful rays of the sun. Its depletion has been linked to the increased incidence of skin cancer, the retardation of the human immune system and the reduction of plant growth. Many potential impacts of ozone depletion are not yet known, but it is believed that the thinning of ozone layer threatens to be potentially catastrophic for life on this planet.

Ozone Depleting Substances (ODS) which include the notorious Chlorofluorocarbons (CFCs) and Halons have been identified as the environmental culprits for ozone loss. These 'miracle' chemicals were first embraced in manufacturing for their stability and versatility, becoming indispensable as aerosol propellants, coolants in refrigeration and air-conditioners, solvents, and in the manufacture of plastic foam. However, the same chemical stability that made these substances a boon to the manufacturing industry has become a serious problem for the environment - these ozone depleting substances can rise to high altitudes remaining unchanged for up to a 100 years. The thinning of the ozone layer, now being experienced is the cumulative impact of decades of ODS emissions into the atmosphere.

The Montreal Protocol - A Global Response to a Global Crisis

The depletion of the ozone layer has been

recognised as a global problem, requiring nothing less than a global solution. In response, 145 countries confirmed their commitment to the cause by signing "The Montreal Protocol on Substances that Deplete the Ozone Layer' on November 27, 1989. It was an important step towards initiating a comprehensive worldwide programme to eliminate the use of newly produced CFCs by the year 2000. The Protocol was further amended in Copenhagen to accelerate the target date for phasing out Halons and CFCs in the developed countries to 1996. Developing countries have been given until 2010 to complete the phase-out of ODS use.

Under Article 10 of the Montreal Protocol, the Multilateral Fund was established in 1991 to support the efforts of approximately 57 developing countries to eliminate the use of these substances.

Malaysia's Commitment to the Montreal Protocol

Malaysia is a signatory of the Montreal Protocol and has from the start been consistently at the forefront of activities to achieve its objectives, both locally and worldwide. The country has served on the Executive Committee of the Multilateral Fund (EXCOM) between 1991 and 1994, chairing the Committee in 1994. EXCOM helps administer vital funding to Protocol-related projects in developing countries.

Malaysia is working towards phasing out CFCs by the year 2000. In this endeavour, the Department of Environment (DOE) serves as the National Focal Point for co-ordinating, monitoring and implementing the regulations of the Montreal Protocol. Malaysia is not a producer of ozone-depleting substances but it

imports these products for use in local industries that manufacture products made with, or containing CFCs such as electronics, foam, air conditioners, refrigeration and aerosols. Halons have been widely used in fire-fighting equipment, while Methyl Bromide is used in agriculture for soil fumigation.

ODS in Malaysia are listed in one of the following categories:

- Annex A* - CFCs and Halons
- Annex B* - CFCs, Carbon tetrachloride and Methyl chloroform (solvents)
- Annex C* - Hydrofluorocarbons
- Annex D* - Methyl Bromide

Malaysia's total consumption of ODS in 1994 was estimated at 10,000 MT. Although the country is certainly not among the largest consumers of these substances, it has wasted no time in implementing measures to speed up their elimination. As early as 1985, a National Steering Committee (NSC) was set up to coordinate the efforts of government agencies such as the Ministry of Science, Technology and the Environment, the Ministry of Finance, and the Ministry of International Trade and Industry, with vital support from the Fire Department, tertiary research and development institutions, representatives of industry, suppliers, consumer groups and local NGOs.

In 1990, an ODS Technical Committee was formed. In addition seven ODS User Sector Working Groups were created to research and identify strategies to replace ozone-depleting substances in each of their allocated sectors. The reports of these Working Groups were essential

in the development of Malaysia's Country Programme to eliminate the consumption and emissions of ODS. The Country Programme was subsequently reviewed several times and the latest update was in 1995.

Malaysia's strategies involved raising public awareness and participation through educational programmes, monitoring the import of ODS through custom control, encouraging the use of ozone - friendly substances as substitutes, and promoting the recycling of CFCs to restrict their emission.

Many of the strategies identified by the Working Groups have received funding from the Multilateral Fund which has been very helpful in supporting Malaysia's initiatives to reduce ODS consumption. Up till December 1995, 80 Malaysian activities and projects had been approved for funding by the Multilateral Fund amounting to approximately US \$25.6 million. Of the projects proposed, 18 have already been executed, successfully phasing out 1,000 metric tonnes of CFCs. So far, an estimated US\$ 8 million has been disbursed to Malaysia from the Fund.

Solvents, aerosols and foam

Between 1993 and 1995, DOE actively conducted campaigns to phase out CFC use in foam production and in aerosols. The Environmental Quality (Prohibition on the Use of CFCs as Propellants and Blowing Agents) Order issued in 1993 further contributed to a substantial reduction in the use of ozone-depleting solvents, aerosols and Halon. These ODS have been effectively substituted with a choice of commercially-available alternatives.

Halon and Methyl Bromide

In June 1990, the Fire Department also made a far-reaching commitment to the Protocol by banning the installations of new halon fire fighting systems, with the exception of those needed for critical uses. They are now actively advocating new ozone-friendly fire-fighting installations. Also, thanks to the responsiveness of the Agricultural Department, the use of methyl bromide in agricultural fumigation has become wholly restricted.

Industry and trade

The Working Groups for industrial sectors have been instrumental in outlining strategies to phase out ODS. In December 1992, MIDA (Malaysian Industrial Development Authority) issued an Administrative Order banning the use of CFCs in all new manufacturing operations.

With the introduction of the Customs Duty (Amendment No 35) Order 1989, there is now an efficient mechanism in place to monitor the use of ODS for statistical purposes, and to regulate trade with non-parties to the Montreal Protocol. It is proposed that the substitution of ODS with alternative products be promoted with tax exemptions for the import of ozone-friendly equipment and technology, and attractive incentives for companies whose products contain ODS substitutes.

Refrigerants

Refrigerants used in air-conditioners and refrigerators comprise the largest proportion of local ODS consumption, accounting for more than 50 per cent of ODS use. A substantial percentage of this is used in Malaysia's growing numbers of road vehicles that use CFC 12 (Freon) as the coolant in their air-conditioners. The MAC (Mobile Air Conditioner) Recycling

Project was organised in 1995 by the newly-formed National Recycling Network to address this sector. The Project received financial support from the Multilateral Fund which enabled it to equip 200 workshops and training centres with the costly recycling equipment needed to recycle CFC 12 in MACs, thus reducing the amount released into the atmosphere, and the need to import fresh supplies.

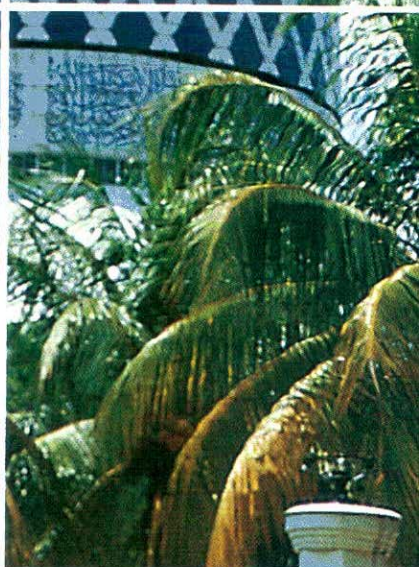
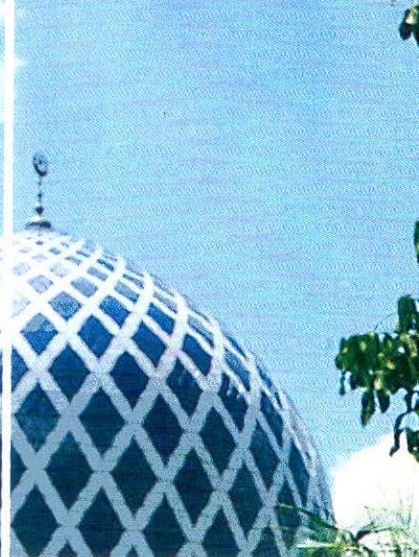
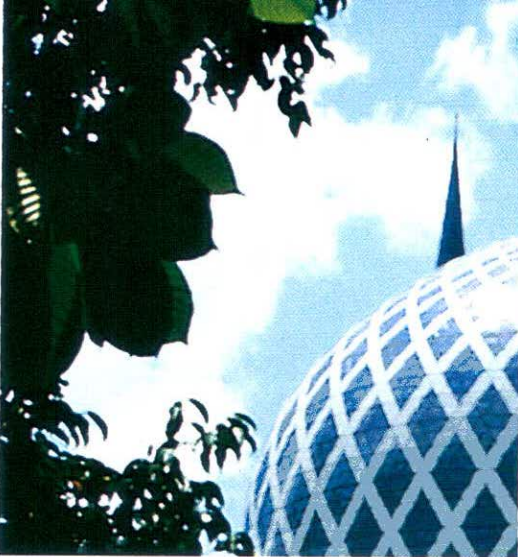
The local car industry also responded to replace ODS use in new cars. For example Malaysia's own Proton Wira uses HCFC 134a, an ozone benign alternative.

Retrofitting is also being made available at minimal cost, as an option to adapt CFC installation to become compatible with alternative ozone-friendly substances. This is in anticipation of the eventual CFC phase out. This technology is now well-established in the refrigeration and air-conditioning sectors.

Despite the work ahead, it is heartening to learn that there are indications that Malaysia's efforts are meeting with success. The Customs Department reports that CFC and Halon use has dropped from 0.29 kg (1989) per capita to 0.24 kg in 1994. This achievement in many ways reflects the collective responsiveness of industry and the government towards fulfilling Malaysia's commitment to the Protocol, and global responsibility to help arrest the depletion of the ozone layer.

Much more remains to be done. The DOE is committed to continue to play a leading role with activities such as to raise public awareness and to steer users of ODSs to safer substitutes.





MALAYSIA'S INFOTERRA:
**BUILDING AN ENVIRONMENTAL
DATA BASE**

By
Roshadah Hashim
Environmental Control Officer (since 1987)
Department of Environment, Head Office

INFOTERRA was established in 1975 following the United Nations Conference on Human Environment (Stockholm 1972). It grew from merely an information retrieval system into a global service geared towards providing substantive environmental information.

The INFOTERRA network consists of 170 access points known as National Focal Points (NFPs), linking approximately 6,800 national and international institutions, non-governmental organisations, industrial and commercial enterprises, academia as well as individual experts.

In Malaysia, INFOTERRA is regarded as an essential part of good environmental management. Its function, like that of other NFPs around the world, is to provide vital information for environmental programmes that will help ensure the sustainable development of our resources.

Malaysia joined INFOTERRA in July 1979 and the National Focal Point was established in the Department of Environment under the Information Services Unit. The Unit collects and collates environmental information, provides query-response services and manages the Department's library. It also disseminates environmental publications such as the Annual Environmental Quality Reports, guidelines, booklets, newsletters, pamphlets and posters to the various target groups.

NFP Query-Response Services

This service covers both local and foreign enquiries on subjects related to the environment. A total of 2,939 queries were handled in 1994, an increase of 8 percent

compared to 1993 which registered 2,719 queries. Out of these, 23 were received and processed through the INFOTERRA network. The rest were queries made through the usage of the environment specialised library or enviro-library, letters and faxes. Queries are also entertained through telephone and the electronic mail.

Queries through the INFOTERRA network came from developed as well as developing countries, such as France, Japan, United Kingdom, USA, Belize, Chile, India, Kenya, Oman, Pakistan, Samoa, Singapore, Sri Lanka, Swaziland and from within the country. The main subject matters, according to INFOTERRA Thesaurus of Environmental Terms, pertained to terrestrial ecosystems, human health, environmental law and institutions, pollution and wastes, environment and development, human settlements, industry and freshwater.

Enviro-Library Services

The Department of Environment's library has a comprehensive collection of environmental reference materials. It has about 14,100 reference materials that include books, technical reports, research documentation, proceedings, journals and magazines, either published locally or overseas, as well as the Department's own publications and unpublished working papers. The library computerised its cataloging work in 1992, by adopting the Columbia Library System (CLS) which enables users to search for materials through On-line Public Access Catalogue (OPAC). In early 1994, OPAC came into full service and was officially launched by the Director-General of the Malaysian National Library on August 6, 1994.

Press coverage of environmental issues continued to increase and hence, the number of newspaper cuttings increased exponentially since 1977. Retrieval of these cuttings is available through the Document Management System (DOCUMAS) or could be searched manually. DOCUMAS also facilitates the retrieval of information on environmental regulations, other relevant Acts and legislations, environmental speeches as well as EIA approval conditions.

The number of library users increases significantly every year, students being the major group, followed by the private sector and environmental consultants. This is an indicator of increasing environmental awareness among the public.

Environmental Publications

Environmental publications in the form of books, magazines, newsletters, brochures, pamphlets and posters are also produced by the NFP. An increase of 54 percent in the number of publications disseminated in 1994 and 67 percent in 1993, compared to the previous years indicate the increasing demand for environmental publications published by DOE.

One such activity was the publication of story books for school children in the lower primary

classes. Ten environment-themed topics were chosen as the theme for the books, namely Water, Air, Habitat, Food, Plants, Rivers, Industry, Town, Transportation and Wastes. This project was initiated to instill environmental awareness from an early age.

FUTURE PROSPECTS

For effective promotion of sustainable development, information has to be made available at all levels, from senior decision makers to the grass-roots and individual levels. However environmental information are available from various sources and therefore a Data Bank should be established to centralise and improve information availability as proposed under Chapter 40 of Agenda 21.

- Under the 7th Malaysia Plan, the DOE proposes to establish an Environmental Information and Education Resource Centre (EIERC). This centre of excellence in environmental information, will consist of a comprehensive core collection of information sources and create a wide range of databases in the field of environment, with links with foreign and international sources. More personnel would have to be engaged and trained for this purpose.



PENGURUSAN BUANGAN TERJADUAL:
20 TAHUN JABATAN ALAM SEKITAR
DITUBUHKAN

Oleh
Abdul Rahman Awang
Pegawai Kawalan Alam Sekitar (1981-1995)
Ketua Penolong Pengarah (sejak 1995)
Jabatan Alam Sekitar, Ibu Pejabat

TAHUN ke 20 penubuhan Jabatan Alam Sekitar telah menampakkan beberapa kejayaan di dalam pengurusan buangan terjadual yang lebih teratur di Malaysia. Ini berikutan dari aktiviti-aktiviti yang dijalankan sejak tertubuhnya Jawatankuasa Kebangsaan Sampah Sarap pada penghujung tahun 1979. Kejayaan-kejayaan yang ketara termasuklah penwartaan dan penguatkuasaan peraturan buangan terjadual, penubuhan kemudahan bersepadu serta kemudahan individu pengolahan dan pelupusan buangan terjadual dan kawalan pergerakan buangan dari satu negara ke satu negara yang lain (import/eksport buangan). Pencapaian setakat ini di dalam pengurusan buangan terjadual adalah hasil dari pembentukan strategi pengurusan buangan terjadual yang diasaskan kepada konsep “cradle-to-grave system” dan pelaksanaan program-program yang berkaitan.

Aktiviti ulung yang dilaksanakan berkaitan dengan buangan terjadual ialah kajian yang dijalankan bagi mengenalpasti punca-punca buangan terjadual dari industri dan masalah yang dihadapi. Kajian ini telah dilaksanakan pada tahun 1981 dengan bantuan teknik Kerajaan Malaysia. Seterusnya kajian pengeluaran buangan terjadual ini dilaksanakan oleh Jabatan Alam Sekitar di antara 1982-1988.

Kajian-kajian kemungkinan yang berkaitan dengan pengurusan buangan juga telah dijalankan. Pada tahun 1985, kajian kemungkinan bagi penubuhan loji pengolahan kimia dan fizikal untuk kilang-kilang di Lembah Kelang terutamanya kilang sadur elektrik telah dijalankan. Manakala pada tahun 1987, kajian kemungkinan mengenai pengolahan dan pelupusan buangan industri telah dijalankan di Malaysia di bawah program bantuan teknik oleh Kerajaan Amerika Syarikat.

Berasaskan kepada kajian awal dan beberapa kajian yang berkaitan mengenai pengurusan buangan terjadual di Malaysia, pendrafan undang-undang untuk mengawal pengurusan buangan terjadual telah dimulakan pada tahun 1985 dengan bantuan Jururunding Denmark di bawah program bantuan teknik ASEAN EEC. Perintah dan Peraturan berikut telah dikuatkuasakan pada 1 Mei 1989:

- Perintah Kualiti Alam Sekeliling (Premis Yang Ditetapkan) (Kemudahan Pengolahan dan Pelupusan Buangan Terjadual), 1989;
- Peraturan Kualiti Alam Sekeliling (Premis Yang Ditetapkan) (Kemudahan Pengolahan dan Pelupusan Buangan Terjadual), 1989;
- Peraturan Kualiti Alam Sekeliling (Buangan Terjadual), 1989.

Penguatkuasaan terhadap Perintah dan Peraturan-Peraturan tersebut tidak berkesan tanpa kemudahan pengolahan dan pelupusan buangan terjadual. Oleh yang demikian di antara tahun 1981-1991, kajian ke atas 91 buah tapak yang berpotensi dijadikan tapak kemudahan pengolahan dan pelupusan buangan terjadual telah dilaksanakan dengan kerjasama Jabatan Penyiasatan Kajibumi dan pihak Kerajaan Negeri yang berkenaan sebelum sebuah tapak di Bukit Nanas di Negeri Sembilan dikenalpasti sesuai.

Pada 4 Disember 1991, Jemaah Menteri telah melantik satu syarikat iaitu Konsortium 1. Kruger yang didaftarkan sekarang sebagai Kualiti Alam Sekitar Sdn. Bhd untuk melaksanakan projek bersepadu untuk memungut, mengangkut, mengolah dan melupuskan buangan terjadual di Malaysia. Surat perlantikan syarikat tersebut telah dikeluarkan pada 8 Januari 1982.

Projek kemudahan pengolahan dan pelupusan buangan tersebut telah diluluskan oleh pihak Kerajaan Negeri Sembilan pada 29 Disember 1983. Pada 26 Ogos 1993 Laporan EIA bagi projek tersebut telah diluluskan oleh Jabatan Alam Sekitar setelah kajian yang terperinci telah dikaji oleh panel EIA yang dilantik oleh Jabatan Alam Sekitar.

Kemudahan yang akan menelan belanja lebih dari RM350 juta ini dijangka akan mula didirikan pada pertengahan tahun 1995 dan tamat pada 1998. Mengikut perancangan projek, pada pertengahan tahun 1996, buangan industri akan dapat dipungut untuk disimpan sementara di kawasan projek cadangan bagi menyelesaikan masalah penstoran buangan terjadual yang dihadapi oleh para pekilang.

Di samping penubuhan kemudahan bersepadu bagi buangan terjadual, Jabatan telah menggalakkan proses penggunaan kembali buangan, pengangkutan, pengolahan dan pelupusan buangan yang sistematik oleh kilang-kilang. Setakat ini, sebanyak 128 lesen telah dikeluarkan kepada pekilang-pekilang bagi tujuan tersebut.

Perkembangan terbaru di dalam bidang pengurusan buangan terjadual adalah penyertaan Malaysia di dalam konvensyen antarabangsa bagi mengawal pergerakan buangan berbahaya di antara satu negara ke satu negara yang lain. Malaysia telah menjadi parti kepada Konvensyen Basel pada 8 Oktober 1993. Konvensyen ini adalah perjanjian antarabangsa untuk menghadkan perdagangan dalam bidang buangan berbahaya yang telah berkuatkuasa pada 20 Mei 1992. Pada prosedur kawalan buangan di bawah Konvensyen ini adalah

melalui prosedur “notification and prior consent”. Keputusan penyertaan Konvensyen adalah berasaskan kepada keputusan Kabinet pada 20 November 1994. Konvensyen ini telah berkuatkuasa dalam Malaysia pada 6 Januari 1994.

Bagi menguatkuasakan Konvensyen Basel, sebelum ini prosedur kawalan di bawah Akta Kastam 1967 telah digubal, iaitu Perintah Kastam (Larangan Mengenai Eksport) (Pindaan) (No.2), 1993 dan Perintah Kastam (Larangan Mengenai Import) (Pindaan) (No.3), 1993. Perintah-perintah ini menetapkan bahawa sebarang eksport/import buangan toksik dan berbahaya (buangan terjadual) perlu terlebih dahulu mendapat kelulusan bertulis daripada Ketua Pengarah Kualiti Alam Sekeliling atau pegawai-pegawai lain yang diberi kuasa olehnya. Perintah ini berkuatkuasa pada 12 Ogos 1993.

Di antara beberapa aktiviti berkaitan dengan Konvensyen ini adalah pemerosesan permohonan import dan eksport buangan. Dari tahun 1993 iaitu semenjak berkuatkuasanya Perintah Kastam tersebut hingga bulan November 1995, sebanyak 145 kes telah diproses. Di samping itu, Malaysia telah dan akan menyertai beberapa mesyuarat di peringkat antarabangsa/serantau yang dikendalikan oleh Sekretariat Konvensyen Basel atau negara berkenaan. Urusan dua hala dengan Singapura mengenai pergerakan buangan terjadual telah dipersetujui semasa mesyuarat Malaysia-Singapore Joint Committee on Environment (MSJCE) pada April 1993 di mana prosedur “one-off notification” diperlukan untuk import/eksport buangan untuk tujuan pemulihan atau penggunaan semula di kedua-dua negara.

Di samping itu, pengajian dua hala di antara Malaysia dan Amerika Syarikat untuk membolehkan pengeluaran buangan di negara ini untuk mengeksport buangan terjadual ke AS telah dimeteri pada 10 Mac 1995.

Bagi mencapai matlamat pengurusan buangan terjadual yang teratur di Malaysia, Jabatan Alam Sekitar telah melaksanakan program-program sokongan seperti perhubungan/perundingan dengan pihak industri, khidmat nasihat, kajian, pendidikan dan kesedaran orang awam terhadap pengurusan buangan serta latihan kakitangan Jabatan Alam Sekitar.







**Sempena 20 Tahun Penubuhan
JABATAN ALAM SEKITAR
PROGRAM PENSWASTAAN PENGAWASAN
KUALITI ALAM SEKITAR**

Oleh
Pauziah Hanum Abdul Ghani
Pegawai Kawalan Alam Sekitar (sejak 1983)
Jabatan Alam Sekitar, Ibu Pejabat

IDE menswastakan pengawasan kualiti alam sekitar dan aktiviti pengurusan data alam sekitar ini telah diilhamkan sendiri oleh Jabatan Alam Sekitar dalam tahun 1990. Dengan ini, terciptalah satu sejarah dalam pengawasan kualiti alam sekitar seumpama ini, yang bukan sahaja pertama kali diadakan di negara ini, malah julung-julung kali pernah dilaksanakan di dunia.

Badan-badan korporat tempatan dan luar negara telah dipelawa untuk mengemukakan cadangan mengenai perkara tersebut. Pada bulan Julai '93, Jabatan telah berjaya mendapat kelulusan daripada kerajaan untuk menswastakan aktiviti pengawasan. Dengan perlaksanaan projek penswastaaan ini, Jabatan Alam Sekitar tidak perlu lagi bimbang tentang perolehan kakitangan tambahan dan juga peruntukan wang untuk membentuk rangkaian pengawasan tersebut. Ini kerana tanggungjawab dan beban berkenaan akan diambilalih oleh pihak swasta yang terlibat. Jabatan Alam Sekitar menganggarkan kos akan berkurangan dari RM40 kepada RM6 bagi setiap percontohan yang dibuat.

Perolehan data melalui program penswastaaan ini dapat dilaksanakan dengan lebih cepat dan tepat, bergantung kepada kadar pengukuran yang dikehendaki, umpamanya setiap minit atau setiap jam. Dengan ini penyebaran maklumat mengenai kualiti alam sekitar kepada orang ramai akan dapat dilaksanakan dengan lebih cekap dan berkesan.

Melalui program penswastaaan ini, bukan sahaja kerajaan dapat menjimatkan kos malah Jabatan Alam Sekitar boleh mengalihkan sumber yang sedia ada dari aspek tenaga manusia dan

keuangan, kepada program-program lain seperti penguatkuasaan, pendidikan alam sekitar dan pembentukan garis-garis panduan mengenai alam sekitar.

Pembelajaran yang diperolehi dari program penswastaaan ini ialah ianya akan membuka peluang yang luas kepada kita mengenai teknik pengawasan yang canggih dan cekap yang dapat menghasilkan keluaran yang lebih cepat dan tepat.

Penilaian data yang berterusan membolehkan penilaian dibuat terhadap keberkesanan program penguatkuasaan undang-undang terutama Peraturan-Peraturan di bawah Akta Kualiti Alam Sekeliling, 1974. Sebelum ini, sistem yang konvensional tidak dapat menyediakan data dan maklumat yang berterusan bagi tujuan penilaian di atas, dan tidak boleh digunakan dalam peramalan kualiti dan kuantiti beban pencemaran yang dihasilkan. Maklumat melalui sistem peramalan ini dapat membantu pihak kerajaan dan swasta dalam pembentukan polisi dan penentuan halacara sektor berkenaan pada masa sekarang dan hadapan.

Nyatalah bahawa melalui penswastaaan ini kerajaan bukan sahaja dapat menjimatkan kos dan meringankan beban perbelanjaan negara dalam bidang pengurusan alam sekitar malah kita akan mendapat pemindahan teknologi tinggi dari negara-negara maju ke Malaysia.

Dengan pertumbuhan ini, satu hari Malaysia akan berupaya menjadi pusat pembuatan alat-alat pengawasan alam sekitar dan mampu menjadi salah satu pengeksport peralatan tersebut yang terbesar di rantau Asia ini dan setanding dengan negara Jepun.





**PENANG DEVELOPMENT CORPORATION
(PDC)**

By
Penang Development Corporation
Penang State Government

SUCCESS OF ENVIRONMENTAL MANAGEMENT IN PENANG PDC'S PERSPECTIVE

Successful Implementation Of EIA Regulations

Since the early days of industrial development, the PDC has always ensured that the environment is not endangered during the course of development. As the main development agency for the State Government, the PDC has been responsible for the successful implementation of the various development projects on behalf of the State Government.

However, when the EIA regulation were gazetted, the PDC has gone one step ahead and successfully used the EIA as an important planning tool in all its development projects. So far, the PDC has obtained approval from the DOE and successfully implemented several major development projects under the EIA regulations.

The secret of PDC's success in implementing the EIA regulations smoothly and effectively, is its close working relationship with the DOE and relevant Government Agencies. At the very early stage of the EIA study and preparation of the report, the comments and proposals of the Government departments are incorporated in the report.

Another important feature is the use of local consultants, where PDC's officers are also part of the team. The use of the EIA procedure as an important planning tool is the key to sustainable development in Penang.

Industrial Development and Promotion

As the agency responsible for industrial promotion in the State, the PDC is in a unique position to identify and promote the right type of industries for the State. Whilst initially the Government was promoting labour intensive industries, the emphasis now is on hitech industries adopting clean technologies.

All applications for industrial land are evaluated carefully to determine their potential for environmental degradation before forwarding to the DOE. During the evaluation, potential investors may be required to submit details of the environmental control systems which includes treatment and disposal options for any waste generated. Information obtained from this exercise is used for overall planning of the industrial park, particularly in relation to the siting and zoning of the industries.

The PDC works closely with the DOE in this respect to ensure that environmentally sensitive industries are identified at the early stage and their operations monitored closely.

Toxic Wastes

One of the major issues related to industrial development in the State of Penang is the management of scheduled wastes (toxic and hazardous wastes). According to a recent survey carried out, Penang seems to be the largest producer of scheduled wastes with 20% of the national output. It is of interest to note that the Northern Region which includes Penang, Perak, Kedah and Perlis produces about 33% of the wastes generated in the country.

In anticipation of this emerging problem, the PDC had identified 2 sites in the new industrial parks it is developing namely, the Bukit Tengah Industrial Park and Bukit Minyak Industrial Park to be used as temporary storage sites.

However, when Kualiti Alam Sdn Bhd (KASB) which was commissioned by the Federal Government proposed a National Integrated System for the Collection, Treatment and Disposal of Scheduled Wastes, they requested a suitable site to be used as a transfer station for the Northern Region.

In view of the urgent need to solve the storage problems faced by local factories, the State Government had agreed to provide the sites

identified, for Kualiti Alam's use as transfer stations. After carrying out the EIA studies for the National System, the site in Bukit Minyak was found to be more suitable, in view of its strategic location close to the North-South Highway.

The Transfer Station in Bukit Minyak will serve as a focal point where all scheduled wastes from the Northern Region will be collected and subsequently transported to the National Waste Treatment Facility for treatment and final disposal. The Transfer Station which is expected to be operational simultaneously with the facility in Bukit Nanas, Negeri Sembilan will solve the storage problems faced by industries in Penang, and at the same time deter the indiscriminate disposal of wastes.





**TWO DECADES OF EXCELLENCE IN
ENVIRONMENTAL MANAGEMENT
IN MALAYSIA**

By
Economic Planning Unit
Prime Minister's Department

TWO DECADES OF EXCELLENCE IN ENVIRONMENTAL MANAGEMENT IN MALAYSIA

The EPU: Plotting Malaysia's Course

In the last two decades, Malaysia has seen a major structural transformation of its economy and experienced significant social changes. With political stability and sound economic policies, Malaysia's economic performance has been remarkable.

Similarly, the welfare of Malaysians has improved significantly, and Malaysia is now ranked among the top five developing countries in the world and aims to be a fully developed nation by the year 2020.

A large measure of this success can be attributed to the development planning carried out by Malaysia. The Economic Planning Unit (EPU) of the Prime Minister's Department, as the agency charged with the responsibility of charting Malaysia's economic, social, cultural and environmental development, is the central agency responsible for formulating the policies, strategies and programmes for this overall development planning.

In drawing up these plans, the EPU has given due recognition to the importance of the environment and the critical role it plays in national economic development.

From the Third Malaysia Plan (1976-1980) onwards, the EPU began to pay serious attention to environmental issues, as these were considered to be essential components of sustainable economic development.

The EPU uses three planning tools, each with a different perspective and time horizon. They are the Outline Perspective Plan, the Five Year Development Plan, and the Mid-term Review of the Five Year Plan. The Outline Perspective Plan sets the broad thrusts, strategies and macro-economic framework for the development of the nation over the long term.

The medium-term or five year plan is the key working document for the implementation of the Government's development programme. It sets out macro-economic growth targets and the size and resource allocation of the public sector development programme. The five year plans also outline the role envisaged for the private sector and identify priorities and guidelines for the major economic sectors to be promoted from which the private sector takes its cue when deciding its own investment policies.

To ensure that the programmes are implemented as planned, the Mid-term Review provides the relevant assessments and identifies possible constraints. Appropriate measure are then instituted to realign and revise the programmes and targets.

It is significant that soon after the adoption of the Environmental Quality Act in 1974, the EPU included a special chapter on environment in the Third Malaysia Plan (1976-1980), which highlighted the importance of environmental considerations in economic and social development.

This emphasis on environment within the context of sustainable development, continued into the Fourth Malaysia Plan (1981-1985), the Fifth Malaysia Plan (1986-1990) and the Sixth

Malaysia Plan (1991-1995). The integration of environmental considerations in the formulation of development strategies, programmes and projects represents a continuing challenge to the EPU, because economic growth and environmental protection are important factors for the future well-being of Malaysians.

During the First Outline Perspective Plan (1970-1990), the EPU addressed issues of poverty alleviation, natural resource development and infrastructure development to cater for both social and economic growth objectives. In line with this, the introduction of the environmental chapter in the Third Malaysia Plan, emphasized that the objectives of development and environmental conservation are kept in balance, so that the benefits of development are not negated by the costs of environmental damage.

Malaysia's environmental policy considered the impact of, among other things, population growth and development on resource use; industrialization and urbanization; the importance of maintaining the quality of the environment compared with the needs of the population, the need to preserve the country's unique and diverse natural heritage; and the interdependence of social, cultural, economic, biological and physical factors in achieving the desired quality of life.

The Fourth Malaysia Plan (1981-1985), saw the introduction of the National Forestry Policy, and enhanced efforts to protect and improve the quality of the environment.

This was followed by the Fifth Malaysia Plan where there was a re-emphasis on the values

needed for development. Besides upholding national interest above ethnic and commercial interests, concern for the environment was inculcated through correct work ethics, entrepreneurship and moral values. The Fifth Malaysia Plan recognized that neglect of the ecological balance in the process of development and progress will result in the deterioration of the environment, which in turn will adversely affect quality of life. It thus stressed that the government alone was not responsible for the protection of the environment; all Malaysians had to play their part in maintaining the cleanliness and beauty of their homes, work premises or public places.

In 1990, the Second Outline Perspective Plan (1991-2000) was formulated. This Plan embodied the National Development Policy (NDP), and contained several policy shifts to further provide new dimensions in Malaysia's development efforts.

The NDP's objectives are to attain balanced development in order to establish a more united and just society. It encompasses the critical aspects of economic growth with equity, issues of national integration, the creation of a progressive society, the development of human resources, the application of science and technology as an integral component in development, and ensuring adequate attention to the protection of the environment.

These ideas and concepts of efficient management of the environment and natural resources as essential conditions for balanced development were incorporated in the Sixth Malaysia Plan (1991-1995). The need to integrate environmental considerations in the formulation of programmes and projects and to

promote the development of better and cleaner technologies were emphasized.

Care was taken to ensure that environmental programmes were effectively implemented to ensure that the poor were not adversely affected by degradation of the environment. In its efforts to achieve sustainable development, the government committed itself to progressively control pollution, conserve natural resources and protect the environment.

In 1993, the EPU also initiated efforts to introduce natural resource accounting. It is intended that these accounts be developed to complement the National Income Accounts in order to assist decision makers ascertain the direction of future growth-based on resource availability and sustainability.

Preliminary work has started on developing various economic and market-based instruments to help take into account environmental costs and to complement command and control measures of protecting the environment and conserving resources.

Greater emphasis is also being placed on increasing the level of public and corporate sector awareness and their sense of responsibility towards the environment.

In addition to systematically integrating economic growth with equity, environmental protection and the eradication of poverty, the EPU has played an important role in soliciting financial and technical assistance from many sources, and co-ordinating proposals prepared by Ministries and line agencies for development assistance.

Even as aid programme funds are declining, assistance for environmental projects is increasing and greater effort will be made to ensure that these resources are used in the most efficient and effective manner.

Increasingly, the EPU has invited the private sector to participate in technical assistance programmes initiated by the government. The EPU also undertook to privatize major environmental management projects, such as the national sewerage project, while other projects in the pipeline include the toxic and hazardous waste treatment and disposal facility, and the national solid waste project.

On the international front, the EPU has been playing an active part in environmental affairs since the United Nations Conference on Environment and Development (UNCED) process began in 1992. The EPU has been appointed the national co-ordinator for the implementation of Agenda 21 and is responsible in co-ordinating the preparation of progress reports to the Commission on Sustainable Development (CSD). The EPU will continue to involve relevant agencies in designing projects for sustainable development and assist them in obtaining training and technical assistance in their respective fields. The EPU will also continue to advise the government's stand on the numerous international conventions to which Malaysia is a party, in order to voice Malaysia's views and concerns and to fulfill international commitments. In addition the EPU, through its Technical Co-operation Programme, has also been providing assistance to other Third World countries in the form of training, expertise and equipment.



Two Decades Of Excellence In Environmental Management In Malaysia

Presently, in preparing the Seventh Malaysia Plan, which covers the period 1996-2000, the EPU has solicited the views and comments from the relevant ministries, the private sector and non-governmental organizations. These dialogues serve to determine common goals, use the synergies of the different groups in society, and to co-ordinate programmes to avoid duplication. As effective management of the

environment and natural resources is an essential condition for ensuring balanced and sustained development, the EPU will strive to develop better techniques towards integrating environmental considerations in the formulation of development strategies, programmes and projects. This is especially important in the light of Malaysia's goal to be a fully developed country by the year 2020.



VALUE-ADDED FOREST MANAGEMENT

By
Forestry Research Institute
Ministry Of Primary Industries

VALUE-ADDED FOREST MANAGEMENT

FORESTS are invaluable for soil and watershed protection, soil generation, energy supply, conservation of biological biodiversity, regulation of climate, recycling of nutrients, carbon sequestration, oxygen release, tourism and recreation. Their sustainable management has been the prime concern of the Forest Research Institute of Malaysia.

Since its formation in 1985, the Forest Research Institute Malaysia (FRIM) has played a crucial role in providing technical inputs required for the sustainable management of our forest resources.

In recent years, with mounting environmental consciousness over forests and forestry practices worldwide, it is therefore inevitable that forestry R&D by FRIM had to be dynamic and forward-looking to ensure sustainable development of the forestry sector while maintaining environmental quality. The following are some of the achievements and contributions of the institute in environmental management in the last two decades.

Saving the Coastline

Among the earliest of FRIM's achievements was battling the problem of coastal erosion of mangroves in Kuala Kedah in the early 80s. FRIM undertook a pilot project study jointly with the Muda Agriculture Development Authority (MADA) aimed at slowing the rate of retreat along 100 metres of the mangrove shoreline at Kuala Kedah.

An offshore breakwater was established using timber piles and disused tyres, and this was followed by enrichment planting of mangroves.

Following the FRIM report, the Prime Minister's Department commissioned a group of foreign consultants in collaboration with Drainage and Irrigation Department (DID) to study the problem of coastal erosion on a nationwide basis. The study was completed in 1985 with recommendations made to undertake feasibility studies to protect several critically eroding areas in the country.

One such study was undertaken jointly by DID and FRIM in Sg. Besar, Selangor. Behind a concrete revetment constructed by DID along the retreating shoreline, FRIM planted mangroves covering an area of about six hectares. A buffer belt of mature mangroves has now been firmly established.

In 1991, FRIM produced a handbook entitled, "Plants for Coastline Planting". The handbook has been useful in providing technical information for coastal vegetation restoration programmes in the country.

Urban Forestry

With the rapid pace of infrastructure development in the country in recent decades, the government has embarked on aggressive greening programmes particularly in urban centres. FRIM has been frequently approached for technical assistance in establishing and maintaining urban trees.

Recognising the wealth of biodiversity of our forests, FRIM has been successful in promoting

the use of indigenous tree species in urban planting programmes as opposed to planting of a restricted range of exotic species as in the past.

Exports of furniture and furniture parts have increased from RM15 million in 1982 to RM940 million in 1993, 70 percent of which were made from rubberwood. Environmentally, the extensive use of rubberwood in furniture making has significantly reduced pressures on harvesting indigenous timbers from natural forests.

Another much sought-after raw material for furniture making is rattan which has become a depleting resource in natural forests.

Through R&D and active promotion by FRIM in collaboration with the Federal Land Development Authority (FELDA) and the Rubber Industries Smallholders Development Authority (RISDA), smallholders and private companies have begun to plant rattan under rubber.

In 1986, a total of more than 7,000 ha were planted. Since then, the extent of rubber estates interplanted with rattan has greatly increased. These efforts will ensure a sustainable supply of rattan to support the furniture industry and at the same time reduce the harvesting of natural forest products.

Wood Wastes

Research on wood wastes by FRIM resulted in the development of a wide range of value-added products. These products are currently manufactured by the wood-based industries and they include blockboards, briquettes, charcoal, particleboard, cement boards and medium density fiberboard.

A recent breakthrough in wood waste utilisation was the development of an oleophilic absorbent for controlling oil slicks. Produced through a novel double pyrolysis double condensation process and patented as "FRIM Sorbent", the absorbent comprises a mixture of rubberwood chips and rice husks.

Tests carried out in the coastal waters off Kuala Terengganu showed that the absorbent has an oil absorption capacity of about 5.5 which is substantially higher than current commercially available absorbents.

When commercially produced, the absorbent could serve as an effective means of addressing problems of oil slick and oil sludge discharge particularly in the Straits of Malacca.

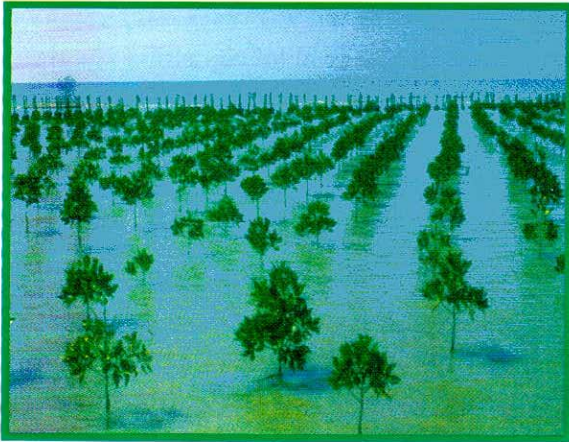
Strategising for the Future

In its 10-year Strategic Plan developed in 1991, FRIM has designed a balanced and realistic manpower and infrastructure development programme to ensure that the forestry sector will have the needed R&D support.

This has taken into account the rapidly changing forestry scenario at the national, regional and international levels.

FRIM's research and development activities will continue to support socio-economic advancement of the country. While forests will continue to be utilised for timber and other products, their strategic role in maintaining quality of life and the environment will be given due recognition.

Value-Added Forest Management



Newly established mangroves planted along an eroding shore at Sg. Besar, Selangor in the mid-1980s.



Forest trees along with other ornamental plants are also widely planted in urban parks.



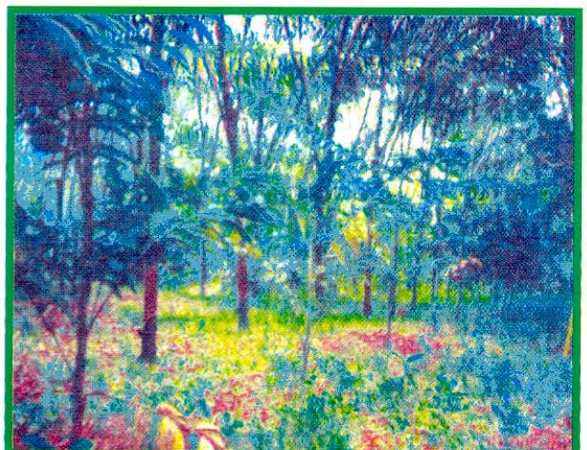
Ten years later, a buffer belt of mature mangroves has firmly established behind the concrete revetment constructed by DID at Sg. Besar.



Rubberwood has fast become a premier choice for furniture making.



FRIM has been successful in promoting the use of indigenous tree species for urban planting. The slide shows the incorporation of forest trees into the urban landscape.



The interplanting of rattan in rubber plantations is becoming increasingly popular among smallholders and private companies. Rotan manau is the most common species planted.





PENGURUSAN ALAM SEKITAR DI NEGERI PERAK DARUL RIDZUAN

Oleh
Unit Perancang Ekonomi
Negeri Perak

PENDAHULUAN

Negeri Perak adalah negeri ke empat terbesar di Malaysia. Keluasannya adalah 21,005 kilometer persegi dan dibahagikan kepada sembilan daerah. Mengikut bancian 1991, Negeri Perak mempunyai penduduk seramai 1.88 juta orang.

Kemelesetan ekonomi dan kejatuhan harga barang mentah telah mendorong Kerajaan Negeri mengambil langkah ke arah menukarkan pergantungan ekonomi semata-mata kepada sektor perlombongan, pertanian dan pembalakan kepada sektor industri dan perkhidmatan termasuk pelancongan.

Walau bagaimanapun, dalam membangunkan negeri ini, aspek alam sekitar tidak diabaikan. Salah satu daripada matlamat Pentadbiran Kerajaan Negeri Perak ialah:

"Mewujudkan di kalangan masyarakat negeri ini budaya yang mengutamakan disiplin, ilmu, kerajinan dan ketekunan berusaha, kecergasan fizikal dan mental, kebersihan dan keindahan alam sekitar"

Bagi mencapai matlamat tersebut Kerajaan Negeri memberi perhatian yang sewajarnya kepada perlindungan alam sekitar dalam melaksanakan projek-projek pembangunan.

Di antara lain, kejayaan dan pencapaian Negeri Perak dalam pengurusan alam sekitar dalam 20 tahun yang lampau adalah penguatkuasaan undang-undang termasuk penggubalan enakmen negeri bagi menangani masalah pencemaran, pengurusan hutan di bawah konsep perolehan berkekalan ("sustainable yield") termasuk hutan paya laut terbesar di Semenanjung Malaysia dan pemuliharaan tanah-tanah bekas lombong.

PERUNDANGAN

Akta Kualiti Alam Sekeliling 1974 dan Peraturan-Peraturan dibawahnya telah dikuatkuasakan dengan lebih berkesan semenjak penubuhan Jabatan Alam Sekitar (JAS) di Negeri Perak pada tahun 1985. Kilang-kilang yang melepaskan air sisa atau pelepasan udara dikehendaki memasang sistem pengolahan effluen dan alat kawalan pencemaran udara.

Perak Quarry Rules 1992

Perusahaan kuari telah berjalan sekian lama tanpa garis panduan atau peraturan khusus bagi mengawal kegiatan tersebut dari segi keselamatan dan pencemaran alam sekitar terutamanya aktiviti letupan batu. Pada tahun 1988, Kerajaan Negeri Perak telah membentuk satu Jawatankuasa Khas bagi mengkaji peraturan baru mengenai perusahaan kuari. Hasil dari kajian tersebut, Kerajaan Negeri telah meluluskan Perak Quarry Rules 1992 yang dikuatkuasakan pada 1 Julai 1992. Negeri Perak merupakan satu-satunya negeri di Malaysia yang mempunyai peraturan khas untuk mengawasi perusahaan kuari. Melalui peraturan ini, pengusaha dikehendaki menyediakan skim kuari yang mengambil kira aspek-aspek keselamatan, perlindungan alam sekitar dan kawalan pencemaran.

Enakmen Pengawalan Penternakan Babi 1992

Selaras dengan arahan Kerajaan Persekutuan bagi mengawal pencemaran alam sekitar yang diakibatkan oleh ternakan khinzir yang tidak dikawal, kerajaan negeri telah meluluskan Enakmen Pengawalan Penternakan Babi 1992. Kerajaan negeri sedang mengubal peraturan di bawah enakmen ini bagi memantapkan lagi kawalan perusahaan ternakan khinzir.

Pengurusan Hutan Paya Laut Matang

Mengikut statistik pada akhir tahun 1993, kawasan-kawasan berhutan Negeri Perak adalah seluas lebih kurang 1,069,425 hektar iaitu 50% daripada keluasan tanah negeri. Daripada keluasan kawasan tersebut, 997,052 hektar merupakan Hutan Simpanan Kekal. Sembilan puluh enam peratus kawasan Hutan Simpanan Kekal merupakan Hutan Darat dan bakinya seluas 43,502 hektar adalah Hutan Paya Laut.

Hutan Paya Laut Matang yang terletak di antara garis lintang 4 15'-5' U dan garis bujur 100 25'-45 T dengan keluasan 40,151 hektar adalah merupakan hutan paya yang terbesar di Semenanjung Malaysia dan telah diiktiraf oleh masyarakat antarabangsa sebagai satu sistem pengurusan Hutan Paya Laut terbaik di dunia. Hutan Paya Laut ini diuruskan di bawah rancangan kerja yang teratur dan lengkap yang mengamalkan giliran tebang 30 tahun. Pada masa ini pengurusan Hutan Paya Laut telah memasuki giliran kedua bagi penggal kedua (1990-1999). Objektif pengurusan Hutan Paya Laut Matang adalah:

- Untuk menghasilkan bahan mentah secara berkekalan untuk perusahaan arang kayu sama ada bagi permintaan tempatan atau luar;

- Untuk mengeluarkan kayu jaras bagi memenuhi permintaan tempatan dan luar;
- Untuk memulihara dan melindungi pinggiran laut dari hakisan ombak dan angin;
- Untuk menghasilkan dan memulihara eko sistem paya laut agar kehidupan tidak terjejas; dan
- Untuk memulihara kawasan hutan yang mencukupi bagi tujuan penyelidikan, pembelajaran dan pelancongan.

PEMULIHAN TANAH BEKAS LOMBONG

Negeri Perak dianggarkan mempunyai baki tanah bekas lombong seluas 26,120 hektar yang berpotensi untuk dibangunkan. Daripada jumlah tersebut lebih kurang 9,001 hektar telah dan dirancang untuk dibangunkan. Aktiviti-aktiviti utama yang dijalankan adalah seperti pertanian, ternakan air, ternakan itik, industri, skim perumahan/kampung tersusun dan pemuliharaan hutan rekreasi.

Pada tahun 1992, Kerajaan Negeri telah menubuhkan sebuah jawatankuasa untuk mengkaji cara-cara untuk membangun dan memulihkan tanah-tanah bekas lombong untuk pelbagai kegiatan ekonomi dengan lebih terancang. Beberapa cadangan bagi meningkatkan pemuliharaan tanah bekas lombong sedang dalam pelaksanaan oleh kerajaan negeri.



PENGURUSAN ALAM SEKITAR DI PULAU PINANG

Oleh
Majlis Perbandaran Pulau Pinang
Negeri Pulau Pinang

MAJLIS Perbandaran Pulau Pinang telah diberi kuasa tertentu yang diperuntukkan di bawah Akta Kerajaan Tempatan, 1976, Akta Jalan, Parit dan Bangunan, 1974, Akta Perancang Bandar dan Desa 1976 untuk mencegah dan memperbaiki kualiti alam sekitar.

Oleh itu, peranan Majlis Perbandaran Pulau Pinang di dalam pengurusan dan peningkatan kualiti alam sekitar termasuk:

- Melancarkan aktiviti pengurusan alam sekitar yang berbentuk aktif “Action-Oriented” di samping memberi kesedaran kepada orang ramai.
- Mencantikkan alam sekitar;
- Dasar Perancangan yang komprehensif (Policy Oriented).

Satu aspek pengurusan alam sekitar ialah menguruskan pemetungan di Pulau Pinang. Majlis Perbandaran Pulau Pinang juga telah berjaya menyediakan Skim Pemetungan Pusat Batu Feringgi untuk rawatan pembuangan najis dan air kumbahan dengan lebih berkesan. Sistem Pemetungan Berpusat ini dapat membantu mencegah pencemaran laut di sekitar Pantai Utara. Kawasan-kawasan lain yang telah menerima perkhidmatan sistem pemetungan pusat adalah kawasan Georgetown dan sekitarnya serta Bayan Baru.

Majlis Perbandaran Pulau Pinang juga telah merancang untuk memperluaskan kawasan-kawasan tadahan bagi sistem Georgetown untuk meliputi Tanjung Tokong di utara, Gelugor di selatan dan Ayer Itam serta Paya Terubong di timur. Rancangan-rancangan ini sedang dilaksanakan secara berperingkat-peringkat.

Majlis Perbandaran Pulau Pinang juga terus memperbaiki pengurusan dan perkhidmatan pembuangan sisa pepejal. Langkah-langkah ini termasuk menyediakan kemudahan-kemudahan untuk pengguna seperti:

- Menyediakan tong-tong sampah di tempat awam
- Pembekalan tong sampah bergerak secara percuma kepada semua premis kediaman (kecuali kepada rumah pangsa yang mempunyai corong pelongsor sampah). Majlis Perbandaran Pulau Pinang telah membekalkan 70,364 buah tong sampah. Harga setiap tong sampah ialah RM73.00 dan kos keseluruhan untuk tong sampah ialah RM2.5 juta.
- Program gunasemula sisa-sisa pepejal telah dilancarkan oleh YAB Ketua Menteri Pulau Pinang pada 17 April 1993 di kawasan Sungai Kelian/Hill Slide, Tanjung Bungah. Program ini bertujuan untuk memberi kesedaran kepada orang ramai tentang pentingnya menjaga alam sekitar. Satu syarikat telah dilantik oleh Majlis Perbandaran Pulau Pinang dalam tempoh percubaan selama satu tahun untuk menjalankan aktiviti kutipan bahan guna semula beroperasi sejak 16 Mei 1995. Projek printis ini telah mencapai kejayaan. Lebih 80% penduduk kawasan terlibat telah memberi kerjasama mereka.
- Majlis Perbandaran Pulau Pinang juga telah menjalankan kerja-kerja landskap untuk memperindahkan pandangan daratan di seluruh kawasan Pulau Pinang. MPPP telah melandskap 32 kawasan di Pulau Pinang.

- Majlis Perbandaran Pulau Pinang juga telah menanam pokok tepi jalan, pokok-pokok dan menggantikan pokok yang telah mati. Dianggarkan sebanyak 36,930 pokok telah ditanam di seluruh Pulau Pinang dari tahun 1985 hingga ke pertengahan tahun ini.
- Majlis Perbandaran Pulau Pinang juga telah menjalankan program gotong royong yang melibatkan belia-belia dari beberapa pertubuhan dan sekolah-sekolah. Satu program “International Youth Village” yang telah diadakan pada 15 November 1994 yang melibatkan belia dari negara Singapura, Brunei, Jepun, Filipina, Indonesia dan Malaysia.

Perancangan jangka panjang Majlis Perbandaran Pulau Pinang untuk meningkatkan kualiti alam sekitar Pulau Pinang terkandung di dalam Rancangan Struktur MPPP 1987.

Objektif ialah “Untuk menjaga dan memulihara kualiti alam sekitar Pulau Pinang dan mencegah kemerosotan kualiti alam sekitar disebabkan oleh pencemaran air, udara, bunyi dan hakisan tanah”.

Strategi

Untuk mencapai objektif di atas, MPPP telah menyediakan beberapa strategi seperti di bawah:

- Memastikan najis dan air kotor dirawat dengan secukupnya sebelum ianya dibuang ke dalam longkang-longkang, sungai-sungai dan laut.
- Terus mengawal pembuangan sampah yang berleluasa untuk mencegah pencemaran longkang-longkang, sungai-sungai dan laut.
- Mengawal pemotongan bukit yang berleluasa dan berlebihan untuk mencegah kecacatan pemandangan dan hakisan tanah dan pencemaran sungai-sungai dan laut oleh mendapan.
- Menimbangkan masalah-masalah pencemaran alam sekitar sedia ada dan yang diramalkan di dalam fungsi perancangan guna tanah dan kawalan kemajuannya.
- Program pengurusan untuk aktiviti ternakan akan dipertingkatkan.

Kawalan Pemaju

Perancangan guna tanah dan kawalan kemajuan menyediakan langkah-langkah jangka panjang untuk mengawal punca-punca pencemaran ke atas alam sekitar. Langkah-langkah tersebut termasuklah:

- Menentukan kawasan-kawasan yang sensitif dari aspek alam sekitar dan pertanian untuk pengendalian dan pemuliharaan seperti hutan simpan, paya bakau, tanah bukit, rezab sungai, akuakultur dan kawasan-kawasan pantai.

Pembangunan di dalam kawasan ini tidak akan digalakkan dan jika dibenarkan, akan dirancang dengan teliti. Laporan Penilaian Kesan Alam Sekeliling (EIA) mestilah dikemukakan dan diluluskan sebelum pemaju boleh diberikan kebenaran merancang.

- Pemisahan industri-industri yang menghasilkan pencemaran dari kawasan-kawasan kediaman.

Beberapa industri sedia ada yang menghasilkan pencemaran di kawasan yang padat penduduknya, dicadangkan untuk dipindahkan ke tempat lain. Zon-zon

pemisah yang secukupnya akan diperuntukkan untuk mengurangkan kesan pencemaran udara dan bunyi dari industri dan lalu lintas.

- ❑ Melarang pemajuan kediaman dan kegunaan berkaitan dengannya di zon kebisingan lapangan terbang.
- ❑ Perancangan jalan-jalan untuk menghalang gangguan laluan terus di dalam kawasan-kawasan kediaman.
- ❑ Memusatkan kandang-kandang khinzir untuk pembuangan dan rawatan najis yang lebih berkesan dan berekonomi.

MAJLIS PERBANDARAN SEBERANG PERAI

Program Kitar Semula,

Majlis Perbandaran Seberang Perai

Majlis Perbandaran Seberang Perai (MPSP) telah pun menyahut seruan kerajaan dalam menangani pertambahan sisa-sisa pepejal dengan mengadakan Program Kitar Semula bahan buangan yang melibatkan kertas buangan, botol-botol kaca dan bekas-bekas minuman aluminium. Beberapa cara dan pendekatan telah digunakan untuk menjayakan program ini antaranya melalui Persatuan-persatuan Penduduk di kawasan perumahan, persatuan alam sekitar di sekolah-sekolah, kelab-kelab kebajikan dan sosial di pejabat-pejabat kerajaan. Sementara di kilang, ianya masih lagi melalui pihak pengurusan.

Program Kitar Semula Di Taman Perumahan

Ianya melibatkan tiga buah taman perumahan iaitu Taman Bagan bagi kawasan Seberang Perai Utara (SPU), Taman Sri Rambai bagi kawasan

Seberang Perai Timur (SPT) dan Taman Sri Nibong di kawasan Seberang Perai Selatan (SPS). Program di kawasan taman perumahan adalah yang pertama kali dimulakan dan majlis pelancarannya diadakan pada 1 Ogos 1993 yang dirasmikan oleh Timbalan Ketua Menteri pada masa itu iaitu YB Dato' Ibrahim Saad. Walau bagaimanapun, perjalanan program ini di kawasan perumahan semakin kurang mendapat sambutan kerana masalah-masalah tertentu seperti persaingan dengan pembeli rumah ke rumah dan masalah pentadbiran persatuan-persatuan penduduk sendiri.

Kutipan Kertas	1993	1994
Taman Bagan	426 kg	992kg

Program Kitar Semula Di Sekolah-Sekolah Rendah

Memandangkan kanak-kanak pada hari ini akan menjadi dewasa pada masa hadapan dan akan menjadi penyumbang kepada pertambahan sisa pepejal adalah perlu bagi kita mendidik mereka ini menangani isu yang kita hadapi pada hari ini agar tidak menjadi masalah pada masa hadapan. Oleh itu, Majlis Perbandaran Seberang Perai telah mengambil inisiatif dengan mengadakan program ini di sekolah-sekolah rendah dengan melibatkan seluruh murid-murid. Ianya diadakan di bawah aktiviti-aktiviti seperti persatuan alam sekitar sekolah dan di bawah pengawasan guru yang bertanggungjawab. Sebanyak 34 buah sekolah mengambil bahagian. Majlis Perbandaran Seberang Perai telahpun membekalkan tiap-tiap sekolah dengan tiga buah tong jenis "Troly Bin". Untuk itu, pelancaran projek di Seberang Perai Utara telah pun diadakan pada 15 Oktober 1994. Sambutan program ini di peringkat sekolah didapati

menggalakkan sehingga kini 1,170 kg “kertas buangan telah dipungut”.

Program Kitar Semula Kertas Buangan Di Pejabat-Pejabat Kerajaan

Adalah difikirkan perlu dikembangkan program ini ke pejabat-pejabat kerajaan kerana didapati pejabat-pejabat kerajaan mempunyai bilangan sampah yang banyak dibuang begitu sahaja. Program ini sedang dilaksanakan di pejabat-pejabat Kerajaan yang berada di Bangunan Tun Syed Shah Shahabuddin, Butterworth dan terdapat sebanyak enam buah Jabatan Kerajaan mengambil bahagian iaitu Pejabat Daerah dan Tanah Seberang Perai Utara (SPU), Jabatan Kerja Raya SPU, Jabatan Pertanian SPU, Jabatan Perikanan SPU, Jabatan Pendaftaran SPU dan Pejabat Belia SPU.

Pelancaran rasmi telahpun dilaksanakan oleh YB Tuan Haji Abdul Latif Mirasa, Exco Kerajaan Negeri Pulau Pinang pada 20 Julai 1995. Majlis Perbandaran Seberang Perai telah membekalkan tempat khas untuk meletakkan guni/plastik untuk mengisi kertas buangan dan juga kotak-kotak khas sumbangan pihak kilang Federal Packages yang membuat kotak-kotak kertas.

Program Kitar Semula Kertas Buangan Di Kilang-Kilang

Program di peringkat kilang-kilang industri yang masih lagi dalam proses

perlaksanaan. Walau bagaimanapun, perbincangan dengan kilang “Chocolate Product” telah pun diadakan dan dengan inisiatif pembeli iaitu Central Sdn. Bhd, kilang tersebut telah mengadakan program ini di peringkat kilang dan sebanyak 2.610 tan kertas buangan telah pun dipungut.

Rancangan Masa Hadapan

Dunia hari ini berkembang pesat dan maju. Berbagai kaedah baru ditemui dalam memproses bahan-bahan semulajadi dan bahan yang telah diproses. Oleh itu, Jabatan Keselamatan sedar bahan-bahan yang susah reput seperti plastik dan tayar-tayar terpakai perlu dicari jalan untuk tidak dibuang begitu sahaja di tapak pelupusan. Jabatan ini telahpun mengenalpasti pihak-pihak atau kilang-kilang yang memproses semula bahan-bahan tersebut.

Usaha juga sedang dijalankan untuk mengenalpasti pihak-pihak atau kilang-kilang yang dapat memproses semula minyak enjin kereta. Selain dari itu, Jabatan ini sedang merangka cara-cara untuk melaksanakan program kitar semula bahan daripada plastik dan tayar-tayar terpakai. Kini maklumat-maklumat mengenai penjual-penjual tayar sedang dikumpul. Jika tiada apa-apa halangan, program kitar semula untuk bahan-bahan tersebut akan dilancarkan tidak lama lagi.



PENJAGAAN ALAM SEKITAR DI PERINGKAT MAJLIS BANDARAYA

Oleh
Majlis Bandaraya Johor Bahru
Negeri Johor

Pembangunan Negeri Johor yang pesat perlu diseimbangkan dengan penghijauan alam semulajadi. Dari itu, adalah penting untuk mengawal, mengenalpasti dan mengekalkan kawasan-kawasan yang mempunyai ciri-ciri kecantikan semulajadi. Sumbangan utama yang diberikan oleh Majlis dalam pengurusan alam sekitar ialah dengan menyediakan dasar yang berkaitan dengan penjagaan dan pemuliharaan alam sekitar melalui Rancangan Struktur Majlis Bandaraya Johor Bahru (MBJB).

Rancangan Struktur MBJB 1994 menganggarkan bahawa terdapat lebih kurang 800 hektar ruang rekreasi awam dan persendirian di kawasan Majlis Bandaraya Johor Bahru. Kawasan seluas 1,920 hektar diperlukan untuk menampung penduduk dan menyeimbangkan pembangunan di Johor Bahru menjelang tahun 2010.

Kawasan hijau yang dimaksudkan adalah kawasan pertanian yang terletak di antara kawasan-kawasan yang telah ditetapkan untuk pembangunan, kawasan-kawasan di sepanjang Selat Johor dan sungai-sungai utama yang merupakan rezab sungai atau rezab pantai dan Hutan Simpan Sungai Johor.

Kawasan-kawasan semulajadi seperti hutan, tebing sungai dan pinggir pantai akan dilindungi dan dibangunkan bagi tujuan rekreasi oleh MBJB dengan tidak mencemarkan ekosistem yang ada. Berpandukan dasar ini, MBJB sedang membangunkan dan memulihara Sungai Skudai, Sungai Tebrau dan Sungai Plentong untuk tujuan rekreasi.

Dalam usaha membangun, mencantikkan dan menjaga kepentingan awam terhadap pinggir pantai dan sungai, beberapa langkah telah

	1992	1995	2000	2005	2010
Keperluan kawasan lapang dalam hektar	690	800	950	1,100	1,240
Tambahan keperluan tanah tambahan (hektar)	130	240	390	540	680

Dasar Penghijauan Alam Sekitar

Rancangan Struktur mempunyai siri dasar yang berkaitan dengan rezab untuk penghijauan alam sekitar. Penyediaan kawasan rekreasi, persekitaran yang hijau dan promosi terhadap persisiran pantai sebagai aset awam yang berkualiti tinggi diberi keutamaan. Dalam usaha ini, Majlis telah mengenalpasti kawasan hijau yang terdapat di seluruh kawasan MBJB untuk dikekalkan, dipulihara dan dibangunkan untuk diseimbangkan dengan pembangunan.

diambil oleh MBJB. Antaranya ialah menggalakkan pihak swasta membangunkan kawasan di sepanjang Selat Johor, Sungai Skudai dan Sungai Tebrau. Penekanan juga diberikan untuk menaikkan taraf kawasan rekreasi sedia ada.

Selain dari membangunkan Sungai Skudai sebagai kawasan rekreasi, MBJB sedang meningkatkan taraf kemudahan rekreasi sedia ada di hadapan Istana Bukit Serene.

Kemudahan seperti Taman Permainan Kanak-Kanak dan gelanggang tenis telahpun disediakan. Fasa seterusnya akan merangkumi kemudahan permainan untuk semua lapisan umur masyarakat, kemudahan sukan air, rekreasi menjalar lengkap dengan galeri seni, perkampungan warisan, mercu tanda, tempat letak kereta dan pokok-pokok untuk tujuan lanskap.

Untuk menggalakkan penglibatan pihak swasta dalam membangunkan kawasan rekreasi tersebut, sokongan dalam bentuk insentif disediakan dengan membenarkan aktiviti-aktiviti komersial dijalankan dalam kawasan rekreasi tersebut dengan tidak melebihi kadar 30% daripada keseluruhan kawasan pembangunan. Aktiviti komersial yang dibenarkan adalah seperti restoran terapung, galeri seni, perkampungan warisan, chalet dan aktiviti sukan air.

Walau bagaimanapun, dalam usaha Majlis menggalakkan aktiviti rekreasi di pinggir pantai dan sungai, penjagaan alam sekitar dititikberatkan bagi menjaga dan memperbaiki pemandangan dan atmosfera Johor Bahru serta memastikan keadaan ekosistem sedia ada dan komunitinya tidak dimusnahkan. Penekanan juga diberikan kepada pengekalan pokok-pokok dan kawasan-kawasan hijau sedia ada bersama-sama dengan lanskap dan penanaman pokok baru sebagaimana yang ditetapkan dalam dasar alam sekitar:

“Pemaju dikehendaki memelihara pokok-pokok sedia ada serta tumbuh-tumbuhan sebanyak mana yang boleh dan menanam pokok-pokok baru dan membina lanskap. Di samping itu, ke semua skim hendaklah membantu dan

melindungi hutan bakau dan kampung tradisional orang Melayu yang terdapat di sepanjang pinggir sungai dan pantai.”

Selain daripada projek pembangunan kawasan Sungai Skudai, Majlis juga sedang membangunkan sebuah kawasan rekreasi peringkat wilayah di Tasek Utara, Johor Bahru seluas 50 ekar iaitu Kawasan Rekreasi Hutan Bandar. Konsep pembangunan Hutan Bandar ialah mengekalkan hutan sedia ada di samping menyediakan pelbagai kemudahan yang bersesuaian dengan konsep hutan seperti tapak perkhemahan, kolam untuk memancing, “spiritual mound”, “sculpture park”, “adventures playground,” “natural amphitheatre,” “ecological park”, “picnic spot”, pentas terbuka, taman burung, taman orkid yang dihubungkan melalui sistem pejalan kaki yang baik.

Dari segi kawalan pembangunan, Majlis juga menitikberatkan pengawalan alam sekitar sama ada dari segi pencemaran udara, bunyi, bau dan kemerosotan nilai-nilai estetika. Untuk mengindahkan pandangan alam sekitar di sepanjang laluan utama ke Bandaraya Johor Bahru, penanaman pokok dan melanskapkan kawasan akan digalakkan terutama di sepanjang lebuh raya Utara-Selatan dan lebuh raya Pasir Gudang dalam usaha menambahkan keindahan, mengurangkan pencemaran bunyi dan kesan pencemaran dari pembangunan di kedua-dua belah bahagian.

Pada masa ini, usaha-usaha tersebut telah pun dijalankan di sepanjang jalan-jalan utama dan di sepanjang landasan keretapi. Usaha ini akan dipertingkatkan di sepanjang Jalan Skudai, Jalan Larkin, Jalan Tebrau, jalan ke arah pelabuhan Johor dan pusat pemeriksaan kastam.

Gerai-gerai makan dan buah-buahan yang berselerak yang mencemarkan pemandangan juga dipusatkan di satu kawasan yang khas melalui program reformasi penjaja. Garis panduan bagi perletakan papan iklan juga telah disediakan bagi menentukan kedudukan papan iklan di sepanjang jalan-jalan utama tidak menimbulkan kesan buruk terhadap pandangan, alam semulajadi dan alam bina. Bagi permohonan kawasan-kawasan perumahan, pemaju dikehendaki menyediakan kemudahan rekreasi yang mencukupi piawaian yang telah ditetapkan dan dilaksanakan sepenuhnya. Malahan konsep Pusat Rekreasi Bersepadu (Central Recreational Areas) digalakkan untuk

memastikan keperluan kawasan lapang/rekreasi mencukupi dan digunakan sepenuhnya.

Bagi penyediaan kawasan perdagangan dan perindustrian, penyediaan zon pemisah adalah diperlukan untuk mengurangkan kadar pencemaran.

Majlis Bandaraya kini giat berusaha untuk membangunkan beberapa kawasan yang telah dikenalpasti untuk tujuan kemudahan rekreasi dan kawasan lapang/hijau. Usaha ini dibuat sebagai satu langkah untuk mengimbangkan pembangunan bandar dengan alam sekitar.







WINDS OF CHANGE IN SABAH

By
Ministry Of Tourism and Environmental Development
Sabah State Government

SABAH is determined that industrial and agricultural development will not be at the expense of its rich natural heritage. The Ministry of Tourism and Environmental Development has already put in place a policy that will ensure that progress is achieved on a sustainable basis.

In the mid-1970's Sabah embarked on an era of development which resulted in rapid changes in the state and its economy. Various industrial and agricultural programmes, helped accelerate efforts to build the state infrastructure. The programmes, however, posed several new challenges which led to the formulation of environmental policies, progressively paving the way for more effective management of the state's environment and its resources.

The landmark response to the changing circumstances was the establishment of a Ministry to deal specifically with environmental matters. The Ministry of Manpower and Environmental Development was created on July 17, 1976, to replace the Ministry of Co-ordination. It had the added responsibility of managing and monitoring the effects of development on the environment.

Five years later, in 1981, the Ministry underwent a change of name. It became the Ministry of Resource Development with no significant changes in its functions and responsibilities. It remained as such until 1985 when it resumed its previous name, Ministry of Manpower and Environmental Development, to reflect its fundamental objectives and functions relating to the development of the state's human resources and the environment.

A fourth change took place in 1987 with the addition of a new dimension to reflect changing development and corresponding needs. The Ministry of Tourism and Environmental Development (MTED) was created giving greater recognition to the importance of tourism in the state's development.

With the latest change the Ministry became responsible for the Wildlife Department, created in 1988, as well as the Sabah Parks, first established by enactment in 1962.

From the outset the Ministry has progressively upgraded efforts to provide more effective management and monitoring of the environment. To meet these demands posed by accelerated development in the state, the Ministry established management and evaluation committees composed of other government departments and agencies concerned with other aspects of the environment.

With the extension of the Federal Department of Environment to Sabah on March 15, 1981, the Environmental Development Division of the Ministry works closely with the Federal Department of Environment to enforce the Environmental Quality Act 1974 in Sabah.

There is still no state environmental legislation formulated and MTED continues to function as an advisor on physical environmental matters and increasingly on land use planning. The Ministry also carries out specific environmental monitoring duties. Since 1980 it has organised small scale environmental education programmes and campaigns targetted at schools and the public.

As part of Sabah's conservation efforts, several large tracts have been set aside as parks, wildlife reserves and sanctuaries, through the Wildlife Department and the Sabah Parks. Their functions and activities have provided important resources for the rapid growth of nature tourism in Sabah. In the past two decades four new parks were created; they were the Turtle Islands (1977), Pulau Tiga (1978), Tawau Hills (1979) and the Crocker Range National Park (1984).

The Wildlife Department manages the Tabin and Kulamba reserves as wildlife sanctuaries, both of which were gazetted under the Forestry Legislation in 1984. Currently, the Kinabatangan Wildlife Sanctuary, a prime nature tourist attraction, is being established. The Department is responsible for enforcing the Fauna Conservation Ordinance 1963.

Expansion of Protected Areas

Since 1976, Sabah's land area under legal state protection saw a three-fold increase from about 3 percent to about 10.11 percent at present. Twenty years ago, the protected areas were in the Kinabalu Park, (gazetted in 1964), Tunku Abdul Rahman Park, (gazetted in 1974), the Crocker Range Forest Reserve, some protected forest reserves and virgin jungle reserves.

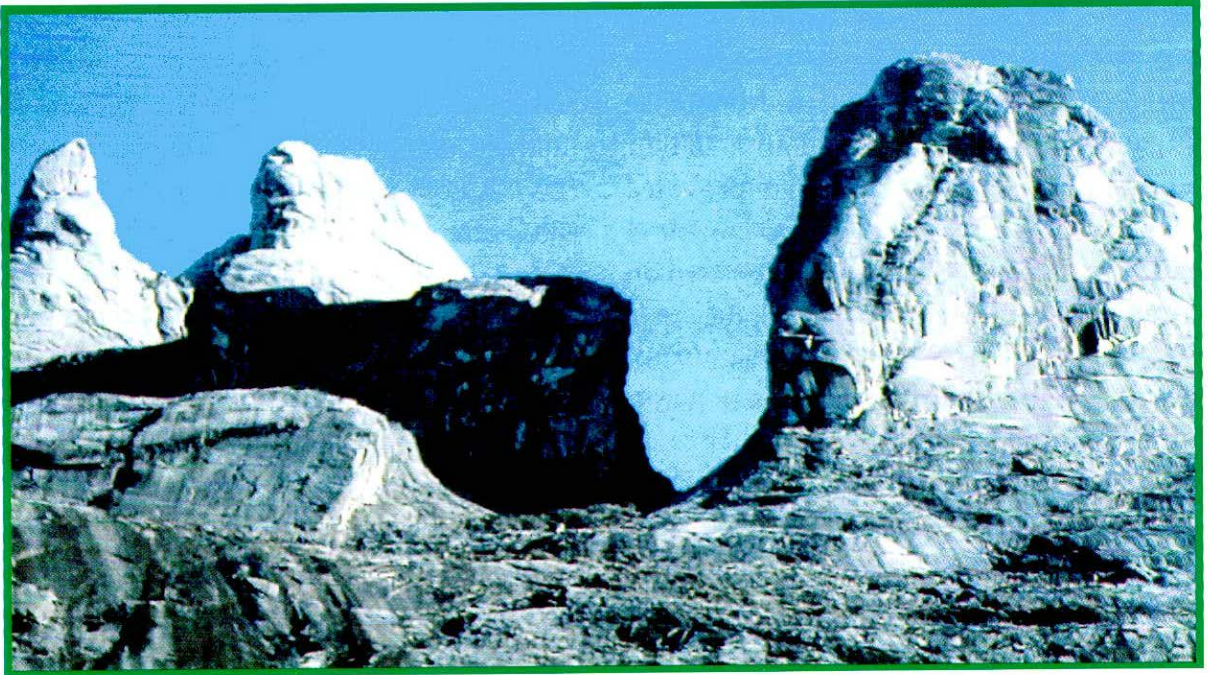
Today the protected areas include Sabah Parks which alone constitutes 2.6 percent of Sabah's total land area, protected and wildlife reserves and sanctuaries and forest reserves which cannot be logged. More wildlife sanctuaries are being planned.

As a principal member of the management committee of the Danum Valley Field Centre in Lahad Datu District, MTED is closely involved in the Danum Valley Conservation Area (DVCA) covering 43,800 ha. As a Class I (Protection) Forest Reserve, it is protected against logging and other disturbance. The Centre which was established in 1984, has affiliations with several state and federal agencies, national universities and the Royal Society of the United Kingdom.

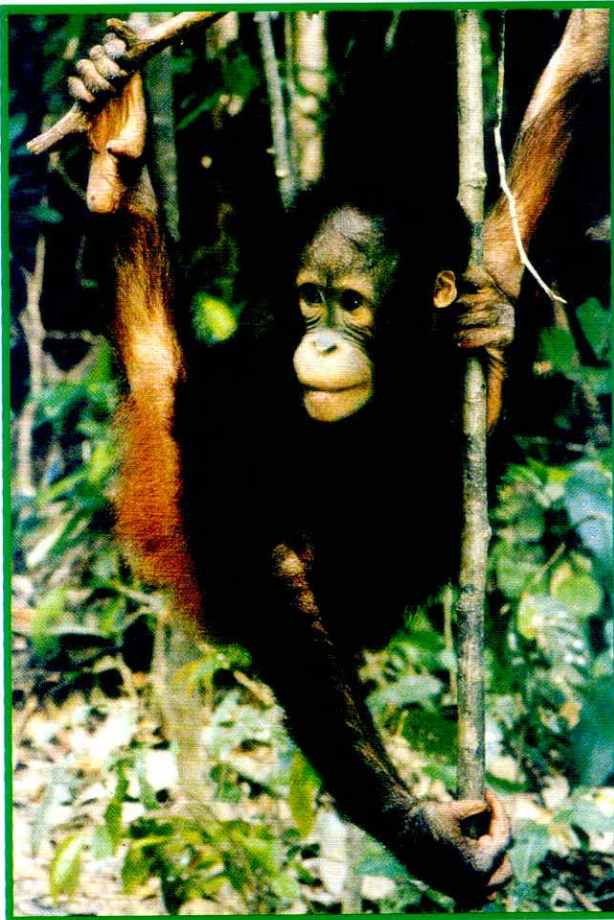
Environmental and Related Studies

In 1990, MTED contracted World Wide Fund for Nature Malaysia (WWFM) to prepare a conservation strategy for Sabah to cover land use and its management, environmental degradation and conservation. The study report, called the Sabah Conservation Strategy, was adopted by the State Development Planning Committee in 1992, and several of the recommendations are currently being implemented.

As part of the long-term plan to manage the environment effectively, and as a member of the National Steering Committee for the National Eco-tourism Masterplan, MTED has commissioned a Sabah Tourism Masterplan study. The study, due for completion by the end of 1995, will contain guidelines on resource use and management of the environment. MTED is now looking into environmental information gathering systems for long-term monitoring and management purposes.



View of Mount Kinabalu, at Kinabalu Park, is the highest peak in Southeast Asia. The remarkable diversity of the flora in this park continues to attract the interest of scientists world-wide.



An orang-utan at the Tabin Wildlife Reserve at Lahad Datu.



Rafflesia keithii, a species of the largest flower in the world, found at Kinabalu Park.



A green turtle on Selingan Island, Turtle Islands Park.





THE GREENING OF SARAWAK

By
Ministry Of Culture And Tourism
Sarawak State Government

TO the outsider, Sarawak may seem like an untamed land, rapidly being stripped of its trees by unscrupulous timber barons, leaving behind a vast swath of desecrated rain forest. This image could not be further from the truth. While large tracks of land are being harvested of its timber, a vast portion of Sarawak remains under green cover.

The greening of Sarawak began in the 1950s with the enactment of legislation for the sustainable management and use of natural resources. The enforcement of this legislation has enabled the state to designate six million hectares of its natural forests as Permanent Forest Estate (PFE) and just over one million hectares as Totally Protected Areas (TPA). The 1.7 million hectares of State land that remain are gradually being designated to either of these categories.

Over the last few decades, ecologically and environmentally sound forest management practices have been developed to ensure sustainable yield and forest development. These practices have been implemented through the Forest Management Plan.

The Forest Management Plan is a legal document and is part of the Forest Timber License which is given to each forest management unit or concession. The Plan contains, among other things, a description of the physical and biological system of the area, the objectives of management, the timber stand volume and cutting cycle and minimum cutting diameter limits. It also specifies the annual allowable harvest, the environmental protection requirements and the duties and responsibilities of the concession holder.

Over the last 20 years in Sarawak, forest harvesting has closely adhered to this Forest Management Plan which is carried out according to the Selection Felling System; mature and over-mature trees are harvested, leaving behind the other trees to generate regrowth, thereby assuring the sustainability of the forests.

The most recent technological innovation in forest harvesting has been the introduction of helicopter logging in April 1994. Presently, five helicopters, each capable of lifting 5 square meters of logs per lift, are used in logging operations in various parts of Sarawak. The use of these helicopters has helped minimise adverse environmental impacts on the forests.

Sarawak is keenly aware of the role its forest plays in maintaining environmental stability and the need for forest conservation to protect the state's natural heritage. Sarawak's forest provides sanctuary for wildlife and is an invaluable store-house of genetic resources. In recognition of this, since the early 1950s, areas of primary forests have been set aside as Totally Protected Areas; these constitute 1.03 million hectares, or 12 per cent of the total forest cover in Sarawak. These areas have been gazetted as National Parks, Wildlife Sanctuaries, Wildlife Rehabilitation Centres, a Nature Reserve and a Marine Park. They receive protection under the National Parks Ordinance. To date, the State has established 11 National Parks, three Wildlife Sanctuaries, two Wildlife Rehabilitation Centres, a Nature Reserve and a Marine Park.

To complement the strategy of protecting and preserving genetic resources in protected areas, additional measures have been taken to support conservation efforts. The Wild Life Protection

Ordinance ensures that plants and animals considered to be endangered are actively protected by law. In the past ten years, more than 20 species of plants and 60 species of animals have been put under protection following the provisions of the Ordinance.

The protection of water bodies is also an integral part of environmental planning in Sarawak. Forested lands have been gazetted as Water Catchment Areas since 1959. Presently, 11 areas have been designated as Water Catchment Areas for the state, while another 25 areas have been proposed.

The National Resource and Environment (Amendment) Ordinance enforced since February 1994, requires Environmental Impact Assessments (EIAs) for most development

projects. These include agricultural development, logging, and the development of commercial, industrial and housing estates. Other activities that may require an EIA are those that may pollute inland water, affect sources of water supply and the state's fisheries, activities that may endanger marine or aquatic life and plants in inland waters, mining and projects which threaten to erode river banks.

The Sarawak Forestry Department has been responsible for the enforcement of the provisions of the Forest Ordinance, National Parks Ordinance and the Wild Life Protection Ordinance since the early 1950s. To enforce the provisions of the National Resources and Environment (Amendment) Ordinance, the Natural Resources and Environment Board was established in 1994. Its efforts are on-going.





STRATEGI PERANCANGAN & KAWALAN PENCEMARAN ALAM SEKITAR BAGI PROJEK KLIA

Oleh

Noor Alshuridin Md. Salleh

Pegawai Kawalan Alam Sekitar (1980-1995)

Ketua Penolong Pengarah (1995-1996)

Jabatan Alam Sekitar, Ibu Pejabat

LATARBELAKANG

Selaras dengan keperluan Perintah Kualiti Alam Sekeliling (Aktiviti Yang Ditetapkan) (Penilaian Kualiti Alam Sekeliling) 1987 Akta Kualiti Alam Sekeliling 1974 dan (Pindaan) 1985, satu laporan kajian terperinci penilaian kualiti alam sekeliling (EIA) KLIA Sepang telah dikemukakan kepada Jabatan Alam Sekitar pada 13 Mac 1993. Laporan kajian EIA tersebut telah dipamerkan di tempat-tempat awam mulai bulan Mac hingga April 1993 untuk mendapatkan pandangan orang ramai. Setelah mengambilkira saranan-saranan panel “ad hoc” EIA serta pandangan-pandangan orang ramai, laporan EIA berkenaan telah diberikan kelulusan bersyarat pada 28 Februari 1994 oleh Ketua Pengerah Kualiti Alam Sekeliling. Fasa pertama KLIA yang melibatkan pembangunan kawasan seluas 2,500 hektar dijangka mula beroperasi menjelang awal Januari 1998 dan berkeupayaan menampung 25 juta penumpang setahun sehingga tahun 2003.

Di peringkat awal pelaksanaan projek KLIA, aspek-aspek pengurusan alam sekitar seperti mana yang terkandung dalam syarat-syarat kelulusan laporan terperinci EIA telah diambilkira semasa penyediaan plan tatatur dan rekabentuk kejuruteraan. Kemudahan-kemudahan bagi sistem kawalan pencemaran alam sekitar seperti loji rawatan kumbahan dan effluen-effluen industri berpusat dan pengurusan sisa-sisa pepejal telah dirancang bagi operasi KLIA. Plan kegunaan tanah termasuk kawasan-kawasan hijau dan lanskap, zon-zon bagi kawalan bunyi bising dan risiko, serta kawasan-kawasan pembangunan bagi aktiviti-aktiviti komersial dan industri telah juga diambilkira bagi perancangan masa depan KLIA Sepang.

Di peringkat kerja-kerja tanah bagi penyediaan tapak dan kerja-kerja pembinaan, K.L. International Airport Berhad mensyaratkan keperluan plan pengurusan alam sekitar dalam semua perjanjian projek KLIA yang ditawarkan. Setiap kontraktor adalah bertanggungjawab menguruskan hal ehwal alam sekitar termasuk semua langkah-langkah kawalan dan tebatan, program percontohan serta laporan pengawasan alam sekitar. K.L. International Airport atau wakilnya termasuk audit bebas alam sekitar yang dilantik akan menjalankan pemeriksaan di tapak projek dari semasa ke semasa ke atas setiap kontraktor di samping untuk memastikan keadaan kualiti alam sekeliling berada pada tahap yang memuaskan.

Matlamat Kawalan pencemaran

Matlamat perancangan dan kawalan pencemaran alam sekitar adalah untuk:

- Mempastikan kesan pencemaran alam sekitar dalam kawasan kawalan pembangunan KLIA Sepang berada pada tahap minimum tanpa menjejaskan atau mengakibatkan risiko kepada operasi pengangkutan udara serta orang ramai; dan
- Menentukan setiap projek yang akan dibangunkan dalam kawasan kawalan pembangunan KLIA Sepang memenuhi semua syarat-syarat keperluan alam sekitar selaras dengan garis panduan perancangan guna tanah.

Punca-punca Pencemaran

Punca-punca utama pencemaran alam sekitar yang berpotensi mengakibatkan gangguan kepada operasi pengangkutan udara termasuk:

- Aktiviti-aktiviti industri atau premis-premis yang menghasilkan pelepasan asap, habuk serta gas berlebihan ke udara boleh

menyebabkan kurangnya daya penglihatan kepada juruterbang pesawat dan pusat kawalan trafik udara;

- Aktiviti-aktiviti industri atau premis-premis yang menghasilkan kepulan haba (heat plume) berlebihan boleh mengganggu pergerakan pesawat penerbangan semasa mendarat dan berlepas;
- Kepadatan serta kesesakan kenderaan bermotor berpotensi menghasilkan pencemaran udara berlebihan.
- Aktiviti-aktiviti pembakaran terbuka; dan
- Aktiviti-aktiviti ladang ternakan khinzir yang menghasilkan bau busuk menyebabkan ketidakselesaan kepada pelancong-pelancong serta penumpang-penumpang kapal terbang.

Aktiviti-aktiviti industri atau premis-premis yang dimaksudkan di atas termasuklah kilang minyak mentah kelapa sawit, kilang pemprosesan getah, kilang papan, kilang batu bata, kilang kertas, stesen janakuasa haba dan loji pembakaran sampah.

Operasi pengangkutan udara KLIA Sepang juga berpotensi menjejaskan keselesaan orang ramai yang tinggal berhampiran akibat kecuaiannya juruterbang tidak mengawal paras bunyi bising pesawat atau tidak menggunakan arah laluan seperti yang ditetapkan oleh pusat kawalan trafik udara.

Pendekatan-pendekatan Jabatan Alam Sekitar

- Memastikan setiap permohonan projek pembangunan yang tertakluk kepada Perintah Kualiti Alam Sekeliling (Aktiviti

Yang Ditetapkan) (Perintah Alam Sekeliling) 1987 mengemukakan laporan EIA kepada Jabatan Alam Sekitar terlebih dahulu sebelum dipertimbangkan untuk kelulusan oleh pihak berkuasa Kerajaan Negeri;

- Mengemukakan ulasan secara bertulis setiap permohonan yang dirujuk kepada Jabatan Alam Sekitar untuk pertimbangan oleh pihak berkuasa Kerajaan Negeri;
- Menjalankan penguatkuasaan dari semasa ke semasa serta mengambil tindakan undang-undang ke atas industri-industri atau premis-premis yang berpotensi menghasilkan pencemaran alam sekitar di kawasan sekitar KLIA Sepang;
- Menjalankan penguatkuasaan dari semasa ke semasa serta mengambil tindakan undang-undang terhadap kenderaan bermotor yang tidak mematuhi peraturan alam sekitar;
- Mengadakan lawat-siasat dari semasa ke semasa ke atas setiap projek pembangunan serta kemajuannya dan memastikan ianya mematuhi syarat-syarat kelulusan alam sekitar; dan
- Memastikan pihak pengurusan KLIA Sepang mengawasi paras bunyi bising supaya ianya tidak mengakibatkan ketidakselesaan kepada orang ramai yang tinggal di kawasan sekitarnya.

Selain daripada mematuhi kehendak-kehendak perancangan guna tanah di kawasan pembangunan KLIA Sepang, kawalan terhadap pencemaran alam sekitar bagi aktiviti-aktiviti industri atau premis-premis yang sedia ada serta

bunyi bising kapal terbang perlu juga diawasi dari semasa ke semasa. Ianya bertujuan memastikan tahap kualiti alam sekeliling berada

pada paras yang tidak membimbangkan sama ada kepada operasi pengangkutan udara serta orang ramai.







PELUPUSAN SISA-SISA GETAH TERVULKAN

Oleh
Lembaga Penyelidikan & Kemajuan
Getah Malaysia

PENCEMARAN

SEJAK tahun 1975, negara telah menghadapi masalah pencemaran getah SMR oleh sisa-sisa getah tervulkan (GTV). Masalah ini telah berleluasa dan menjadi satu masalah negara yang serius sehingga ke hari ini. Keadaan ini telah menjejaskan kualiti getah SMR dan menyebabkan ianya mendapat harga pasaran yang rendah.

Oleh yang demikian, tindakan yang sewajarnya perlu diambil bagi mengatasi masalah ini. Satu kaedah yang boleh dilaksanakan ialah dengan memusnahkan sisa-sisa getah ini dengan sempurna supaya ianya tidak boleh diambil semula oleh pihak-pihak yang tidak bertanggungjawab untuk digunakan semula di dalam pengeluaran getah SMR. Kaedah pemusnahan yang telah dikenalpasti adalah dengan cara **pembakaran**.

Pada tahun 1987, Kementerian Perusahaan Utama (KPU) dan Lembaga Pasaran dan Perlesenan Getah Malaysia (LPPGM) telah memberi arahan kepada semua pengusaha-pengusaha barangan berasaskan getah supaya membakar sisa-sisa buangan atau sisa-sisa getah tervulkan dari kilang-kilang mereka.

Amalan ini adalah merupakan pembakaran secara terbuka. **Pada dasarnya amalan ini adalah satu kesalahan di bawah Peraturan 11, Peraturan-Peraturan Kualiti Alam Sekeliling (Udara Bersih) 1978.** Di samping itu, amalan ini juga telah mendatangkan masalah pencemaran yang keterlaluan dan pelepasan asap hitam yang amat ketara di samping pelepasan habuk dan zarah-zarah hidrokarbon. Lanjutan dari keadaan ini beberapa sesi dialog

dan mesyuarat telah diadakan di antara agensi-agensi kerajaan dengan wakil-wakil pengusaha barangan berasaskan getah sejak awal tahun 1988 dan berterusan sehingga ke hari ini bagi mencari jalan penyelesaian kepada masalah ini.

LESEN PELANGGARAN

Jabatan Alam Sekitar telah menyedari akan implikasi pencemaran getah SMR kepada hasil pendapatan dan imej negara. Oleh itu, Jabatan ini telah memberi kelonggaran sementara bagi membantu menyelesaikan masalah yang dihadapi dengan memberi lesen pelanggaran kepada pekilang-pekilang berkenaan untuk menjalankan pembakaran terbuka. Dalam hal ini, Jabatan ini juga telah menegaskan bahawa semua permohonan yang diterima tidak akan diluluskan secara automatik dan pemberian lesen adalah sebagai langkah sementara sahaja untuk membolehkan pekilang melupuskan sisa-sisa buangan yang telah banyak terkumpul sejak tahun 1987/1988.

Sebelum sesuatu lesen dikeluarkan, Jabatan Alam Sekitar akan mengkaji setiap permohonan secara terperinci dengan mengambil kira beberapa faktor penting meliputi tapak/lokasi di mana pembakaran akan dijalankan, kuantiti yang hendak dibakar dan beberapa aspek lain. Kelulusan hanya diberi setelah Jabatan ini benar-benar berpuas hati bahawa tapak pembakaran yang dicadangkan adalah ber-sesuaian, tidak sensitif dan tidak mengganggu orang ramai dan pekilang memang benar-benar tidak dapat mengamalkan kaedah lain seperti menanam atau membakar secara terkawal di dalam insinerator yang telah dilengkapi dengan alat kawalan pencemaran. Adalah menjadi dasar Jabatan Alam Sekitar tidak menggalakkan

amalan ini dan pemberian lesen hanyalah untuk tempoh yang terhad sahaja.

Dari rekod Jabatan Alam Sekitar, sebanyak 83 permohonan untuk lesen pelanggaran telah diterima bagi tahun 1989/1990. Daripada jumlah tersebut sebanyak 35 permohonan telah diluluskan, manakala selebihnya ditolak kerana tapak tidak sesuai ataupun pekilang gagal mengemukakan maklumat lengkap yang menyebabkan permohonan mereka tidak dapat diproses dan tidak diluluskan.

SIKAP PENGUSAHA

Pemberian lesen ini telah tidak mencapai objektifnya setelah didapati bahawa pengusaha-pengusaha barangan getah telah didapati bersikap berhak menerima lesen atas alasan LPPGM telah mengarahkan supaya pembakaran dijalankan. Usaha-usaha ke arah penyelesaian jangka panjang adalah terlalu lambat dan tidak membawa sebarang hasil yang positif walaupun tempoh tiga tahun berlalu. Pekilang masih membuat permohonan pembaharuan lesen dan mengemukakan rayuan demi rayuan dengan pelbagai alasan untuk dipertimbangkan.

Di samping itu, amalan pembakaran terbuka ini pula telah menimbulkan reaksi yang tidak menyenangkan di kalangan orang ramai. Pencemaran asap yang dihasilkan adalah keterlaluan. Memandangkan keadaan sedemikian, pelbagai aduan dari orang ramai telah diterima yang mana secara langsung telah menyalahkan pihak berkuasa tempatan serta Jabatan Alam Sekitar. Rungutan dan bantahan ini telah disuarakan melalui akhbar-akhbar. Masalah ini dipandang berat oleh Jabatan ini.

Walaupun pada awalnya Jabatan Alam Sekitar telah bersetuju untuk memberi lesen pelanggaran kepada pekilang-pekilang bagi melupuskan sisa-sisa getah tervulkan dan singkiran pengeluaran yang terkumpul dengan banyaknya pada tahun 1987/1988 sahaja, kesannya adalah tidak menyenangkan. Dengan itu keadaan ini tidak boleh berlarutan dan memerlukan tindakan segera semua pihak berkenaan.

LANGKAH-LANGKAH PENYELESAIAN

Setelah beberapa tahun berlalu, Jabatan Alam Sekitar telah sentiasa menegaskan bahawa pembakaran terbuka adalah merupakan kaedah penyelesaian jangka masa pendek. Dengan itu semua pihak adalah digesa supaya mempertimbangkan kaedah-kaedah penyelesaian jangka masa panjang bagi menyelesaikan masalah ini. Beberapa kaedah yang telah dikenalpasti adalah:

- Mengamalkan skim **kawalan mutu** supaya kuantiti buangan yang dihasilkan dapat dikurangkan ke tahap minimum. Berdasarkan kepada rekod LPPGM adalah dianggarkan sebanyak **17,000 tan** buangan getah dihasilkan dalam tempoh satu tahun iaitu lebih kurang 27-39% dari susu getah pekat yang digunakan setahun. Ini adalah satu jumlah kuantiti yang besar yang patut dikurangkan melalui kawalan mutu.
- Menjalankan penyelidikan terhadap penggunaan semula sisa-sisa getah bagi membolehkan ianya digunakan semula.
- Mengamalkan **kaedah pelupusan yang tidak mencemarkan** seperti menghancurkan sisa-sisa tersebut dan menanamnya.

- **Pembakaran dengan terkawal** iaitu dibakar di dalam insinerator yang sesuai dan dilengkapi dengan alat kawalan. 'Heat recovery' adalah amat digalakkan. Dalam hal ini, kilang-kilang besar perlu diarahkan untuk menyediakan insinerator sendiri manakala bagi kilang-kilang kecil kemudahan insinerator berpusat hendaklah disediakan dengan kerjasama pihak berkuasa berkenaan seperti Kementerian Perusahaan Utama, LPPGM dan pihak Berkuasa Tempatan sebagai bantuan kepada industri-industri kecil.

Setelah beberapa kajian dan perbincangan dibuat Jabatan Alam Sekitar telah membuat beberapa ketetapan bagi menangani masalah pencemaran dari sisa-sisa getah tervulkan iaitu:

- **Melarang sama sekali pembakaran terbuka dilakukan ke atas sisa-sisa getah tervulkan dan singkiran pengeluaran cara mem-**berhentikan pengeluaran lesen pelanggaran di mana kilang-kilang telah diberi notis memaklumkan bahawa lesen pelanggaran tidak akan dikeluarkan lagi bagi maksud ini mulai 1 Julai 1991.
- **Penggunaan semula ke atas sisa-sisa getah perlu diberi keutamaan dan menjadi pilihan utama** dan LPPGM hendaklah mensyaratkan supaya buangan ini dihantar ke kilang yang sedia menerimanya di dalam lesen yang dikeluarkan. **Pelupusan dengan cara menanam di tapak yang diluluskan oleh pihak Majlis adalah digalakkan untuk diamalkan.** Keadaan ini telahpun diamalkan di beberapa negeri di Malaysia.
- Bagi pekilang yang terpaksa membakar buangan ini, **pembakaran hendaklah dibuat secara terkawal iaitu dengan membakar di dalam insinerator yang berkesan dan lengkap dengan alat kawalan pencemaran.** 'Heat recovery' adalah digalakkan. Walau bagaimanapun, kaedah ini adalah tidak dibenarkan di kawasan Lembah Kelang dan kawasan-kawasan di mana kadar pencemaran udara adalah tinggi.
- Pihak LPPGM atau pihak yang mendapat sumbangan daripada perusahaan getah perlu membina beberapa insinerator yang sesuai di tempat-tempat strategik sebagai menyediakan perkhidmatan kepada pengusaha-pengusaha kecil barangan berasaskan getah.





SETTING ENVIRONMENTAL STANDARDS FOR NATURAL RUBBER

By
Rubber Research Institute
Ministry Of Primary Industries

THE Rubber Research Institute of Malaysia has been the custodian of the natural rubber industry. It has won worldwide recognition for its research capabilities. Its contribution towards effective environmental quality control in Malaysia's natural rubber industry, is of particular significance.

Natural rubber has had a long and productive history in Malaysia. Ever since the first plant took root in our soil, the rubber tree has thrived and become part and parcel of our landscape. The widespread use of synthetic rubber affected the Malaysian rubber industry, driving down production. The Rubber Research Institute of Malaysia (RRIM) responded by looking at better production methods and new applications for natural rubber.

Environmental concerns were central to RRIM's research and development activities, and the Rubber Research Institute of Malaysia (RRIM) has initiated and promoted environmentally sound practices and technological refinements over the past two decades.

Effluent Treatment

In 1971, RRIM established an Effluent Research Committee to undertake a concerted study on the nature and treatment of effluent from rubber factories. This initiative resulted in the development of suitable technologies for the treatment of rubber factory effluents.

At the same time, the Institute assisted the Department of Environment (DOE) in formulating suitable standards for the discharge of effluents from rubber factories utilising available technology. RRIM proposed suitable standards to the DOE based on its intensive

monitoring studies on full-scale effluent treatment systems which were developed by the Institute.

The compliance level of raw natural rubber factories to DOE's licensing conditions is very high (over 85%). This is attributed to the concerted R&D efforts by the RRIM and the excellent co-operation from the rubber industry.

RRIM's success in controlling the pollution is primarily the result of the Institute's ability to develop effluent treatment technologies which are suitable to local needs and within the economic means of the rubber industry.

The majority of the rubber factories have had no difficulty in adopting RRIM treatment technologies. As a result, over 90% of the pollution load has been removed from the rubber industry which was one of the major contributors of water pollution in Malaysia. The pollution load from the rubber industry was estimated to be equivalent to the organic pollution load from a population of about 4.5 million.

The technologies developed by the RRIM in effluent treatment and adopted by the raw rubber industry are rubber trap, slotted-plate deammoniation tower, ROTORRIM (a rotating-disc deammoniation system), anaerobic/facultative ponding system, oxidation ditch, and land application system.

Rubber trap

The rubber trap using baffle plates was widely adopted by rubber factories. It is capable of recovering rubber particles in the effluent and significantly reducing the amount of solids in the effluent.

Slotted-plate Deammoniation Tower

The slotted-plate deammoniation tower developed in 1973 has been used to remove ammonia from skim latex with the effect of reducing the pollution load. Realising the problems of the slotted-plate system, the ROTORRIM, a more efficient and cost-effective system of deammoniating skim latex, was invented in 1991. The invention received the PETRONAS Invention Award in 1992.

Anaerobic/Facultative Ponding System

The anaerobic/facultative ponding system and the oxidation ditch, unlike ROTORRIM, were previously developed elsewhere for the treatment of a variety of effluents.

The ponding system, in particular, was effective considering that it was adopted by over 80 percent of the rubber factories. Its effectiveness is due to its advantage of minimum equipment, maintenance and skilled supervision. However, it requires a large land area thereby restricting its adoption only to factories sited in estates.

Oxidation Ditch

The oxidation ditch, which uses surface rotors to mix and aerate the mixed liquor containing flocculated bacteria and effluent, has been selected to satisfy the needs of factories without adequate land and near a residential area. The oxidation ditch overcomes the malodour problem associated with the ponding system.

Land Application System

The land application of rubber effluent which is rich in plant nutrients such as nitrogen and phosphorus has been shown to be beneficial, resulting in increased crop yield, with minimal adverse environmental impacts.

RRIM has contributed significantly in developing and establishing the design and operating criteria for the successful adoption of these technologies for the treatment of rubber effluent.

Ecoenvironment Impact of Hevea Planting

In another related area, the Hevea planting in the form of estates and smallholders has played an important role in the conservation of the environment over the years. Proper planning of land operations, coupled with the implementation of established agronomic practices, can hasten the recovery of soil fertility close to the original levels within a short duration.

The biomass production of mature rubber stands can attain levels similar to that of the tropical evergreen forest. Being efficient in fixing CO₂ through photosynthesis, *Hevea* can act as a carbon sink, and hence indirectly helps in minimising the effect of CO₂ pollution.

Taking cognisance of the environment impact, the planting of *Hevea* has potential in reforestation programmes, in particular, as a species to enrich biodiversity. The cooler microclimate of a mature stand is a suitable habitat for the establishment of shade tolerant trees such as rattan and for shelter of animals, insects and other natural vegetation, including medicinal plants.

Green Products from Hevea

The Hevea forest can be used as the alternative source of economic raw materials such as latex, pharmaceutical products, and heveawood. Heveawood is gaining popularity as a substitute for tropical timber and the exploitation of

Hevea forest plantations will relieve overlogging pressure, and can thus play a significant role in natural forest conservation.

Zero Burning in Replanting of Rubber

In support of Malaysia's efforts to adopt environmentally expedient practices within its different industries, the natural rubber industry has initiated the zero burning practice in rubber replanting.

This requires that the balance of *Hevea* plant material be stacked systematically after *Hevea* wood is removed from the field and sold. These leftover *Hevea* plant materials are chiefly composed of root boles, smaller branches, twigs and leaves.

The total absence of open burning contributes to a cleaner atmosphere. In addition, the biomass left behind in the field checks soil erosion loss by rain. The return of nutrients into the soil through biomass decay contributes to physical improvement of the soil and chemical fertility.

On the practical side, zero burning allows great flexibility in time of planting, since a dry period is not required for burning.

The zero burning practice, being a new technique, is not without problems. Among them, the fear of a high incidence of root disease in replants has discouraged the widespread use of zero burning to be practised on a wider scale.



Wood from rubber trees (*Hevea brasiliensis*) is well regarded as an environment-friendly material.





RUBBING OUT POLLUTION

By
Lee Rubber Group

THOUGH Malaysia is no longer the world's top natural rubber producer, the sticky latex is here to stay. Companies like the Lee Rubber Group will make sure of that.

For more than half a century, children in Malaysia grew up studying the importance of rubber and tin ore in our nation's development. Every school child could recite the proud fact that Malaysia was the world's leading natural rubber and tin ore producer.

Tin-mining has fallen from its once lofty heights. However, Malaysia still remains a powerhouse in terms of rubber production, although rubber has lost some of its bounce. One of the stalwarts which are helping to sustain the natural rubber process industry, is the Lee Rubber Group.

The Lee Rubber Group is a leading player in the industry. In 1994 the Group handled about 30 percent of Malaysia's total production of 1.1 million tonnes, and accounted for some 31 percent of the export of SMR (Standard Malaysian Rubber) and latex concentrate. Its market share has remained more or less unchanged over the years, although rationalization has now reduced its operation to 13 SMR and 6 latex concentrate factories.

The Group has pioneered techniques for controlling rubber effluent and air pollution in keeping with its corporate policy which, amongst others, emphasizes social responsibility and care for the society and environment.

Efforts to control rubber effluent pollution began with the introduction of the Environmental Quality Act 1974, and the Environmental

Quality (Raw Natural Rubber) Regulations, 1978. These regulations specifically require all rubber factories to meet the regulatory standards set for the discharge of rubber effluents.

In response to this, the Lee Rubber Group took immediate steps to install effective effluent treatment systems. Sites and facilities were made available to the Rubber Research Institute of Malaysia (RRIM) for pilot schemes in the late seventies. These included the ponding system oxidation ditch, de-ammonia tower systems, and other biological systems such as the rotating bio-disc.

Various technical and operational aspects of controlling the discharge of factory effluents were investigated in these experiments, and the results were evaluated. The experience gained from this collaboration resulted in the adoption of treatment systems on a large scale not only within the Lee Rubber Group but also in other rubber factories.

There were some 35 factories in the Lee Rubber Group in the early 1980's. They were located in all parts of the country but the majority were close to urban areas. Due to the diverse physical conditions, the Group found it necessary to employ different treatment measures to meet the conditions prevailing in differing locations.

Basically, two approaches were adopted: the normal ponding system and the mechanical aeration system. The former necessitates the use of a large tract of land, and was therefore installed in 15 factories, while the remaining factories were equipped with the mechanical aeration system. The great majority of these factories used the oxidation ditch, whilst surface

aerators and submerged air-blowers were adopted in certain factories.

The installation of the mechanical aeration system not only requires greater capital outlay but also incurs higher operating and maintenance costs. The Group has already invested more than RM10 million, ranging from about RM30,000 to RM1 million in each factory.

Apart from the control of rubber wastes, the Group also pioneered measures to reduce the level of malodour. These involved the installation of the water scrubber system, which effectively absorbed air pollutants emanating from the SMR dryers.

Numerous tests conducted by RRIM have confirmed that close to 95 percent of the air pollutants, which consist mainly of non-toxic volatile fatty acids, are removed by passing the exhaust gases from the dryers into a water scrubber system.

The water scrubber system is now used by practically all other rubber factories in Malaysia where such control is required.

The Group is confident that the future of the rubber industry is still bright. In view of this, and its commitment to the rubber processing sector, it is determined to continue to improve and upgrade all its pollution control systems to ensure that regulatory standards are fully met at all times.





CINTAILAH SUNGAI KITA

Oleh
Jabatan Pengairan Dan Saliran

SUNGAI WARISAN SEMUA

SUNGAI yang merupakan nadi kepada pembangunan negara pada masa lampau berhadapan dengan berbagai cabaran. Kalau dahulu ianya merupakan saluran utama perhubungan, tempat mencari rezeki, tempat pembersihan diri dan pakaian dan tempat untuk beriadah, kini penggunaannya semakin terhad.

Pelbagai masalah menimpa sungai dan sungai-sungai kini menjadi semakin cetek bersama aliran air yang jijik dan kotor, penuh dengan kelodak tanah, sisa buangan dan sampah sarap. Hakikat ini tidak dapat dinafikan dan dapat dilihat di merata pelusuk negara kita, bukan sahaja di kota-kota besar, malah juga di pekan-pekan kecil. Kebanyakan nilai keindahan yang berada bersama sistem semulajadi ini dicemari dan dinodai akibat segolongan kecil masyarakat yang tidak menghargai alam sekitar.

Justeru itu, Kerajaan melalui Jabatan Pengairan dan Saliran dengan kerjasama Jabatan dan Agensi lain telah memulakan satu kempen yang dinamakan Kempen Cintailah Sungai Kita pada tahun 1993. Pelaksanaan kempen ini menunjukkan komitmen Kerajaan dalam menangani isu-isu alam sekitar dalam semua aspek kehidupan masyarakat. Atas kesedaran ini, usaha untuk menjadikan sungai dan persekitarannya bersih dan indah perlu mendapat kerjasama dan penglibatan bersepadu semua pihak termasuk jabatan dan agensi kerajaan, pihak swasta dan orang ramai.

PELAKSANAAN KEMPEN

Majlis pelancaran rasmi kempen ini telah dilakukan oleh Menteri Pertanian Malaysia

ketika itu, YB Datuk Seri Sanusi Junid pada 20 Februari 1993 dan ianya berlangsung di ibu kota Kuala Lumpur di pertemuan Sungai Batu dan Sungai Gombak.

Antara objektif utama pelaksanaan kempen ini ialah:

- Untuk mewujudkan kesedaran tentang betapa pentingnya sungai dalam kehidupan setiap individu bagi menimbulkan keinginan untuk bersama-sama memelihara dan mencintai sungai.
- Untuk memperkenalkan kepada orang awam langkah dan amalan yang boleh menyumbang ke arah pengendalian keindahan semulajadi dan perlindungan sungai; dan
- Untuk mempertingkatkan pengetahuan dan teknik pengurusan sungai dan kawasan tadahannya di kalangan agensi yang terlibat bagi menjamin pembangunan harmonis yang berkekalan.

Pada tahun 1993, enam aktiviti utama telah diperkenalkan termasuk aktiviti Sungai Angkat, Pemeliharaan Sungai, Ekspedisi Sungai, Pendidikan Sungai, Pengindahan Sungai dan penganjuran satu Simposium Antarabangsa yang bertemakan 'Pengurusan Sungai Untuk Masa Hadapan'.

PENCAPAIAN

Secara keseluruhannya, Kempen Cintailah Sungai Kita yang berjalan sepanjang masa mulai tahun 1993 hingga kini telah berjaya mencapai objektif-objektif sebagaimana yang telah ditentukan. Kejayaan tersebut dapat dilihat dari

segi peningkatan kesedaran kumpulan sasaran untuk sama-sama memulihara sungai sama ada secara langsung atau tidak.

Dari segi fizikal kempen yang telah diadakan pada tahun 1993 dan 1994 berjaya menghasilkan lebih daripada 120 kawasan persekitaran sungai yang berwajah baru di seluruh negara yang sesuai untuk aktiviti rehat dan rekreasi. Ini dapat dihasilkan melalui pertandingan sungai angkat terbaik yang disertai oleh JKKK dan sekolah-sekolah di seluruh Malaysia.

'River Watch'

Bagi golongan pelajar, aktiviti pemerhatian sungai atau '*river watch*', ceramah dan pendidikan telah berjaya mendedahkan mereka kepada aspek-aspek penting berkaitan dengan penjagaan dan pemuliharaan sungai. Di dalam aktiviti '*river watch*', pelajar-pelajar yang terlibat dapat mengetahui dengan lebih jelas punca-punca pencemaran, jenis-jenis elemen yang terdapat di dalam sungai yang tercemar dan cara-cara untuk mengukur dan mengawasi kualiti air. Pada tahun 1993, sebanyak 29 buah sungai telah diawasi oleh pelajar-pelajar sekolah dan pertubuhan sukarela iaitu Persatuan Pencinta Alam (MNS) dan Asean Wetland Bureau (AWB).

Pendidikan

Ceramah berhubung dengan sungai yang berjalan sepanjang tahun 1993 dan 1994 telah berjaya disampaikan kepada lebih 10,000 orang pelajar daripada lebih 200 buah sekolah di seluruh negara. Kandungan ceramah-ceramah tersebut meliputi peranan dan kegunaan sungai, masalah yang dihadapi oleh sungai, kesan-kesan buruk jika sungai tidak dipelihara dan peranan

yang boleh dimainkan oleh pelajar-pelajar dalam menjaga kebersihan sungai.

Ekspedisi-Ekspedisi Sungai

Aktiviti ekspedisi sungai merupakan aktiviti kembara melalui sungai-sungai terpilih yang disertai oleh wakil-wakil media massa, Jabatan dan Agensi Kerajaan dan badan-badan sukarela. Pengalaman menarik yang dialami melalui ekspedisi ini disebarkan untuk pengetahuan orang ramai melalui media cetak dan media elektronik. Di samping memperkenalkan keindahan semulajadi sungai, ekspedisi yang dijalankan juga bertujuan menonjolkan aspek-aspek rekreasi dan kembara bagi meningkatkan kesedaran tentang pentingnya sungai dalam kehidupan seharian.

Pada tahun 1993, tiga ekspedisi sungai telah diadakan termasuk untuk Sungai Perak, Sungai Endau di Johor dan Sungai Lipis di Pahang yang melibatkan lebih 200 peserta. Pada tahun 1994 pula, ekspedisi sungai telah diadakan di Sungai Negeri di Kelantan. Ke semua ekspedisi yang diadakan telah mendapat sambutan menggalakkan terutama sekali dari pihak media massa dan badan sukarela.

Simposium Antarabangsa

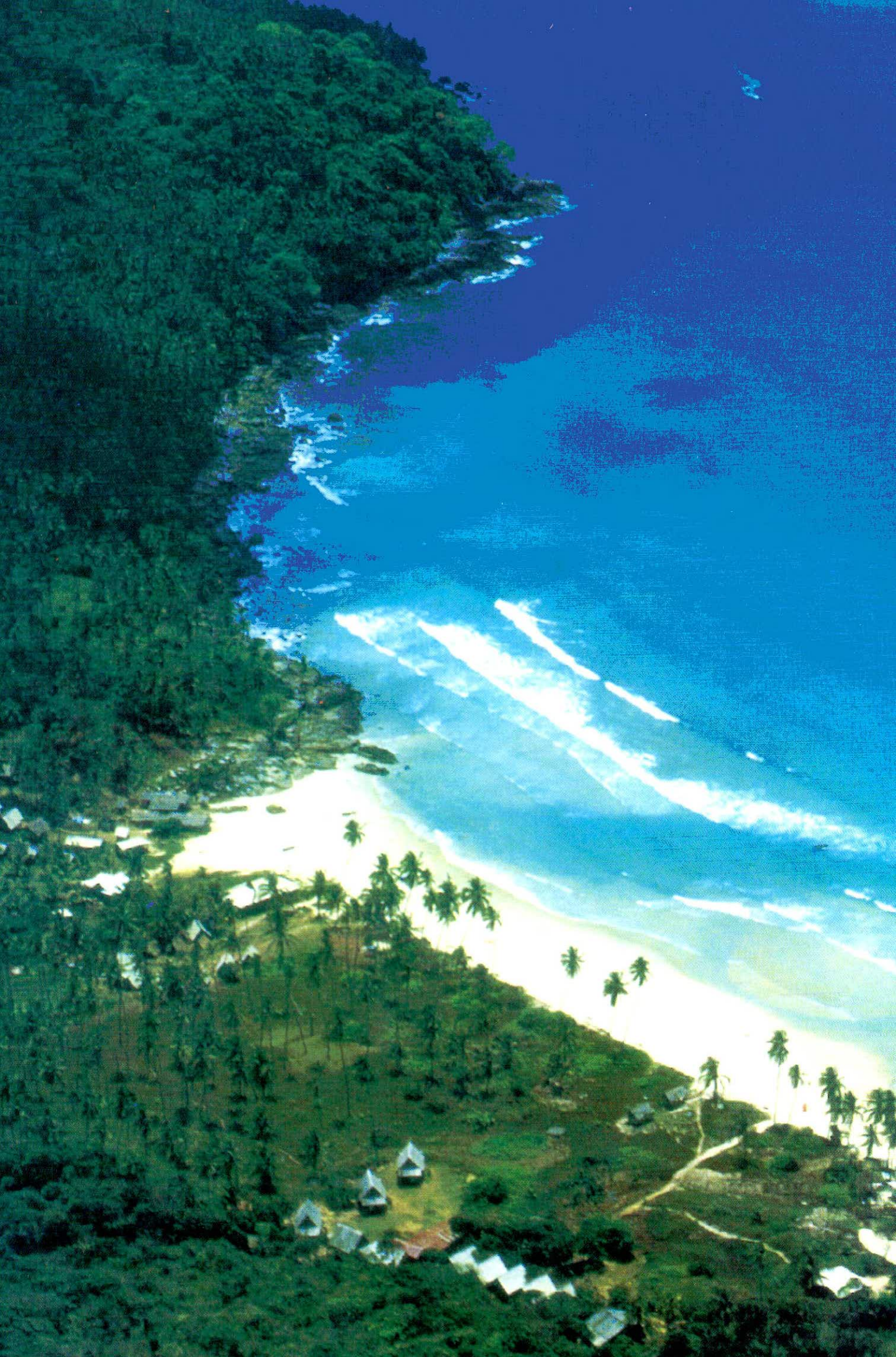
Pada akhir tahun 1993, satu simposium antarabangsa yang bertemakan '*Management of Rivers for the Future*' telah berjaya dilangsungkan di Kuala Lumpur. Objektif utama simposium ini adalah untuk mewujudkan satu forum bertukar-tukar pengetahuan dan pengalaman dalam bidang pengurusan masa depan sungai sesuai dengan konsep pembangunan berkekalan. Sebanyak 59 kertas kerja teknikal dan empat '*keynote address*' telah dibentangkan oleh penulis dan wakil-wakil dari

14 buah negara. Sebanyak 332 peserta yang terdiri daripada jurutera, juruperunding, saintis dan pentadbir daripada 22 buah negara dan tiga buah institusi antarabangsa (ICID, WMO dan FAO) telah menyertai simposium ini. Pada keseluruhannya simposium ini telah berjaya mencapai objektif-objektifnya dan telah menghasilkan rumusan dan cadangan untuk rujukan semua pihak yang berkenaan.

Kempen Cintailah Sungai Kita telah mengorak langkah ke arah mengindahkan lagi sumber-sumber semulajadi negara di samping menyedarkan penduduk-penduduk Malaysia terutamanya penuntut-penuntut sekolah tentang pentingnya sungai-sungai untuk kehidupan masa kini dan masa hadapan. Dari liputan media massa jelas dapat dilihat bahawa kini kesedaran mulai timbul bukan sahaja dalam aspek pemuliharaan sungai malah untuk alam sekitar keseluruhannya.







PENGAWALAN HAKISAN PANTAI NEGARA

Oleh
Jabatan Pengairan Dan Saliran

LATAR BELAKANG

SEJAK beberapa tahun kebelakangan ini, hakisan pantai telah menyebabkan kerosakan dan kemusnahan kepada kawasan pertanian, hutan kayu bakau, perumahan, rangkaian jalan perhubungan dan pantai rekreasi. Menurut Kajian Pantai Negara, daripada sepanjang 4908 km pantai di negara ini, lebih kurang 1390 km iaitu 29 % sedang mengalami hakisan pantai. Anggaran kasar nilai harta benda yang terancam pada tahun 1987 oleh fenomena semulajadi ini adalah kira-kira RM 200 juta.

Pengawalan ke atas kesan hakisan pantai negara sekarang telah menjadi satu keperluan dari segi ekonomi dan sosial. Untuk tujuan ini, Kerajaan telah melaksanakan strategi pengawalan yang berbentuk dua peringkat. Sebagai langkah jangka pendek, harta benda dan kemudahan awam di kawasan kritikal yang terancam oleh fenomena ini akan dilindungi, sekiranya didapati ekonomikal berbuat demikian. Langkah jangka panjang pula, adalah untuk mengawal kesan hakisan pantai melalui penyelarasan perancangan dan pengawalan pembangunan di kawasan pantai secara bersepadu.

PELAKSANAAN STRATEGI

Untuk melaksanakan strategi pengawalan hakisan pantai ini, Kerajaan antara lain telah mewujudkan dua institusi kawalan iaitu Majlis Kawalan Hakisan Pantai Negara (MKHPN) dan Pusat Teknikal Kejuruteraan Pantai (PTKP).

MKHPN adalah merupakan badan penasihat mengenai kawalan hakisan pantai dan fungsi utamanya ialah untuk memperakukan kepada

Kerajaan mengenai program, pembiayaan dan penyelarasan tindakan, bukan sahaja antara Kerajaan Persekutuan dan Negeri tetapi juga dengan sektor swasta. PTKP pula telah ditubuhkan di Jabatan Pengairan dan Saliran (JPS) pada Januari 1987 dan bertanggungjawab untuk melaksanakan kerja-kerja pengawalan hakisan pantai bagi kawasan hakisan yang kritikal, menjalankan kajian teknikal, memberi khidmat nasihat serta maklumat kepada MKHPN, memberi khidmat nasihat kepada semua agensi atau pihak berkuasa tempatan dalam pemberian kelulusan pembangunan di dalam zon pantai negara dan menguruskan satu pusat maklumat kejuruteraan pantai bagi membantu usaha-usaha perancangan dan rekabentuk.

Dalam menangani masalah pengawalan hakisan pantai secara berkesan, Kerajaan juga melaksanakan dua peringkat tindakan iaitu:

□ **Langkah Jangka Pendek:** Tindakan-tindakan yang diambil meliputi pembinaan struktur-struktur pengawalan hakisan di kawasan-kawasan yang menghadapi hakisan yang kritikal untuk melindungi kemudahan atau harta yang sedia ada. Kaedah atau jenis struktur pengawalan hakisan yang dibina adalah tertakluk kepada kesesuaian dari segi teknikal bergantung kepada keadaan sesuatu tempat dan antara lainnya meliputi struktur lapis lindung (revetment), groyne, pemecah ombak dan penambakan pantai (beach nourishment). Pengawasan dan pengesanan kepada tempat-tempat di mana kelihatan tanda-tanda hakisan sentiasa dilakukan sepanjang masa supaya tindakan sewajarnya dapat diambil sebelum masalah menjadi lebih buruk.

□ **Langkah Jangka Panjang** : Tindakan-tindakan jangka panjang ini adalah bertujuan untuk mengawal kesan hakisan pantai melalui penyelarasan perancangan dan pengawalan pembangunan di kawasan pantai secara bersepadu. Jentera pelaksanaan langkah jangka panjang yang sedia ada pada masa ini meliputi Akta Kualiti Alam Sekeliling dan Surat Pekeliling Am Bil. 5/1987 yang dikeluarkan oleh Jabatan Perdana Menteri. Pekeliling tersebut memerlukan semua pembangunan di zon pantai dirujuk kepada PTKP untuk ulasan atau nasihat. Sehubungan dengan ini, Unit Perancang Ekonomi di Jabatan Perdana Menteri dengan kerjasama semua Agensi dan Jabatan Kerajaan berkaitan, sedang berusaha untuk menggubal satu polisi untuk Pengurusan Sumber Zon Pantai Negara.

Di samping itu, Kerajaan Denmark di bawah projek DANCED akan membiayai satu projek bagi penggubalan Polisi Pengurusan Zon Pantai Kebangsaan (National Coastal Zone Management Policy). Projek ini dijangka bermula pada akhir tahun 1995 dan akan mengambil masa selama tiga tahun.

KEMAJUAN

Kos yang diperlukan untuk melindungi keseluruhan kawasan di mana hakisan kritikal pantai berlaku kini dianggarkan dalam lingkungan RM400 juta. Memandangkan kos pembiayaan yang diperlukan adalah besar dan peruntukan pula terhad, maka pelaksanaan kerja-kerja pengawalan hakisan pantai ini telah dijalankan secara berperingkat mengikut keutamaan.

Dalam Rancangan Malaysia Kelima, sejumlah RM17.2 juta telah dibelanjakan di bawah program-program pengawalan hakisan pantai. Untuk Rancangan Malaysia Keenam, jumlah peruntukan bagi program-program pengawalan hakisan pantai adalah RM114 juta. Daripada jumlah peruntukan Rancangan Malaysia Keenam tersebut, sejumlah RM95.6 juta telah dibelanjakan sehingga akhir April 1995. Sehingga kini sejumlah 23 daripada 66 kawasan pantai yang menghadapi hakisan kritikal, telah siap dibina dengan struktur-struktur perlindungan hakisan dan 13 lagi adalah dalam pembinaan. Adalah dijangkakan bahawa Jabatan Pengairan dan Saliran Malaysia akan dapat menyiapkan kerja-kerja pengawalan hakisan bagi kesemua kawasan hakisan kritikal yang telah dikenalpasti, pada tahun 2000.

Dalam mengawal dan mengurangkan kesan hakisan pantai negara serta kos pencegahannya, perlu dipastikan supaya segala usaha pembangunan di kawasan zon pantai mengambilkira semua aspek tindakbalas alam sekitar termasuk fenomena semulajadi hakisan pantai ini. Semua sudut termasuk hal berkaitan dengan alam sekitar perlu dipertimbangkan dan dikaji dengan teliti semasa perancangan dan pembangunan di kawasan berkenaan dilaksanakan.

Kerajaan Malaysia di dalam hal ini telah mengambil beberapa langkah dan tindakan positif termasuk cadangan penggubalan polisi untuk pengurusan zon pantai dan sumber yang terdapat di dalamnya. Di samping itu, kerja-kerja pengawalan hakisan pantai negara akan terus dijalankan.

Dalam hal pengurusan zon pantai, semua pihak harus memainkan peranan penting dan bekerjasama untuk menjayakan pembangunan yang berkekalan bagi kawasan zon pantai yang dianggap paling berharga dan penting dari sudut ekologi dan bio-diversitinya. Ini termasuklah Kerajaan Persekutuan, Kerajaan Negeri dan pihak swasta. Adalah diharapkan, dengan

adanya kerjasama dan koordinasi yang mantap dan pandangan jauh semua yang terlibat dalam perancangan dan penggunaan zon pantai, kawasan zon pantai akan dapat dimanfaatkan oleh rakyat negara ini secara berterusan untuk pelbagai kegunaan yang membawa kepada kesejahteraan hidup bersama.





VAI-17A



**TAMAN-TAMAN LAUT
PEMULIHARAAN SUMBER
KEKAYAAN MALAYSIA**

Oleh
Jabatan Perikanan Malaysia

Latar belakang

PADA tahun 1983, Y.A.B. Perdana Menteri Malaysia mempertanggungjawabkan Kementerian Pertanian khasnya Jabatan Perikanan, untuk menubuhkan dan menguruskan Taman-Taman Laut di Malaysia. Taman Laut adalah kawasan perairan laut yang dizonkan sebagai santuari untuk komuniti batu karang yang merupakan salah satu ekosistem yang paling produktif di dunia dan kaya dengan spesis flora dan fauna. Objektif-objektif utama penubuhan Taman Laut ialah:

- Memelihara dan melindungi kawasan terumbu karang daripada kesan pembangunan yang tidak mapan dengan tujuan mengekalkan sumber-sumber perikanan;
- mempertingkatkan dan mengekalkan tempat hidupan dan tumbesaran semulajadi bagi hidupan laut yang mengalami bahaya kepupusan;
- memberi perlindungan kepada flora dan fauna dengan pengezonan untuk tujuan aktiviti penyelidikan; dan
- memastikan pengezonan untuk aktiviti rekreasi yang bersesuaian dengan kadar daya tampungan bagi kawasan tersebut.

Peranan Pemuliharaan

Taman-Taman Laut terletak di bawah Cawangan Taman-taman Laut, Rizab Laut & Perikanan Rekreasi, Jabatan Perikanan Malaysia. Fungsi-fungsi Cawangan ini ialah:

- mengurus dan mentadbir segala hal berkaitan dengan Taman Laut Malaysia, iaitu pendidikan dan publisiti, penguatkuasaan, tugas-tugas harian pentadbiran dan membantu kerja-kerja penyelidikan;
- kerja-kerja memelihara dan melindungi penyus laut dan telur-telurnya, serta membantu kerja-kerja penyelidikan penyus laut;
- melaksanakan projek tukun tiruan dan juga membantu dalam kerja-kerja penyelidikannya;
- merancang dan menyelia hal-hal perikanan rekreasi dan mewujudkan peraturan-peraturan untuk menguruskan perikanan rekreasi; dan
- menjadi urusetia untuk segala program antarabangsa yang berkaitan dengan pengurusan sumber pantai/pengurusan ekosistem laut.

Penubuhan Taman Laut

Pada 26 Oktober 1994, perairan dua batu nautika daripada 38 buah pulau-pulau di Semenanjung Malaysia dan Wilayah Persekutuan Labuan telah diwartakan sebagai pulau-pulau Taman Laut dan penguatkuasaannya bermula pada 15 Disember 1994. Kriteria yang digunakan untuk mengenalpasti kawasan yang sesuai ialah terdapatnya kawasan terumbu karang yang perlu diberi perlindungan kerana kawasan sedemikian sangat produktif dan menjadi kawasan pembiakan untuk hidupan akuatik seperti batu karang, ikan, tumbuhan laut dan lain-lain lagi.

Jadual 1: Taman-Taman Laut di Malaysia

Kedah	P. Payar, P. Lembu, P. Kaca dan P. Segantang
Terengganu	P. Perhentian Kecil, P. Perhentian Besar, P. Lang Tengah, P. Redang, P. Kapas, P. Susu Dara, P. Lima, P. Ekor Tebu dan P. Pinang.
Pahang	P. Chebeh, P. Tulai, P. Tioman, P. Seri Buat, P. Sembilan, P. Labas, P. Sepoi, P. Gut dan P. Tokong Bahara.
Johor	P. Hujung, P. Tengah, P. Besar, P. Rawa, P. Tinggi, P. Mentinggi, P. Sibul, P. Aur, P. Pemanggil, P. Harimau, P. Goal, P. Mensirip dan P. Sibul Hujung.
Labuan	P. Kuraman, P. Rusukan Besar, P. Rusukan Kecil.

Tiga puluh lapan buah pulau-pulau itu dikumpulkan kepada 5 buah Pusat Taman Laut. Sehingga sekarang, terdapat 4 buah Pusat Taman Laut telah dibina dan beroperasi untuk memastikan pembangunan, pengurusan serta penyelenggaraan Taman Laut dapat dilakukan dengan lebih baik dan berkesan. Keempat-empat pusat tersebut adalah :

- Pusat Taman Laut Pulau Payar (4 buah pulau)
- Pusat Taman Laut Pulau Redang (9 buah pulau)
- Pusat Taman Laut Pulau Tioman (9 buah pulau)

- Pusat Taman Laut Mersing (13 buah pulau)

Sebuah lagi Pusat Taman Laut akan dibina di Wilayah Persekutuan Labuan bagi menguruskan Pulau Kuraman, Pulau Rusukan Kecil dan Pulau Rusukan Besar.

Sumbangan Taman Laut

Dengan tertubuhnya Taman-Taman Laut ini, aktiviti-aktiviti seperti “eko-pelancongan” telah meningkat dengan penambahan “chalet”, rekreasi- rekreasi dan projek-projek lain yang berkaitan dengan penggunaan sumber-sumber laut sebagai daya tarikan utama. Penglibatan nelayan-nelayan tradisional tempatan juga amat menggalakkan. Mereka telah mula mencebur diri dalam bidang penjualan makanan/minuman, cenderamata dan peralatan memancing. Ada juga yang menyediakan perkhidmatan seperti “dive guard”, bot-bot pelancong dan lain-lain lagi. Aktiviti-aktiviti ekonomi tersebut telah secara tidak langsung meningkatkan pendapatan orang-orang kampung setempat khususnya nelayan-nelayan tradisional.

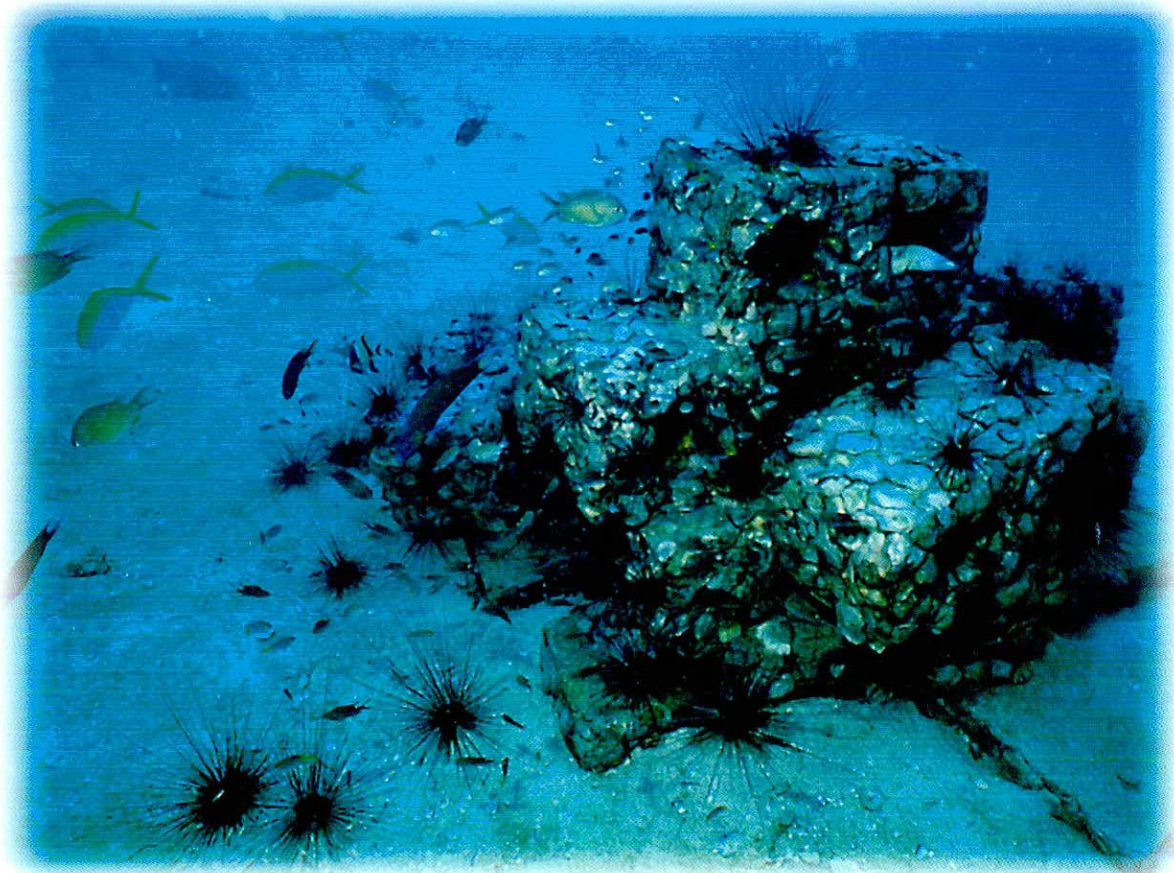
Jabatan Perikanan juga telah mengadakan pelbagai aktiviti untuk mempromosikan Taman-Taman Laut Malaysia, bukan sahaja dengan tujuan menarik pelancong dari dalam dan luar negara malah untuk memberi maklumat dan kesedaran kepada orang ramai. Di antara aktiviti-aktiviti yang dilakukan ialah : pelancaran video dan komersil “Marine Parks of Malaysia - Underwater Paradise” di “Airport TV”, Kempen Cintai Taman Laut Malaysia, Ekspedisi Tahunan “Crown of Thorns” serta pameran-pameran bergerak untuk memperkenalkan Taman-Taman Laut.

Selain daripada itu, Kempen Kesedaran Penyu juga telah diadakan untuk memberikan kesedaran kepada orang ramai tentang pentingnya usaha pemuliharaan penyu. Publisiti

bagi kesedaran penyu ini diteruskan dengan tayangan video “Penyu! Khazanah Kita” di “Airport TV” serta mengadakan pameran-pameran bergerak.







TUKUN TIRUAN MALAYSIA

Oleh
Jabatan Perikanan Malaysia

SEJARAH

Pembinaan tukun tiruan secara tradisi di Malaysia telah lama dilakukan oleh nelayan tempatan. Walau bagaimanapun tujuan asal dan utama hanyalah untuk mengumpul ikan dan menangkapnya. Hasil daripada penyelidikan Jabatan Perikanan didapati sumber perikanan di Malaysia semakin berkurangan. Purata kadar tangkapan pada tahun 1970 sebanyak 131.1 kg/jam berkurangan 55% dalam masa 10 tahun iaitu hanya 58.9 kg/jam pada tahun 1980.

Ekoran daripada itu, sebagai satu langkah untuk mengatasi masalah pengurangan sumber dan memulihara habitat, Jabatan Perikanan melalui Institut Penyelidikan Perikanan telah melancarkan tukun tiruan pada tahun 1975. Tukun tiruan tayar yang pertama telah dilancarkan di Pulau Telur, Kedah pada bulan Mei, 1975. Di Pantai Timur Semenanjung Malaysia tukun tiruan yang pertama dilancarkan pada tahun 1979 di Pulau Ekor Tebu, Terengganu.

Perkembangan teknologi tukun tiruan semakin menonjol dan pada tahun 1986, tukun tiruan konkrit yang pertama di Malaysia telah dilancarkan di Pulau Payar, Kedah. Pada tahun 1987, tukun yang serupa telah dibina di perairan negeri Terengganu. Selain daripada itu, bot-bot lama telah dijadikan tukun sebagai salah satu cara pelupusan.

Perkembangan terbaru di dalam pembinaan tukun tiruan di Malaysia adalah penggunaan paip PVC. Pada tahun 1990, tukun PVC buat pertama kalinya telah dilancarkan di Pulau Lembu, Kedah dan pada April 1991, tukun PVC yang bersaiz besar dilancarkan di Pulau Perhentian, Terengganu.

PEMBANGUNAN TUKUN TIRUAN

Tukun Tiruan Tayar

Pembinaan tukun tiruan di Malaysia bermula pada tahun 1975 dengan pembuangan tayar-tayar terpakai ke laut di Pulau Telur. Pada tahun 1984 satu kempen mengumpul tayar di seluruh Malaysia telah dilancarkan oleh Y.B. Menteri Pertanian dan berjaya mengumpul sebanyak 1.4 juta tayar. Sasaran bagi setiap tapak tukun tiruan ialah 28,000 tayar yang dianggap mencukupi bagi membina satu habitat yang kompleks.

Sehingga tahun 1993, Semenanjung Malaysia mempunyai 54 tapak. Sarawak 6 tapak dan Sabah mempunyai 7 tapak tukun tiruan tayar. Sebanyak tiga juta tayar terpakai telah digunakan untuk tujuan ini. Daripada 45 tapak tukun tiruan tayar di Semenanjung, sebanyak 38 terletak di Pantai Timur dan 16 tapak di Pantai Barat. Pada masa ini negeri Terengganu mempunyai bilangan tukun tiruan tayar terbanyak sekali dan diikuti oleh negeri Pahang dan Johor.

Kebanyakan tukun tiruan ini terletak berhampiran pantai atau berhampiran dengan pulau-pulau. Tukun tayar terletak kira-kira 200 meter hingga 1 kilometer dari daratan dan diletakkan pada kedalaman air di antara 15-25 meter. Sebanyak 42 biji tayar ditebuk dan diikat bersama menjadi satu bentuk piramid dan memenuhi satu kawasan seluas 3 meter persegi.

Hasil daripada pengawasan ke atas tukun tayar ianya menunjukkan perkembangan positif. Kadar tangkapan ikan di tukun tayar sebanyak 8.7 kg/jam/orang. Tukun tiruan tayar menyediakan satu habitat yang baik untuk

hidupan akuatik dan hal ini dapat dilihat dengan jelas dengan pertumbuhan dan perkembangan organisma seperti karang keras, karang lembut dan span tumbuh di atasnya.

Tukun Tiruan Konkrit

Penggunaan tayar sebagai tukun tiruan telah bermula pada 1975 dan satu dekad selepas itu bahan konkrit telah digunakan. Tukun tiruan daripada konkrit telah lama digunakan di negara Jepun dan Taiwan. Tukun tiruan konkrit yang pertama dilancarkan ialah di Pulau Paya, Kedah pada bulan Disember 1986, kemudian diikuti oleh Pulau Pinang dan dua tapak di Terengganu pada November 1987.

Pada pelancaran awal tukun konkrit di Pulau Payar, dua jenis reka bentuk digunakan:

- Silinder konkrit (61 cm garispusat x 122 cm panjang)
- Kulvat konkrit berbentuk "V" (61 cm tinggi x 81 cm panjang)

Sebanyak 20 modul tukun konkrit dilancarkan di Pulau Payar dan 20 modul lagi di Muka Head, Pulau Pinang. Di Terengganu, sebanyak 144 unit modul tukun konkrit silinder dilancarkan di Kuala Ibai dan Setiu pada November 1987.

Empat bulan selepas pelancaran, di dapati sebanyak 70% permukaan tukun konkrit telah pun diliputi oleh organisma marin terutama tiram, teritip dan algae.

Hasil daripada penelitian yang dijalankan di tukun konkrit telah didapati satu keputusan yang positif. Kajian yang dijalankan di Kuala Ibai dan Setiu, Terengganu menunjukkan purata

tangkapan menggunakan pancing ialah 8.7 kg/jam/orang dan 20.72 kg/jam/orang masing-masing. Kajian menggunakan bubu mendapati kadar tangkapan ialah 9.58 kg/haul/bubu untuk tempoh menahan bubu selama lima hari (Sukarno, et al, 1990). Kajian yang sama dijalankan di Thailand mendapati sebanyak 15.55 kg/haul/bubu (Parnichsuke, et al, 1988).

Tukun tiruan yang juga berfungsi sebagai alat peranti pengumpul ikan telah berjaya mengumpul sebanyak 25 famili dan 60 spesies ikan (Sukarno, et al, 1990). Sudah semestinya tukun tiruan telah menjadi satu habitat baru bagi spesies ikan ini bermastautin. Kajian juga mendapati di perairan awam kadar tangkapan dengan menggunakan pancing ialah 0.728 kg/jam/orang.

Tukun Tiruan PVC

Pembangunan tukun tiruan di Malaysia telah dikejutkan dengan penggunaan bahan PVC sebagai bahan utama pembinaan. Tukun PVC telah diperkenalkan oleh Dr. William S. Alevizon pada awal tahun 80an di perairan Caribbean yang bertujuan untuk menarik ikan 'snappers' dan 'grunts'. Mengikut beliau bahan ini sesuai digunakan di perairan bertenaga tinggi. Beliau juga berpendapat bahawa unit tukun PVC dapat menarik spesies sasaran dan beranggapan bahan ini berpotensi meningkatkan stok perikanan setempat.

Pada tahun 1990, satu projek perintis pembinaan tukun PVC telah dijalankan di Pulau Lembu, Kedah. Dalam projek ini tukun tiruan dibina menggunakan paip PVC bergarispusat 5 cm. Kejayaan projek perintis ini telah mendorong satu projek yang lebih besar untuk dilaksanakan.

Tapak pembinaan tukun PVC yang dipilih ialah di Pantai Keranji, Pulau Perhentian, Terengganu. Tukun tersebut dibina pada kedalaman air 20 meter dengan dasar laut yang berpasir.

Perkembangan ekologi pada tukun PVC Pulau Perhentian adalah sangat pantas. Pada minggu pertama didapati 40% permukaan diliputi oleh teritip dan pada minggu kedua sebanyak 80%. Lima bulan selepas pelancaran didapati tiram mutiara "*Pteria penguin*" dan "*Pinctada margaritifera*" telah mula berkumpul bersama-sama dengan karang lembut "*Dendronephthya sp.*" dan span.

Tukun Tiruan Bot

Sehingga tahun 1992, terdapat 8 tapak tukun tiruan bot di Semenanjung dan 2 tapak di Sarawak. Tukun bot yang pertama dilancarkan pada tahun 1984. Tukun-tukun bot yang dibina di Malaysia ialah dengan menenggelamkan bot-bot yang dirampas ataupun bot yang hendak dilupuskan.

Bagi bot-bot yang hendak dijadikan tukun tiruan, segala sampah dan barang yang bebas telah dikeluarkan untuk mencegah pencemaran. Tangki air dan minyak akan dibuka untuk membebaskan udara yang terperangkap supaya daya ampung bot dapat dikurangkan. Bot-bot ini seterusnya diisi dengan beg-beg pasir untuk menambahkan berat bot supaya mudah tenggelam. Seterusnya bot-bot akan ditunda ke tapak pelancaran dan kemudian dipasangkan sauh. Bahagian kulit bot dipecahkan untuk membolehkan air masuk di dalam bahagian dalam bot. Di Terengganu, kebanyakan bot-bot yang dilupuskan telah dijadikan tukun tiruan di perairan Pulau Kapas. Sehingga Julai 1993

sebanyak 286 buah bot telah dijadikan tukun tiruan. Pada amnya tukun bot ini terletak pada kedalaman air 24 meter. Tukun-tukun ini telah menjadi tumpuan kepada nelayan-nelayan pancing dan bubu.

Tukun Rekreasi

Di Malaysia, perikanan rekreasi (recreational fisheries) masih belum lagi digemari ataupun masih lagi belum popular di kalangan penggemar laut. Walau bagaimanapun, di Malaysia penduduknya memang gemar atau mempunyai hobi memancing. Namun demikian, tumpuan pemancing-pemancing ini lebih di perairan darat seperti sungai, tasik, lombong ataupun hanya memancing di pinggir pantai. Masih terlalu sedikit badan atau agensi yang menawarkan pakej memancing di laut yang betul-betul disebut sebagai 'sport fishing'.

Sehubungan dengan itu, Jabatan Perikanan Malaysia di bawah projek Pinjaman Bank Pembangunan Asia (ADB) telah melaksanakan satu projek pembinaan tukun rekreasi. Pembinaan tukun ini telah siap pada bulan Mei 1992. Tukun ini terletak di satu tapak yang kedalamannya kira-kira 25 meter. Pulau Tioman telah dipilih untuk membina tukun rekreasi ini kerana pulau ini merupakan salah satu destinasi pelancongan utama di negara ini. Pulau ini juga mempunyai prasarana yang baik untuk tujuan kegiatan-kegiatan rekreasi seperti bot pelancong dan hotel.

Perkembangan ekologi di kawasan tukun tiruan ini agak perlahan jika dibandingkan dengan tukun-tukun di tapak yang lain. Tukun konkrit di Kuala Ibai, Terengganu menunjukkan kadar pertumbuhan yang cepat. Dalam jangka masa 4 bulan semua permukaan tukun telah dilitupi

oleh teritip dan tiram sebanyak 100%. Pada jangka masa yang sama pertumbuhan ekologi di tukun rekreasi Tioman hanya 40% sahaja iaitu 60% algae, 20% bivalvia, 10% teritip dan 10% lain-lain seperti karang lembut, tunikat dan sebagainya.

Tukun Udang Karang

Pendaratan udang karang dan udang ketak di Semenanjung Malaysia pada tahun 1990 adalah dianggarkan 580 ton. Udang karang mempunyai nilai komersial yang tinggi terutamanya spesimen yang hidup di restoran-restoran makanan laut.

Pada Jun 1992, Jabatan Perikanan telah membina tukun tiruan untuk udang karang di Perairan Taman Laut Pulau Redang. Pembinaan tukun yang sedemikian telah lama dilaksanakan

di negara-negara Caribbean seperti di Mexico. Nelayan-nelayan di sana membina tukun tiruan "casitas/sombras" untuk mengumpul dan memudahkan tangkapan udang karang.

Pada amnya, udang karang banyak terdapat di kawasan berbatu yang mempunyai lubang atau gua kecil. Pembinaan tukun yang hampir menyerupai habitat semulajadi dibuat dengan harapan tukun ini akan mencapai matlamatnya. Pembinaan bermula pada Jun 1992 dan pemerhatian dijalankan setiap bulan sebaik sahaja pelancarannya.

Sehingga akhir 1992, masih belum terdapat udang karang di tukun tiruan yang dibina. Walau bagaimanapun, tukun udang karang ini menarik banyak spesis ikan berkumpul di tukun ini.



Tayar-tayar terpakai ini dijadikan tukun tiruan.

Tukun Sotong

Tukun sotong ialah sejenis tukun tiruan yang dibina untuk menyediakan satu habitat haiwan sotong untuk membiak dan berlindung. Pembinaan tukun tiruan untuk sesuatu spesies sasaran lebih dikenali di negara Jepun. Teknologi ini disebut juga sebagai ladang laut ataupun "marine ranching". Ini bermakna sesuatu teknologi perikanan tiruan perlu diusahakan untuk menguruskan keseluruhan pusingan hidup sesuatu biota marin bermula daripada masa bertelur sehingga boleh ditangkap. Pengurusan ini melalui penggubalan atau manipulasi bijak dan pengawalan ke atas gelagat biota tersebut di suatu kawasan yang tidak terhad (Nakamura, 1991).

Habitat semulajadi sotong akan melekatkan telur-telur pada sebarang substrat di dalam air. Sotong-sotong akan melekatkan beribu-ribu telurnya di dalam pundi telur pada substrat seperti bubu, unjam lama, tali ataupun ketulan batu yang kecil yang terdapat di atas dasar laut (Sukarno, pers. comm)

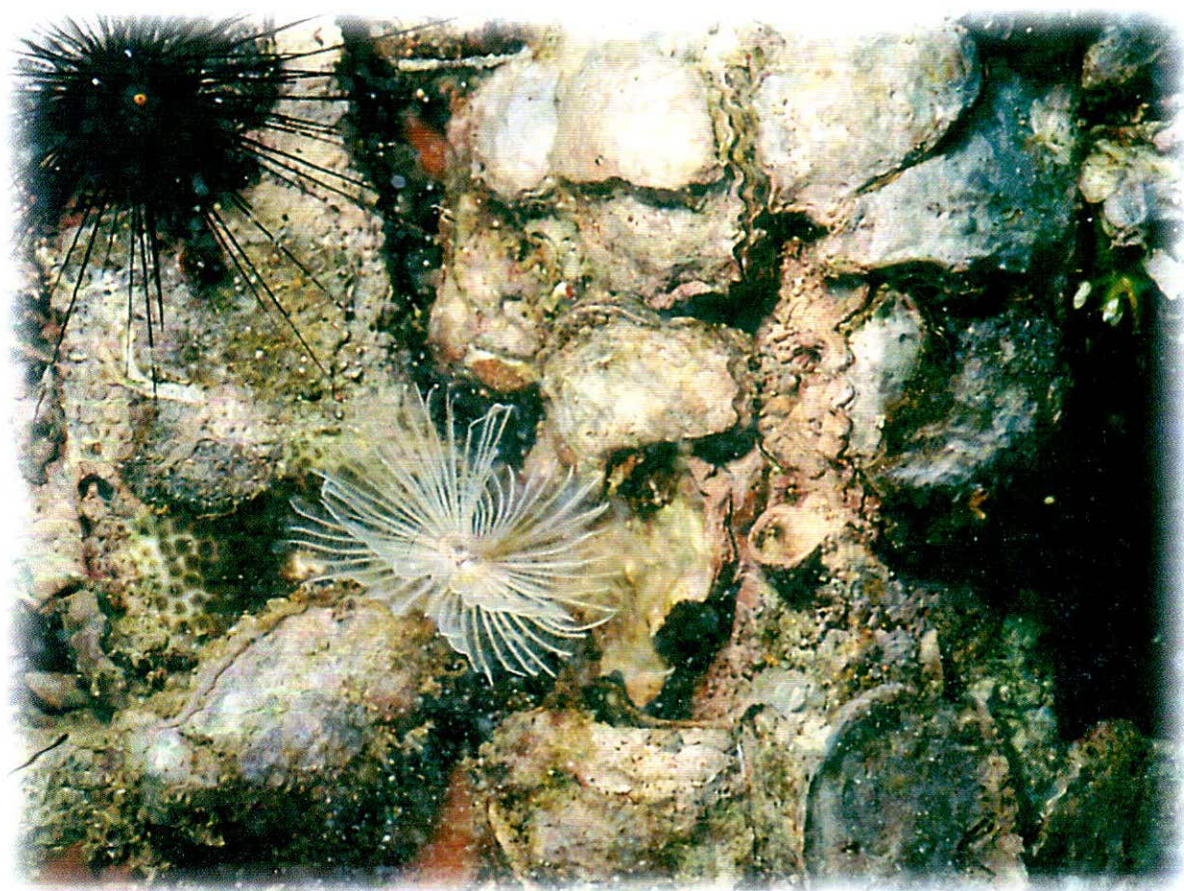
Tukun tiruan sotong yang dibina di perairan Jambu Bangkok telah menunjukkan kesan yang positif selepas dua bulan pelancarannya. Tukun ini mula diliputi oleh teritip dan tiram mutiara "*Pinetada sp*" sepenuhnya sebulan selepas pelancaran. Pada masa yang sama juga terdapat kumpulan ikan pelagik dan demersal bermain di keliling tukun. Spesies ikan yang utama terdapat di kawasan tukun tersebut ialah *Latianua lutianus*, *Lutianus lineoplatus*, *Latjanus vitta*, *Lutjanus rusolli*, *L. malabaricus*, *Epinephelus aerolatus*, *E. bleekerii*, *Cephalophalis bocnack* dan *Plootothyphonus sp*. Spesies ikan pelagik yang dominan ialah *Selaroides laptolopis* dan *Sphyræna obtusata*.

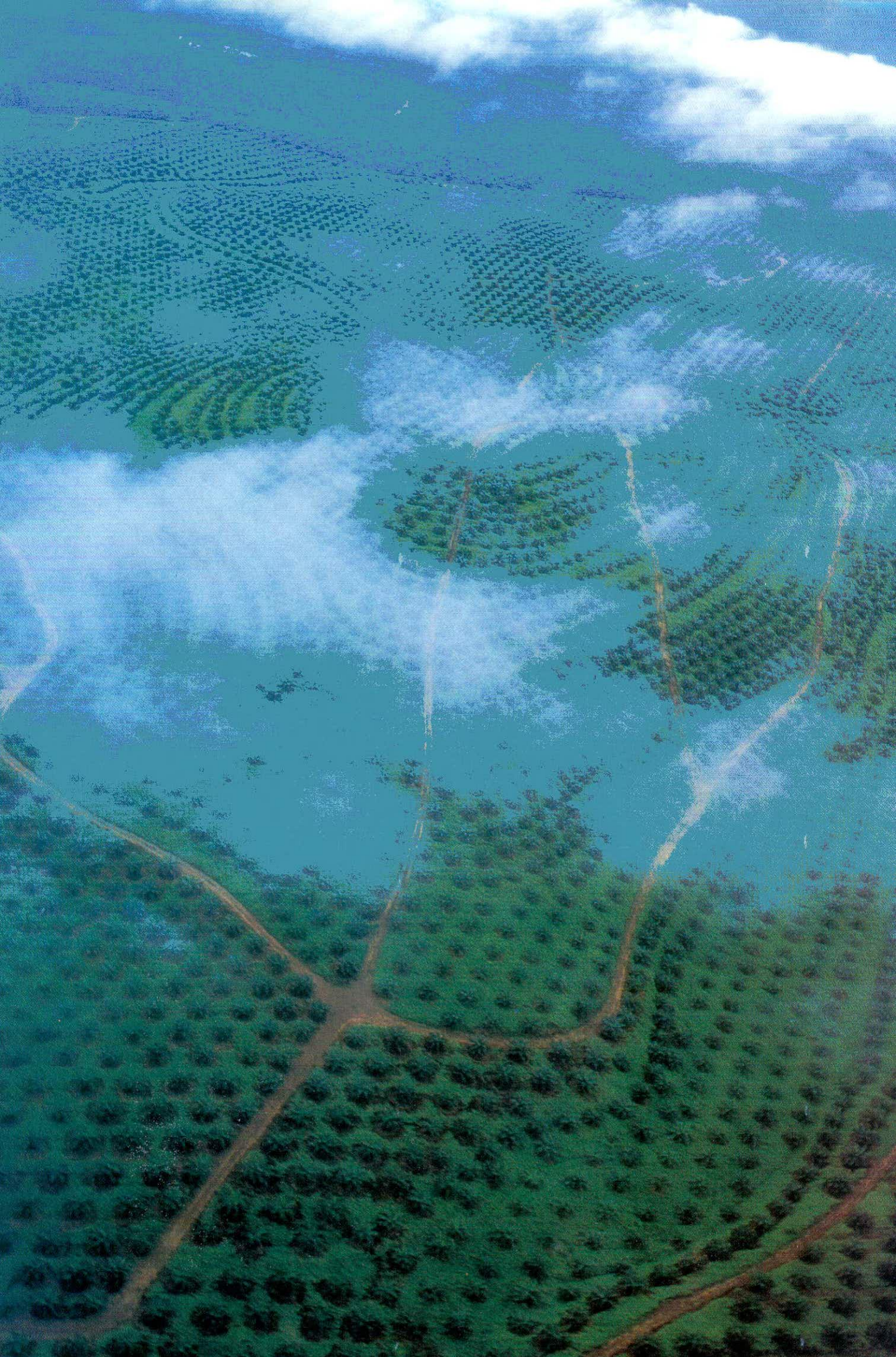
Pada bulan kedua terdapat sotong katak *Sepia pharaonis* telah melekatkan telur-telurnya di lantai tingkat pertama Tukun Mengabang. Sebanyak 5 tukun telah dilekati telur sotong dengan bilangan di antara sembilan hingga 600 pundi telur. Daripada pemerhatian itu juga didapati sotong *Sepia pharaonis* lebih cenderung melekatkan telurnya di permukaan tukun yang menghadap kepada arus air.

PROSPEK

Sehingga kini 40 negara daripada 6 benua telah mempraktikkan teknologi habitat tukun tiruan untuk pelbagai kegunaan industri perikanan, pemuliharaan sumber, pengurusan sumber, pelepasan anak-anak ikan, marikultur dan penangkapan ikan. Laporan daripada kesemua negara tersebut menunjukkan peningkatan kadar tangkapan ikan kepada 20% sehingga 400% habitat ini juga dibina untuk pengurusan habitat dan sumber marin yang lebih baik serta salah satu cara pelupusan bahan buangan.

Teknologi tukun dan habitat tiruan sekiranya dilaksanakan dengan baik akan menyediakan satu alternatif penyelesaian kepada masalah pengurangan sumber dan habitat. Keperluan semasa yang masih hangat diperkatakan ialah menekankan lebih banyak penyelidikan tentang kesannya terhadap sumber perikanan secara langsung dan juga tentang gelagat ikan kepada tukun tiruan. Teknologi ini bukan sahaja meningkatkan habitat untuk perikanan tetapi kepada bidang lain yang tidak melibatkan secara langsung sumber perikanan seperti pelancongan dan rekreasi yang memberi pulangan yang baik.





SUCCESS IN OUR PALMS:

MALAYSIAN OIL PALM GROWERS' COUNCIL

Oleh
Gurmit Singh
MOPGC/MRPC Joint Working
Group On By-Product Utilization And
The Environment

ENVIRONMENT-friendly policies are finally beginning to convince palm oil producers that responsibility and the balance sheet are compatible.

A humble fruit is not usually associated with a nation coming-of-age in the export sector. But consider palm oil's outstanding achievements. Twenty years ago, Malaysia was producing a mere million or so tonnes. Today, the country has increased production to more than 7.2 million tonnes. We are now the leading exporter of palm oil, contributing more than half of the world's needs. In 1994, this spiky red fruit added RM8.6 billion to the national coffers.

In the early years, when the palm oil industry was finding its feet, the emphasis was on increasing production. Unfortunately, in the quest to boost output, the industry neglected other important concerns. It was accused of contributing to widespread environmental degradation. In response, the palm oil industry swiftly took this criticism on board, and concentrated its energies on developing strategies to reorientate its activities to become more environmentally sound.

Producers began to rethink their agricultural policies. From steps taken to prevent water, air and soil degradation, to crop establishment, down to processing, producer began to experiment with more responsible techniques. To their satisfaction, these policies have been quite successful. They have now been widely adopted by the enlightened palm oil industry.

During land preparation, planting and upkeep, emphasis is given to the use of proven site

specific agricultural practices that are both environmentally sound and beneficial to crop productivity. On hilly terrain, measures are taken to minimise soil erosion and conserve moisture. These include the construction of terraces, silt pits, the planting of creeping leguminous cover crops, and circle mulching of newly planted palms with empty fruit bunches. In coastal areas, emphasis is given to proper drainage and water management, especially with respect to the fragile acid sulphate and peat soils.

In replants, zero burning is now increasingly practised. The old stands of oil palms are mechanically felled, windrowed, shredded and allowed to decompose in the avenues. This technique, besides contributing to a cleaner environment, also recycles large amounts of organic matter, improving the physical and chemical properties of the soil.

In pest management, greater emphasis is now given to integrated control. This involves regular monitoring, suitable agronomic practices, the conservation of beneficial broad leaf flowering weeds for enhanced parasite and predator activity, and the conservation and utilisation of natural enemies.

Over the years, harmful insecticides with a broad spectrum of activity, long and persistent residues and high mammalian toxicity, have been replaced with safer and more target specific products. These new insecticides are also softer on the environment. Similarly, trunk injection, an environmentally compatible system of treating outbreaks of leaf-eating pests, is now widely practised in the industry. The biological control of rats using the barn owl is also gaining acceptance.

Blanket weeding is now discouraged. Soft weeds with a shallow root system that do not grow to excessive heights are encouraged outside the weeded circle. Chemical usage is low. Spraying is confined to the circles and the harvesting paths, which collectively represent only about 25 per cent of the planted area.

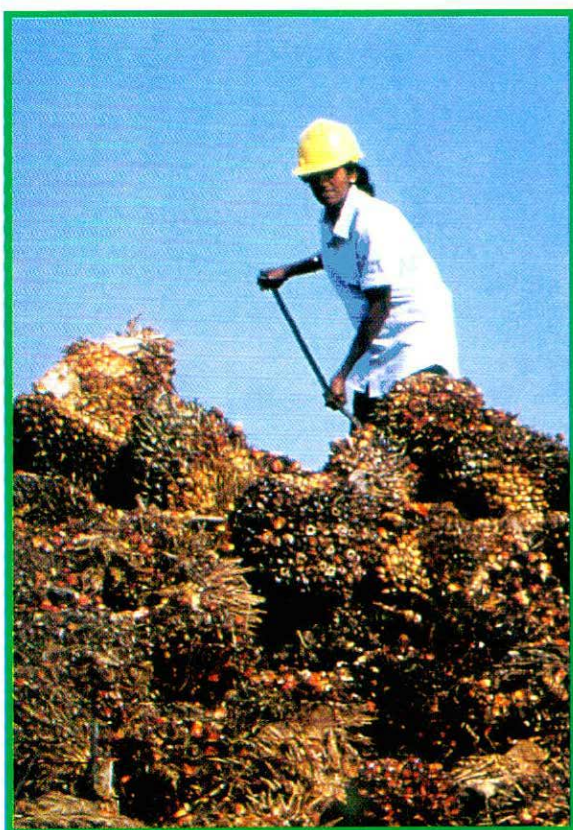
Safe handling of pesticides, an area of growing concern, is given priority and greater emphasis is given to operator safety.

In the cultivation and processing of oil palm, the industry generates a number of by-products and waste material; these are either recycled or converted to value-added products. The main residues produced in the field are the pruned fronds and the trunk and leaf tissues of the

former stand of oil palm. Both these sources of biomass are recycled in the field as organic matter, enriching the soil. The 'zero burn' technique of replanting is, in this respect, a step in the right direction. Not only is it pollution-free, it also conserves large quantities of organic matter which is badly needed in the impoverished tropical soils. The fronds can also be used for roughage in animal feed or for the production of pulp and paper, and fibre-board. Similarly, the trunk can be further reprocessed into fibre-boards, pulp and paper and animal feed or used as timber in the manufacture of furniture.

In the mill, the main waste products generated during the processing of the fruits is the palm oil mill effluent (POME) and empty fruit bunches (EFB). In 1995 about 22 million tonnes of POME and eight million tonnes of EFB were produced in Malaysia. POME is a high strength organic waste with a BOD in excess of 25,000 mg/l. Prior to 1978, the raw effluent was discarded into public waterways, seriously polluting the aquatic environment. Today, all the materials are biologically treated in open ditches or tank digesters to reduce the BOD to less than 100mg/l for watercourse discharge. Increasingly, the effluent after treatment is being used for land application to oil palm at controlled rates. The biogas produced during the decomposition process is presently under-utilised, but has good potential as an energy source. In some mills, the clarification sludge is dried via a decanter-drier and the resultant solids are used as an animal feed supplement, or may be further processed into a high grade organic fertiliser.

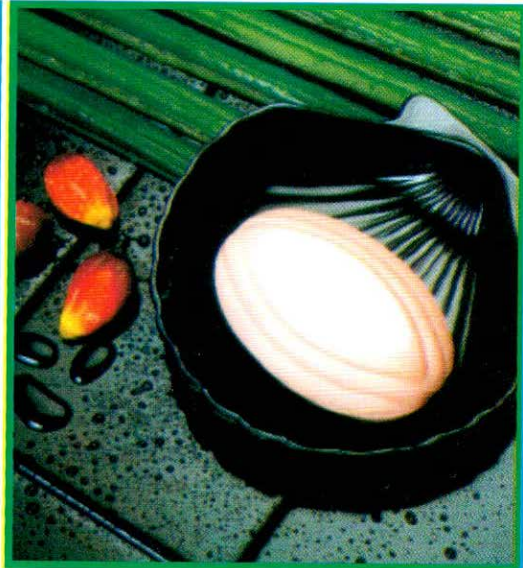
The empty fruit bunches, like the POME, were till a few years ago, underutilised and discarded



Oil palm fresh fruit bunches are loaded into cages for transport to the factory.

as waste. Being a rich source of plant nutrients they are now extensively used as a mulch in plantations. Limited quantities are, however, still incinerated for the production of bunch ash - a useful potash fertiliser. In mills where additional energy is required, the empty bunches

are dewatered and burnt together with fibre and shells to raise steam and to generate power. Additionally, the empty bunches can also be used for the production of fibre-boards, pulp and paper, animal feed or as a substrate for the cultivation of edible mushrooms.



Oil palm products.





GREEN APPROACHES IN PLANTATION MANAGEMENT

By
Sime Darby Group

RUBBER and oil palm plantations have been included as part of Malaysia's green cover. However, plantation management has often contributed to water and air pollution. In its efforts to ensure sustainable development of Malaysia's plantation sector, Sime Darby has focussed on soil and water conservation, non-threatening ways of increasing crop yield, as well as productive utilisation of plantation waste.

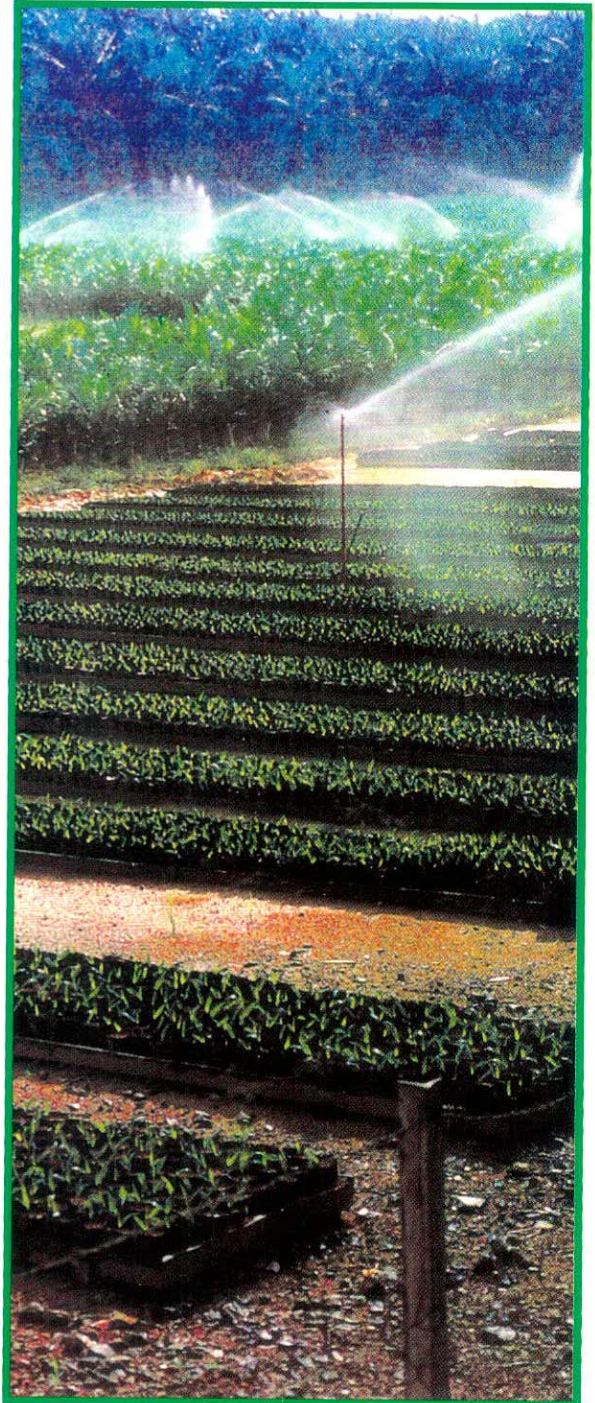
The Sime Darby Group has a total of 86,000 hectares under its Plantations Division. This comprises about 90% oil palm, while the remaining areas are mainly rubber. Environment-friendly techniques to increase crop yields and utilisation of plantation wastes (biomass) are continuously being developed and refined.

Soil and Water Conservation

Oil palm needs regular fertiliser applications and good water regimes, which should preferably be well distributed throughout the year. Although Malaysia generally has a high rainfall, about 30-50% of the rainfall is lost as surface run-off due to the hilly terrain in most of the inland areas. Surface run-off results in soil erosion and along with it, fertilisers find their way into the water system. The results are siltation of water courses and flooding of the lowland coastal areas, as well as river pollution.

Research into soil and water conservation has taken priority at Ebor Research, the research arm of Sime Darby Plantations. Presently Sime Darby plants palms on contour terraces with adequate backslope to retain water on gentle slopes of three degrees or more. Where possible wide terraces are used so that mechanisation of field operations, including collection of

harvested fruit bunches, can be carried out. As palms mature, the canopy gradually closes. But surface run-off and erosion can still occur. Sime Darby has developed effective silt-pitting and frond replacement techniques to minimise these adverse effects.



Watering of young palms.

Underplanting

This system of replanting under an existing old stand was tested and refined by Ebor Research in the 80's. Generally, 50 percent of the old stands are removed at six months and the balance at 18 to 24 months.

Underplanting not only offers economic benefits but is also environment friendly. This method requires no burning, minimises soil erosion and compaction and retains more organic matter nutrients. It has been implemented commercially in areas that do not require terracing.

Biomass Utilisation at Replanting

For rubber, about 50 to 60 percent of the biomass at replanting is now extracted for furniture manufacture and production of panel products such as medium density fibreboard. Its impact on the environment is therefore relatively minor.

During oil palm replanting, about 75 tonnes of trunks and 15 tonnes of fronds are produced per hectare. In the past, these residues were mainly burnt to control certain major pests and root diseases. In Sime Darby Plantations, trunk chips have been tested and found suitable for replacing empty fruit bunches (EFB) as a mulch. The use of trunk chips as a mulch for newly planted palms, also eliminates burning during replanting.

Sime Darby is also looking into the use of oil palm fibres (from trunks, fronds and EFB) for manufacture into cement-bonded particle boards. This can provide an additional source of building materials not only for the booming local building industry but also for large potential markets in Asia.

Research has also indicated that the palm cabbage, also called palm heart, can be processed into a delicacy. However, the market for this has yet to be developed.

Utilisation of Palm Oil Residue

Residue is produced during the milling of fresh fruit bunches (FFB) for the extraction of oil and kernel. For every tonne of FFB processed, about 220 kg of empty fruit bunches (EFB), 670 kg of palm oil mill effluent (POME), 120 kg of fruit mesocarp fibre, 70 kg of shell and 30 kg of palm kernel cake are produced.

Ebor Research was among the first to develop the use of EFB for mulching both on immature and mature palms. This has had significant benefits on growth and yield especially on inland soils with low water-holding capacity.

Composting of EFB was also studied and found to be suitable for manufacture into an organic fertiliser and soil conditioner.

The process which takes about three months is essentially aerobic. The organic matter is microbiologically converted into humus with the liberation of carbon dioxide, water and heat.

POME became a major pollutant of our rivers in the 70s. Sime Darby pioneered the closed tank system for POME digestion to produce biogas (60-65% methane) for heat and electricity generation.

Ebor Research also developed the long-bed system of land application to recycle nutrients in the digested mill effluent. This enabled the total replacement of inorganic fertilisers in the plantations, at the same time increasing yield by about 10%. Ebor Research also developed an organic fertiliser, "Baja Bio" from POME.

The above contributions by Sime Darby have not gone unnoticed. Ebor Research has been nominated by the Prime Minister's Department to chair the National Malaysian Industry-Government High Technology Group (MIGHT) on Agro-Waste based technologies.

Integrated Pest Management

Sime Darby has implemented an Integrated pest management system with minimum use of chemicals to reduce crop losses. Most pests and diseases are kept under natural control by antagonistic organisms and bio-agents. A good example is the biological weed control by integrated sheep farming with young rubber and oil palm. This had been tried on some Sime Darby estates. The use of barn owls for rat control is currently under commercial scale evaluation in several Sime Darby's estates.

Reclamation of Tin Tailings for Agriculture

It is estimated that there are about 200,000 hectares of tin tailings in Peninsular Malaysia.

Those around urban centres have been used for housing and horticultural purposes.

In 1986, a joint development project between Sime Darby Plantation and the Malaysian Mining Corporation successfully rehabilitated tin tailings for the establishment of oil palm, pasture land and some timber species such as *Acacia mangium*. This development especially for oil palm has the potential of reclaiming ex-tin mining land and improving the environment.

Timber and Rattan Planting

Sime Darby Plantation has initiated trail plantings of several fast-growing timber species since 1984 on different soil types and terrain in Peninsular Malaysia and Sabah. Results indicate that fast-growing species like *Acacia mangium* and *Paraserianthes falcataria* in short rotations of about eight to ten years can offer alternative land uses for steep areas where soils are poor. Timber planting requires minimum soil disturbance and is therefore friendly to our environment. Presently, the Group is experimenting with other indigenous species.



Enrichment planting with preferred species.





A COMMITMENT TO ENVIRONMENT EXCELLENCE

By
Golden Hope Plantations Bhd.

GOLDEN Hope Plantations strongly believes that environmental considerations should guide every aspect of its business operations. Corporate responsibility has translated into an active promotion of sound environment practices.

As a leading Malaysian corporation, Golden Hope Plantations Berhad has a strong commitment towards the protection of the environment. This commitment is firmly expressed in the Group's environmental policy.

"We at Golden Hope recognise our responsibility to safeguard the environment in the course of conducting our business operations. Environment will be a primary consideration in all aspects and at all stages of our business."

To protect the environment we shall:

- Prevent or minimise any potential adverse environmental impacts arising from our operations, products and services.
- Review and improve continuously our protocols, operations, products and services to enhance our environmental performance.
- Encourage employees to conduct their occupational and personal activities in an environmentally-responsible manner.
- Promote high environmental performance standards amongst our stakeholders and the industry at large."

In line with this environmental policy, Golden Hope strives to adopt environmentally sound practices at every stage of its operations, from land clearing and cultivation to the processing

of agricultural products, downstream manufacturing and management of wastes.

Following the introduction of the Environmental Quality Act in 1974, Golden Hope's research and development efforts focused on the development of appropriate methods for treatment and monitoring of effluent produced in its mills and factories. The anaerobic reactor digester system with extended aeration for treating raw palm oil mill effluent (POME) which was first developed in the 1970's and subsequently improved and upgraded is being effectively used in the Group's palm oil mills.

Cleaner production was achieved by the reduction of effluent volume and zero discharge approaches.

The company collaborated with Peralisi M.I.A.P of Italy in 1994 in a research and development project which resulted in a new palm oil milling process that provides more efficient oil and kernel recovery and significantly reduced effluent output. Compared with the conventional milling process, the technique reduced the biochemical oxygen demand (BOD) loading by 800 percent.

A recent breakthrough in zero discharge is the development of the Golden Hope effluent treatment system for the treatment of the effluent from latex concentrate production and the manufacture of medium density fibreboard (MDF).

The new system consists of a clarification system with mixing and aeration features to reduce the solids content and heavy metals, the chemical oxygen demand (COD) and biochemical oxygen demand (BOD) of the effluent.

The treated water can be recycled as clean water for process or other uses. This innovative technology was featured in the United Nations Environment Programme (UNEP) Industry and Environment 1994 Publication “Cleaner Production in the Asia Pacific Economic Co-operation”.

In the plantation sector, environmentally sound practices include zero burning, soil management using leguminous cover and Vetiver grass, integrated pest management and utilization of agricultural wastes.

The zero burning technique of replanting is a procedure where old palm stands and other plantation crops, at the end of their economic life, are felled, shredded and left to decompose *in situ*. In contrast to the conventional clean clearing and burning system, no burning is carried out.

Beside eliminating potential atmospheric pollution, the zero burning technique replenishes soil organic matter, improves the physical properties of the soil and enhances its fertility through recycling of plant nutrients. Consequently, the utilization of chemical fertilizers is accordingly reduced.

Zero burning has been adopted as a sound commercial practice by Golden Hope and other plantations. In recognition for this contribution to the preservation of the environment, Golden Hope received the prestigious United Nation Environment Programme (UNEP) Global 500 Award for Environmental Achievement in Rio de Janeiro in 1992.

As palm oil mill effluent (POME) and empty fruit bunches (EFB) are rich in plant nutrients, they are recycled as organic fertilizers. Instead of being incinerated as previously practised, EFB are applied to young and mature oil palm fields as a mulch and a source of natural nutrients.

Other by-products such as kernel shell and palm fibre are used as boiler fuel for power generation in the oil mill. Thus, what used to be liquid and solid wastes are now recycled as beneficial resources to the production system. The ultimate aim is to try to achieve zero waste generation.

As early as the 1960's Golden Hope has adopted an integrated approach towards management of insect pests. This approach utilizes a best mix of pest control techniques that would result in the suppression of pest population to a harmless level. Although the system was effective, it continued to be dependent on the application of pesticides as one of the control techniques.

Since 1990, Golden Hope has intensified research into biological control techniques. This is an active approach where the population of natural enemies of pests are deliberately enhanced to reduce, if not replace, the use of pesticides. Areas of biological control being pursued include the use of barn owl for controlling rats, biocontrol of leaf eating insect pests and the rhinoceros beetle and biological control of *Ganoderma* basal stem rot, the most serious disease of oil palm in Malaysia.

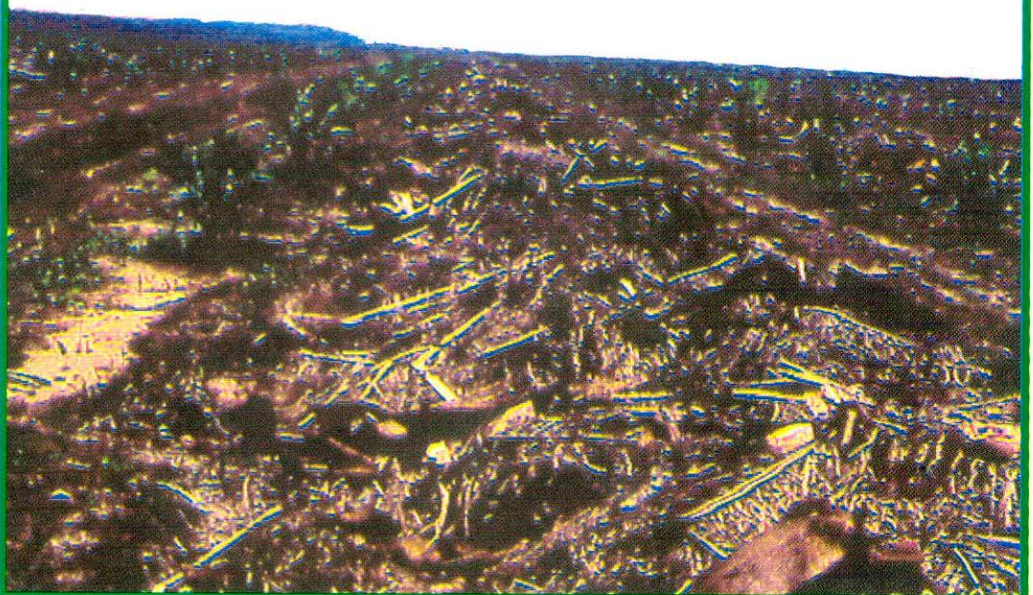
Although Golden Hope has made significant contributions in respect of the environment over the years, it recognises that greater effort would be required for the common goal towards attainment of sustainable development.

Golden Hope believes in the holistic approach and is introducing systematic environment management throughout the Group. Towards this end, it became a signatory of the International Chamber of Commerce (ICC) Business Charter for Sustainable Development in 1993 and is guided by the Chapter's 16 principles for environmental management.

The Group also intends to adopt the environment management systems being developed under the ISO 14000 series of standards. In the broader context, environmental management in Golden Hope would also cover occupational health and safety aspects under the provision of Health and Safety Act of 1994.



Palms are felled and shredded in the first stage of the Zero Burning technique.



A typical Zero Burning oil palm replant with organic matter and plant nutrients being recycled into the soil





SHELLING OUT FOR THE ENVIRONMENT

By
Tan Ging Tuang
Health, Safety and Environment Co-ordinator,
Shell Malaysia Limited

OIL and gas companies are not well known for their environmental conservation activities. But some companies, like Shell, are trying to prove that oil companies can do business without polluting or desecrating the planet.

Oil and gas giant, Shell Malaysia, has been active on and off Malaysian shores for over a hundred years. The company, with its distinctive red and yellow logo, has endeavoured to conduct all its activities in a safe and environmentally sound manner.

To this end, Shell has carried out a number of changes in its operations to comply with all governmental legislations relating to the environment.

The Environmental Quality Act (EQA) of 1974 introduced a new era of environmental conservation in Malaysia. Here, we track the changes in environmental management in Shell over the 20 years since the introduction of the EQA.

Initially, Shell practised end-of-pipe solutions, which were the norm in the industry at that time. This meant that whatever wastes or effluents that were generated would be treated before being discharged.

Shell later embarked on a strategy to reduce the contaminants at source, which resulted in the development and implementation of a comprehensive environmental management system.

The key to Shell's successful implementation of these programmes was, and still is, its people - from the senior management down to the

individual employee - who have fully supported Shell's commitment to put its environmental management programmes into practice.

These efforts are directed from the highest level through the appointment of an executive director responsible for the company's health, safety and environmental affairs.

Shell has started a number of programmes. These can be classified into five categories.

End-of-pipe Technologies

With the introduction of regulations specifying effluent standards, liquid effluent treatment facilities at terminals and retail stations were upgraded to meet stringent legal requirements, particularly those concerning oil content in water.

The industry, working with the Department of Environment (DOE), agreed to install a common oil interceptor at every petrol station. In addition to this, a series of oil removers - ranging from simple oil interceptors to air flotation cells - were installed at distribution terminals to intercept effluents.

Black smoke emissions were reduced with the installation of smoke reduction equipment at the company's installations and refineries. Scheduled wastes which cannot be disposed off, have been inventoried, labelled and stored on-site in anticipation of the provision of third-party waste management facilities.

Reduction at Source

The company places increasing emphasis on the reduction of contamination at source. This is done through prevention, reduction, reuse,

recycling and recovery rather than through end-of-pipe solutions, following experiences gained from earlier environmental practices.

Programmes for the reduction of priority waste streams were also developed and implemented. Following the installation of air floatation cells at the Labuan Crude Oil Terminal, liquid effluent has been reduced rather significantly to below the limit for offshore discharge of 100mg/l oil in water.

This reduction has been achieved through a better selection of chemicals, the segregation of water streams, regular site maintenance, diligent training of operators and line or site management accountability, including regular performance reports.

With the availability of environment-friendly mud, the use of oil-based mud in offshore drilling has ceased. This has been achieved through a successful research programme to develop environmentally-cleaner operational processes - including research on the use of vegetable oil. (Vegetable oil was found to be technically feasible, but not economically viable). The new mud system has also proven to be more cost-effective than the oil-based mud.

In line with the Montreal Protocol requirements, the exploration and production sector of Shell has also reduced halon emission well ahead of the Protocol's time-table. As a result of this, there have been substantial cost savings from this environmental exercise through reduced handling and maintenance of the product. The halon removed is recycled with DOE's approval, for reuse by local halon suppliers. This, in turn, reduces the quantity of halon imported into the country.

The design of new production, refining and manufacturing facilities in Shell no longer includes provisions for halon.

Shell also conducts environmental impact assessments (EIAs) for all its major projects. Current environmental requirements, anticipated legislative developments as well as industry standards are taken into account at the concept and design stage of each new facility or process.

The need to minimize adverse environmental impact through reduction of emissions and the efficient use of energy are thus considered at the very early stages of process design and selection of equipment. For example, new gas development processes would now require produced water to be re-injected into the field as an operational procedure rather than introduced into surface water, as was previously practised by the industry.

Raw Materials and Cleaner Products

Shell has put a lot of effort into developing and producing cleaner products which will have minimal impact on the environment.

The company introduced unleaded petrol in 1990. Since then, Shell has invested heavily in providing facilities for unleaded petrol at its refineries right through to all its distribution depots and services stations to ensure that unleaded petrol is widely available to all motorists throughout the country.

The market share for unleaded petrol has also increased substantially, indicating that more Malaysians are switching to unleaded petrol. Working with the DOE, the industry has, since April 1994, supplied diesel fuel that contains a

low 0.5 percent sulphur content, which is half the previous level.

Shell has also introduced low-smoke lubricants into the market, specifically for motorcycles. The introduction of these products helps to reduce the emission of lead, sulphur and smoke into the atmosphere - especially in the more urban and traffic-congested environments.

Yet another development in environmental management has been achieved in the packing of Shell lubricants. The thickness of the plastic packs has been reduced to minimize weight and waste. Where necessary, the packs have been reshaped to ensure that structural integrity is maintained. Bulk delivery of products has also been encouraged to dispense with packaging.

The novel Shell Middle Distillate Synthesis (Shell MDS) technology is a good example of the company's successful commitment to environmental research and development.

The Shell MDS complex in Bintulu, Sarawak, is the first of its kind in the world to convert natural gas into high quality naphtha, kerosene, gasoil, waxy raffinate and other specialty products such as detergent feedstocks and various grades of wax. These middle distillates are of very high environmental standards, being free of sulphur, nitrogen and aromatic compounds.

The plant's two basic raw materials are natural gas and oxygen, and the by-product resulting from the conversion process is water. Shell MDS has extensive waste water treatment facilities which ensure that waste water produced and discharged by the plant meets with DOE's requirements.

Research and Community Support

Beyond its realm of oil and gas operations, Shell is a concerned and committed corporate citizen of this country. It maintains a wide range of community-support initiatives and programmes which include the promotion of environmental awareness through education and the conservation of wildlife.

In a joint programme with Universiti Sains Malaysia, Shell sponsored studies on marine ecosystems and communities off the shores of Sabah and Sarawak. Begun in 1981, these studies are ongoing and have contributed to the development of local expertise and a database on sea-bed communities in Malaysian waters.

A Chair on environmental studies was created by Shell at the Universiti Malaysia Sarawak (UNIMAS) to support environmental research. Rainforest research and conservation have also benefited through the company's sponsorship of the Danum Valley Field Centre in Sabah.

With the Forest Research Institute of Malaysia (FRIM), the company supports a nature education centre at the Institute. This promotes environmental awareness and appreciation among school children and the general public. Shell also sponsors the upkeep of Zoo Negara's marine section, the small mammals and water birds sections in Zoo Melaka, and the flamingoes of the Bintulu Wildlife Park.

Other environmental-support programmes include the sponsorship of a book on 100 Malaysian trees and the publication of a quarterly health, safety and environment magazine for distribution to staff, academic institutions, government agencies and industry-related parties to help raise awareness in the field of health, safety and the environment.

Conservation of the environment is a shared responsibility, and a close relationship with government, industry and non-governmental organisations is critical for more effective environmental conservation and management.

Consistent with this philosophy, the company participates actively in government and other forums on environment-related issues and initiatives, and is an active member of the Business Council for Sustainable Development in Malaysia.

Environmental Management System

The company has developed a comprehensive environmental management system (EMS) as its response to increasing environmental expectations and challenges in industry.

Based on environmental practices and activities of the last decade as well as on new and recent initiatives, Shell's EMS provides a structured and dynamic approach to addressing key environmental issues. The EMS defines organizational structures, operational measures and resources required to implement the environmental policy as well as to control performance.

The EMS's hazard and effective management process ensures that environmental considerations, resources and controls are integrated into business decisions and activities in a systematic manner.

Communications systems and the exchange of views on environmental matters are established between staff and external parties such as contractors, customers, local authorities and non-governmental organizations.

Through regular performance reports, inspections and environmental audits, the EMS provides a feedback loop for process review and continuous improvement.

This system has placed Shell in a strong position to respond to increasingly stringent environmental demands on industry.

The EMS is also in line with the draft ISO 14000 series on environmental management systems. Shell fully endorses the International Chamber of Commerce's Business Charter for Sustainable Development with its 16 principles on environmental management. These principles are aimed at assisting business in fulfilling its commitment to environmental stewardship in a comprehensive manner.

The challenge to managing the environment is in integrating and utilizing the entire range of clean technologies through the EMS. The strategy to meet this challenge will have to incorporate many factors, including economics and management leadership to yield lasting and effective benefits to the environment.



ENVIRONMENTAL CONSERVATION AND MANAGEMENT AT PETRONAS

By
Health, Safety & Environment Department
PETRONAS Corporation

VESTED with the entire ownership and control of Malaysia's oil and gas resources, PETRONAS, the national oil company, has taken a proactive stance in ensuring the sustainable development of these resources.

PETRONAS is an integrated petroleum corporation, engaged in a broad spectrum of oil and gas activities, ranging from exploration and production to refining; marketing, trading and distribution of crude oil and petroleum products; natural gas processing, transmission and distribution; natural gas liquefaction and marketing of liquified natural gas; and manufacturing and marketing of petrochemicals and fertilisers.

The national oil company oversees the development of Malaysia's oil and gas resources through the promotion and regulation of Production Sharing Contracts (PSCs) which govern the exploration and production of the country's hydrocarbon resources.

In spearheading the development of the national petroleum industry, PETRONAS is committed to the need to preserve and protect the environment in which it operates. This is clearly spelt out in the PETRONAS Corporate Policy on Health, Safety and Environment (HSE) which places excellence in HSE on par with its other business objectives.

It also emphasises the obligation and responsibility of each operating division, unit and individual to take every reasonable and practical step to prevent any adverse impact on the environment while taking a proactive stance towards the conservation of the environment.

Towards this end, PETRONAS has adopted a Group HSE Masterplan which incorporates the business integration of HSE matters across the Corporation. Several programmes have been implemented to ensure sound environmental management practices in all phases of its project planning and implementation throughout the Group with emphasis on sustainable development, preventive measures and hazard and effect management.

PETRONAS ensures that all projects comply with the approval conditions of EIA, such as the implementation of the required post EIA monitoring programmes and mitigation measures set by the authority.

Oil Spill Contingency Plan

To protect the marine environment, PETRONAS ensures that every PS Contractor has an oil spill contingency plan in place and adopts the First Tier Oil Spill Response System prior to exploration and development drilling activities as well as during the production stage.

Oil spill response exercises are carried out to prepare oil companies to respond appropriately to oil spill incidents. For major oil spills, PETRONAS has initiated the establishment of a Petroleum Industry of Malaysia Mutual Aid Group (PIMMAG) comprising members drawn from the oil companies operating in Malaysia.

PIMMAG aims to provide a second tier response capability for its members by facilitating the sharing of stockpiled oil control equipment among member companies. Incorporated in December 1993, PIMMAG has established three stockpile centres located in Port Dickson, Kertih and Labuan. PIMMAG

also integrates with the National Contingency Plan for the Control of Oil Spills.

Crisis Management Measures

Individual plants have their own contingency plans to help them respond effectively to any possible emergency situation. In addition, inter-plant mutual aid plans have also been established at a regional level to deal with major disasters. All Regional Emergency Plans interface with the relevant local or state authorities and rescue organisations.

To cater for offshore disasters involving major fires/explosions, PETRONAS has formed a Crisis Management Team to provide additional assistance to its PS Contractors by interfacing with and seeking help from relevant Government agencies at national level. Regular exercises are also held for both the onshore regional emergency response plans and the offshore plans to ensure a continuous state of preparedness.

Environmental Studies and Monitoring Programmes

Environmental studies and monitoring programmes are conducted to enhance oil spill contingency planning and response, to assess the environmental effects of discharges and to improve the quality of EIAs. Environmental auditing is also carried out on the Environmental Management Systems of PETRONAS' Operating Units and PS Contractors.

Risk Management

Risk management at PETRONAS is aimed at identifying the hazards assessing and analysing the risks and consequences, and formulating solutions to eliminate or minimise the hazards.

The objective is to promote the utilisation of risk assessment studies in the process of decision making for new projects or activities and in post modification works to ensure that all health, safety and environmental factors are considered.

Research and Development

On-going research and development work relating to environmental conservation and management is being carried out, including among others, petroleum sludge treatment and disposal, biodegradation of oil contaminants, oil spill dispersant criteria and the effects of atmospheric pollutants from facilities.

Introduction of Unleaded Gasoline and Natural Gas for Vehicles (NGV)

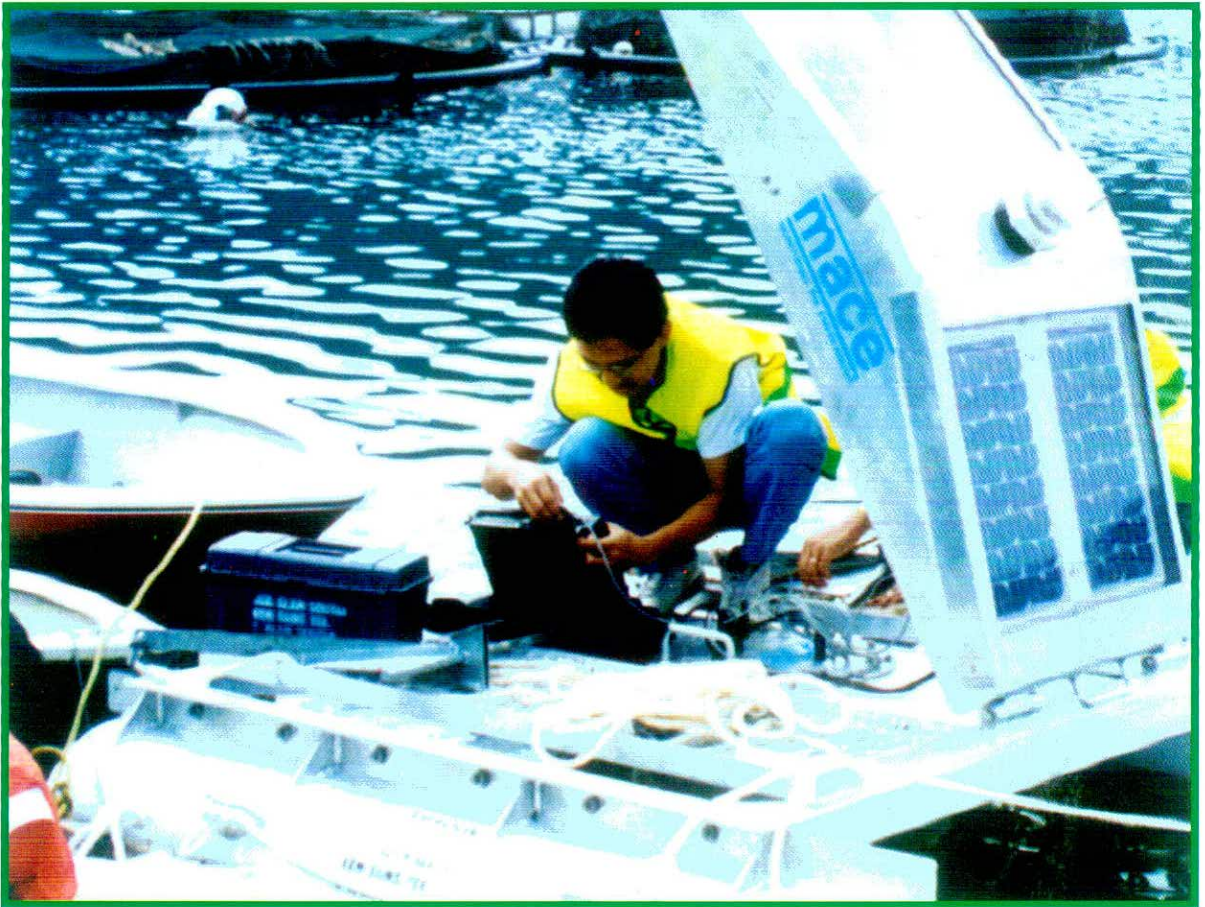
In line with its efforts to promote environment-friendly and clean fuel, PETRONAS introduced unleaded gasoline, Primas, into the Malaysian market in 1990. It also began retailing Natural Gas for Vehicles (NGV) in 1992 at six of its petrol stations in the Klang Valley.

Promotion of Gas Utilisation

The greater utilisation of gas as a cleaner and environmental friendly fuel, spurred PETRONAS to initiate the Peninsular Gas Utilisation (PGU) project in early 1981. Being implemented in three stages, the PGU project which is scheduled to be completed by the end of the decade comprises a trans-peninsular gas transmission pipeline system, gas processing plants and related facilities to supply gas to the industrial, commercial and residential sectors of the country.

Introduction of the Gas District Cooling System

To further enhance the utilisation of gas, PETRONAS will soon be introducing a new



PETRONAS was the first to market unleaded petrol to Malaysians in a move to introduce cleaner fuels.

application, the Gas District Cooling (GDC) system, which uses natural gas as an energy source for air conditioning and co-generation. The Kuala Lumpur City Centre (KLCC) will be the first user of the system.

Waste Management Programmes

These programmes include the development of procedures governing the safe handling, transportation and storage of hazardous materials and the disposal of waste associated with materials; the identification of suitable sites for the proper and environmentally safe disposal of hazardous waste materials; the promotion of internal and external recycle process of system and the use of recycled materials; and the

selection of an alternate technology to minimise waste.

Environmental Performance Appraisals

The environmental performance of PETRONAS' operating units are monitored through regular environmental performance appraisals.

Pollution Control

The effectiveness of available pollution control facilities is also monitored and a baseline information system on pollution levels at and around the vicinity of the project site is being established.

Environmental Awareness Programme

Environmental awareness among PETRONAS' operating units is being promoted through programmes such as training, seminars and workshops as well as the dissemination of information through communications materials such as newsletters, bulletins and poster campaigns.

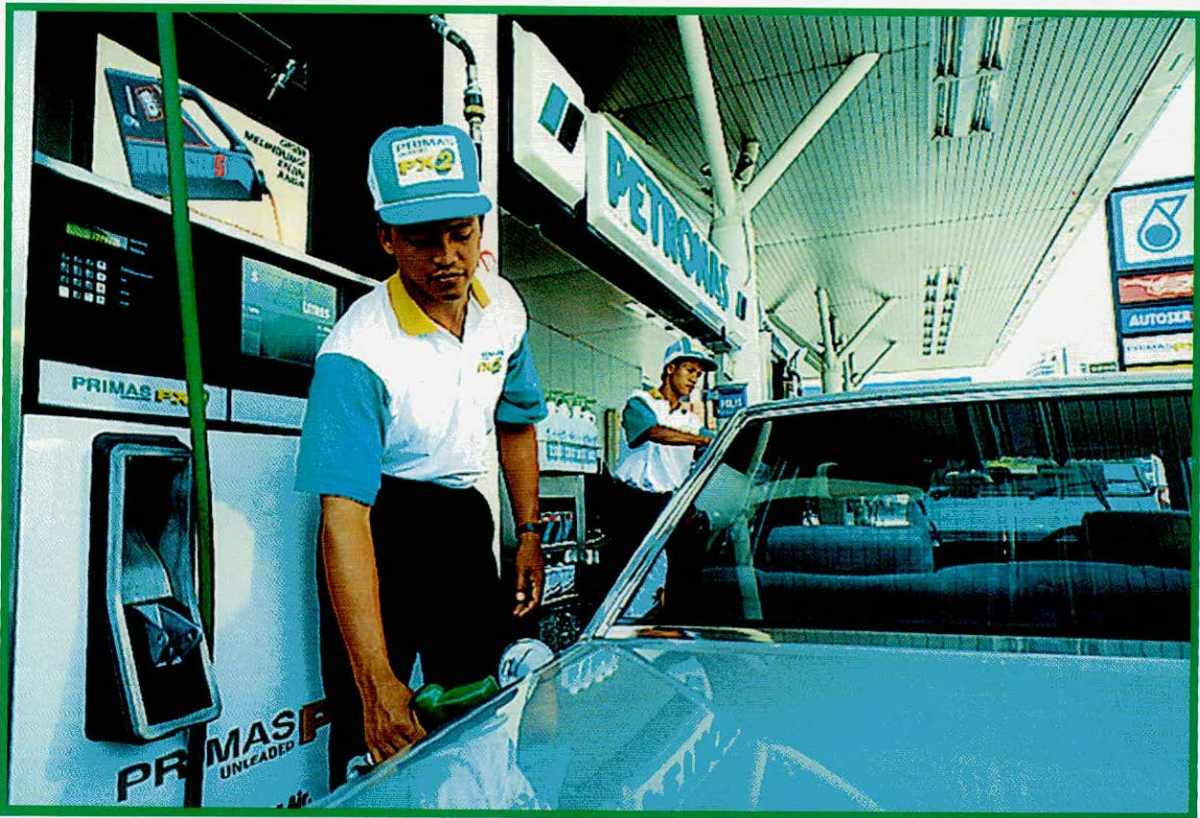
- Environmental Law Review.
- National Oil Spill Control Committee.
- Sub-committees in the development of ISO 14000 Environmental Standards.
- Waste Management Committee.

Collaborative Efforts

In support of the Government's efforts in environmental management, PETRONAS is represented in various Committees, such as:

- Environmental Quality Council.

To keep abreast with the latest development in environmental management, PETRONAS is also a member of the International Petroleum Industry Environmental Conservation Association (IPIECA) as well as a member of the Environmental Research and Management Association of Malaysia (ENSEARCH).



PETRONAS' corporate philosophy is guided by the commitment to place environmental concerns on par with its business objectives.



THE GREENING OF MALAYSIA TAKES FOUR STEPS FORWARD

By
Berjaya Group

IT is said progress in this day and age is so rapid that a country has little choice but to move forward just to stay where it is. For developing countries whose progress and prosperity is almost entirely dependent on its natural resources, this poses a particularly difficult problem: that of achieving what is today fashionably termed 'sustainable development'. Simple as this sounds in concept, in reality, it translates to a complex process of managing the environment.

The Berjaya Group has taken the initiative to play a part in this massive task by addressing a range of different issues. Four of these projects are presented here.

Indah Water Konsortium Sdn Bhd.

Alongside Malaysia's sustained growth and prosperity, the nation's sewerage system served only 45% of the urban population and was found to be in a generally poor and even unserviceable condition.

The lack of a modern and efficient sewerage system was determined to be the major cause of environmental damage to our rivers and waterways. With this came the possibility of outbreaks of water-borne diseases such as typhoid, hepatitis A, cholera and dysentery. This situation was inconsistent with the vision of a nation marching towards full industrialisation status by the year 2020.

Every year, Malaysians produce over five million tonnes of raw sewage or over 100 kilograms per average household. With little or no effective waste treatment, a staggering 65% of this volume goes straight back into our waterways, to the rivers and seas.

A Berjaya company called Indah Water was given the mandate by the Government to take over sewerage services from all the Local Authorities throughout the country and provide the nation with a modern and efficient sewerage system and services. This project is reputed to be one of the largest environmental clean-up exercises in the world, and of national importance in the overall effort to ensure a cleaner, healthier environment and a better standard of public health in the country.

Indah Water has made a corporate commitment towards providing a cleaner environment for the well-being of all Malaysians. The company will spend RM6 billion on capital works and RM17 billion on operations and maintenance works for the nation's sewerage systems.

Currently, Indah Water is managing over 3,000 treatment plants and is already providing services to 10 million customers.

Indah Water will build 15,000 kilometers of sewer pipelines, forming an extensive underground highway that will be an integral part of a nationwide sewerage services and will plan, design and construct new sewers and treatment plants. This will ensure that sewage collected through the network is properly treated and disposed of.

Berjaya Carlovers

The number of vehicles is increasing exponentially and becoming a problem in virtually every corner of the globe. Quite apart from the traffic congestion and air pollution problems associated with motor vehicles, the cleaning of cars has also begun to have a negative impact on the environment since this

results in additional waste water as well as in the contamination of the country's waterways.

Berjaya Carlovers operates an Australian franchise of environmentally-responsible automatic and serviced laser car-wash facilities which use state-of-the art technology to clean vehicles. The environment is protected at the same time by way of an advanced water reclamation system, energy-efficient lighting and heat pump technology as well as through the use of phosphate-free biodegradable detergents.

The CarLovers Carwash System uses only a third of the water used by the average home hose car-wash; and even this wash or rinse water is treated before being recycled or discharged. With this, up to 75% of the water is recycled and reused.

Proof yet again that, with the right approach and technology, clean can also mean green.

Berjaya Hotels & Resorts

In its development of beach resorts, Berjaya has again adopted several environmental initiatives.

Apart from extensive landscape preservation and beautification exercises undertaken during their construction, Berjaya Hotels & Resorts have also embarked on "Adopt a Tree" and "Green Campaign" programmes aimed at maintaining or enhancing the beauty of the environment in which the resorts exist.

In the "Adopt a Tree" programme, Berjaya Hotels & Resorts have undertaken widespread tree-planting programmes to supplement the natural tree cover in the islands of Langkawi, Redang and Tioman. The local population is

actively encouraged to participate in these projects.

Berjaya's "Green Campaign" involves the pooling of resources in joint efforts to clean-up the beaches as well as the island in general through gotong royong or community self-help projects. Education of villagers, the provision of refuse bins and the organisation of weekly refuse collection points have all worked to ensure that the islands are not saddled with waste disposal problems. Recycling is carried out wherever possible and other non-biodegradable waste is transported by boat to the mainland for more efficient disposal.

In Redang and Tioman, which are designated National Marine Parks, Berjaya Hotels & Resorts have taken the further step of helping preserve the coral and surrounding sea-life by disallowing fishing and motorised sea-sports (except for a cordoned-off area in Tioman) as well as by channelling effluents for treatment and preventing their discharge into the sea.

In recognition of these efforts, the Berjaya Langkawi Beach Resort in Burau Bay was awarded "Beautiful Landscape 1995" under the Resorts Category by the State Government of Kedah.

It is good feeling when initiative produces results, even better when recognition follows suit.

Berjaya UNZA

Most people are oblivious of the fact that the manufacturing or use of personal care products that are not environment-friendly can be a threat to man in the long-term.

Irresponsible manufacturing practices can result in anything from the destruction of the ozone layer, to stimulating the growth of harmful anaerobic bacteria which can then suffocate and destroy waterways, or from the creating of solid and liquid waste that overload or contaminate landfills and waterways, to the cruel and inhumane treatment of animals.

Berjaya Unza has taken major steps towards becoming one of the leading advocates and practitioners of responsible manufacturing of personal care products in the country.

Berjaya Unza markets environmentally-friendly products which do not contain chlorofluorocarbon, are not tested on animals and are packed in containers made from biodegradable plastic material.

Waste water from manufacturing is treated before release into the public sewerage system. Berjaya Unza has never used BAS (branched alkyl sulphonic acid) which, today, is banned by the Department of Environment. The surfactants used in all its products are non-toxic and, for the long-term, the Company is also moving towards the use of biodegradable raw materials.

In all this, Berjaya Unza offers an environmentally-responsible public alternative products which do not degrade the environment and will help ensure its long-term survival.

As a corporate citizen, Berjaya believes that it has a responsibility to the environment and to the people in those areas where it operates its businesses. This is to ensure that all progress and development in which it is involved does not run counter to the long-term survival of the environment.







EKO-PELANCONGAN DI MALAYSIA

Oleh
Kementerian Kebudayaan Dan Pelancongan

PELANCONGAN adalah merupakan satu aktiviti yang menjanjikan rantaian peluang ekonomi yang menguntungkan bagi sesebuah negara. Untuk mewujudkan peluang ekonomi yang produktif, perancangan dan pembangunan pelancongan hendaklah sentiasa peka kepada perkembangan permintaan pelancongan antarabangsa (global) di samping mengambilkira faktor-faktor pembangunan pelancongan dalam negara. Memandangkan produk eko-pelancongan masih baru dalam dimensi pelancongan di negara ini, semua pihak sama ada sektor swasta harus mengambil kesempatan memajukan produk pelancongan yang terletak

ketibaan pelancong dan juga sumbangan kepada pendapatan negara. Bagi Tahun Melawat Malaysia yang pertama iaitu pada tahun 1990, Malaysia telah berjaya menarik seramai 7.5 juta orang pelancong dengan menghasilkan jumlah pendapatan sebanyak RM 4.5 billion. Bagi tahun 1991 dan 1992, jumlah kedatangan pelancong secara global telah berkurang dan ini telah juga dialami oleh negara kita. Kedatangan pelancong bagi negara Malaysia sehingga tahun 1994 adalah seperti di Jadual 1.

Dari segi pendapatan daripada tukaran wang asing, sumbangannya terus bertambah pada

JADUAL 1
Ketibaan Pelancong Dan Pendapatan Malaysia 1989-1994

TAHUN	JUMLAH KETIBAAN	PENDAPATAN (RM BILLION)
1989	4,846,320	2.8
1990	7,476,772	4.5
1991	5,478,213	4.3
1992	4,016,209	4.6
1993	4,503,860	5.1
1994	7,197,229	9.0

Sumber: Pelancongan Malaysia

di bawah bidang kuasa dan tanggungjawab masing-masing.

Perkembangan Industri Pelancongan Negara

Prestasi sektor pelancongan negara semakin menggalakkan terutamanya dari segi jumlah

setiap tahun di mana pada tahun 1994 pendapatannya begitu membanggakan sekali iaitu berjumlah RM9 billion. Kejayaan ini telah menunjukkan bahawa sasaran Dasar Pelancongan Negara bagi tahun 2000 iaitu sebanyak RM8.3 billion telah dapat dicapai

enam tahun lebih awal. Ini menjadikan industri pelancongan sebagai sektor penyumbang kedua terbesar kepada pendapatan tukaran asing negara pada tahun 1994 berbanding dengan kedudukan komoditi lain seperti di jadual 2.

tarikannya yang berasaskan sumber-sumber alam semulajadi yang kaya dengan flora dan fauna.

Syurga Marin

Malaysia dikenali di seluruh dunia dengan kecantikan kehidupan marin serta pantai-pantai yang canggih. "Deep sea diving", 'scuba diving',

JADUAL 2
Pendapatan Tukaran Asing Negara (RM Billion)

TAHUN 1993			TAHUN 1994		
1.	Perkilangan	89.7	1.	Perkilangan	116.8
2.	Petroleum	10.6	2.	Pelancongan	9.0
3.	Balak	7.5	3.	Petroleum	8.7
4.	Pelancongan	6.5	4.	Kelapa Sawit	7.8
5.	Kelapa Sawit	5.8	5.	Balak	7.1
6.	Getah	2.1	6.	Getah	2.3

Sumber: Laporan Ekonomi 1994/1995

Dari segi penggalakan promosi pelancongan pula, ternyata sektor ini tidak ketinggalan menerima peruntukan yang besar dari Kerajaan bagi menjayakan berbagai aktiviti. Antara aktiviti yang mendapat keutamaan dalam pembangunan sektor pelancongan adalah aktiviti-aktiviti promosi, publisiti, penyediaan infrastruktur pelancongan, penggalakan pasaran, pembangunan produk dan peluasan skop insentif bagi meliputi pelaburan-pelaburan yang berkaitan dengan pelancongan.

Malaysia telah lama dikenali di kalangan pelancong luar negara dengan tarikan-

'fishing' dan 'snorkelling' adalah antara aktiviti-aktiviti yang membuka dunia laut kepada para pencinta marin. Antara destinasi yang popular ialah Pulau Sipadan dan Ligitan, Pulau Layang-Layang, serta pantai dan pulau-pulau di sepanjang pantai Terengganu, Pahang dan Johor.

Sebahagian besar daripada tempat-tempat tersebut telah diwartakan oleh Kerajaan sebagai Taman Laut yang bermaksud untuk memelihara hidupan laut di kawasan-kawasan berkenaan dan menghalang aktiviti-aktiviti yang boleh memudaratkan hidupan di kawasan tersebut

seperti penangkapan ikan dan penggunaan kapal-kapal besar.

“Panggilan” Hutan Rimba

Bagi pelancong-pelancong yang meminati aktiviti-aktiviti luar, mereka berpeluang menikmati dua jenis aktiviti.

‘*Hard-adventure Tourism*’ ialah aktiviti yang bersifat mencabar seperti mendaki gunung, merentas hutan, ‘water rafting’, ekspedisi sungai dan sebagainya. Destinasi pelancongan yang termasuk dalam kategori ini ialah Gunung Kinabalu, Gua Mulu, Sungai Kinabatangan, Gunung Tahan, Taman Negara, Sungai Pahang, Air Terjun Endau Rompin, hutan-hutan bakau dan sebagainya.

‘*Soft-adventure Tourism*’ adalah aktiviti berprofil rendah seperti lawatan untuk menikmati keindahan dan keunikan sesuatu tempat. Tempat-tempat yang telah dikenalpasti sebagai tarikan eko-pelancongan jenis ini adalah seperti memerhati burung di Bukit Frazer, memerhati keindahan bunga-bunga, mandi-manda di air terjun dan sebagainya.

Eko-pelancongan mempunyai potensi menjana hasil (revenue generating potential) khususnya untuk negara-negara yang membangun. Penggalakan eko-pelancongan dengan sendirinya dapat mewujudkan daya pemuliharaan (conservation) sumber-sumber alam semulajadi dengan meningkatkan kesedaran orang awam terhadap pentingnya sumber-sumber alam semulajadi tersebut. Di samping itu, penggalakan eko-pelancongan dapat mewujudkan peluang-peluang pekerjaan sama ada secara langsung atau tidak langsung di kawasan-kawasan luar bandar atau pedalaman.

Kepentingan untuk mengengahkan eko-pelancongan bukan sahaja terletak kepada keupayaan menawarkan pelbagai kebaikan sepertimana yang dapat ditawarkan oleh produk-produk pelancongan yang lain seperti sumbangan kepada sumber pendapatan negara, mempelbagaikan peluang perniagaan/pekerjaan dan menyekat aliran wang keluar negara semata-mata tetapi apa yang lebih penting, eko-pelancongan adalah merupakan aset bagi mewujudkan pembangunan yang memerlukan keseimbangan antara pembangunan material atau fizikal dengan pembangunan yang mampan (sustainable).

Pada umumnya, eko-pelancongan bergantung kepada kombinasi antara persekitaran semulajadi dan persekitaran buatan, kedua-duanya memerlukan kemudahan asas dan perkhidmatan sokongan sebagai daya penarik bagi sesuatu destinasi pelancongan. Pada asasnya pembangunan eko-pelancongan hendaklah mengekalkan ciri-ciri semulajadi di samping usaha-usaha pengembelian unsur-unsur persekitaran buatan dengan persekitaran semulajadi. Oleh yang demikian, dalam pembangunan eko-pelancongan, kita hendaklah berhati-hati tentang kesan-kesan negatif yang mungkin timbul. Tanpa perancangan yang teratur dan kawalan yang ketat, kedatangan pelancong-pelancong ke kawasan tertentu secara besar-besaran akan mengurangkan nilai sumber-sumber tersebut.

Dasar Eko-Pelancongan

Dasar utama Kerajaan dalam pembangunan eko-pelancongan adalah untuk melindungi dan memulihara produk-produk pelancongan yang menjadi tarikan eko-pelancongan. Tindakan telah diambil iaitu melantik juruperunding bagi

menjalankan kajian ‘**National Eko-Pelancongan Plan 1995**’ yang bertujuan untuk mengenalpasti kawasan-kawasan alam semulajadi yang menjadi aset pelancongan serta kaedah-kaedah pembangunannya. Kawasan-kawasan tersebut akan dipulihara dan dilindungi daripada pembangunan yang tidak sesuai dan tidak seimbang.

Dasar yang kedua ialah untuk mewujudkan satu imej dan identiti Malaysia yang unik dan tersendiri dengan mengekalkan keaslian budaya dan menghidupkan kembali kesenian negara ini. Kepelbagaian budaya Malaysia diakui sebagai aset tambahan kepada sektor pelancongan. Budaya tempatan yang berbeza-beza dan berbagai corak akan digalakkan sebagai sesuatu yang mempunyai tarikan istimewa dan unik di rantau ini. Asas sosio budaya yang luas dan pelbagai serta kaya dengan cerita rakyat, seni pementasan, tradisi, kraftangan dan seni bina serta makanan istimewa akan dapat menyediakan tarikan-tarikan yang lebih luas untuk menghasilkan produk yang berbeza dan berbagai. Dari segi kesenian pula, terdapat seni muzik, seni teater, seni tari, seni ukir, batik, songket dan sebagainya.

Program dan pembangunan projek-projek pelancongan hendaklah dijalankan secara berhati-hati dengan mengambil kira aspek kawalan ke atas pencemaran, pembuangan najis, hakisan pantai, hutan dan ekosistem lain dan mengenalpasti zon dan kawasan yang sesuai untuk pembangunan pelancongan. Tujuannya adalah untuk meminimalkan kesan-kesan negatif ke atas sumber-sumber alam semulajadi.

Pembangunan produk pelancongan seharusnya dijalankan tanpa mengorbankan atau mencemarkan alam sekitar dan budaya negara ini.

Di dalam Kajian Dasar Pelancongan Negara, sebanyak enam zon pembangunan kawasan pelancongan telah dicadangkan dan sebahagian besar daripada produk pelancongan yang dicadangkan adalah berasaskan kepada eko-pelancongan. Kawasan dan zon yang dicadangkan adalah seperti **Lampiran A, B dan AB**.

Sebarang perubahan yang keterlaluan dan ‘**over-commercialised**’ tidak akan digalakkan. Penilaian Kesan Alam Sekeliling (**Environmental Impact Assesment**) bagi projek-projek pembangunan yang tertentu adalah wajib di Malaysia. Selain kawasan-kawasan alam semulajadi, di bawah Rancangan Malaysia ke enam, beberapa program dijalankan termasuk pemuliharaan dan pemagaran tempat-tempat bersejarah, menggalakkan program kebersihan dan pengindahan serta penguatkuasaan pemuliharaan alam sekitar.

Bagi menjayakan pembangunan eko-pelancongan, masyarakat tempatan perlulah didedahkan kepada aspek-aspek pemuliharaan dan pelancongan. Usaha-usaha untuk meningkatkan tahap kesedaran dan kefahamannya perlulah ditekankan terutamanya sikap dan tingkah laku rakyat kepada alam sekitar. Pihak-pihak yang terlibat secara langsung dalam bidang pelancongan pula hendaklah mewujudkan profesionalisma di kalangan mereka dengan menjalankan aktiviti secara cekap dan jujur.

Langkah-Langkah Kawalan

Antara usaha-usaha pemuliharaan kawasan-kawasan eko-pelancongan ialah untuk memastikan pembangunan produk pelancongan tidak mengganggu rezab pantai, rezab sungai, bukit serta hutan yang telah



Pulau-pulau juga dapat dijadikan tarikan pelancong

ditetapkan. Ianya bertujuan supaya tidak berlaku pencerobohan rezab pantai yang menjadi kawasan awam, mengelak daripada berlakunya penerokaan serta pemotongan bukit tanpa had sehingga memusnahkan kawasan semulajadi dan menyebabkan hakisan tanah.

Di samping itu, kawalan terhadap kebersihan dan sistem pembuangan dan pelupusan sampah perlu diadakan bagi memastikan kebersihan dan keadaan semulajadi kawasan terkawal.

Kawalan terhadap pembinaan bangunan perlu dibuat dari segi fizikalnya iaitu rekabentuk, ketinggian, bahan binaan dan nisbah kepadatan. Kawalan ini perlu kerana rekabentuk haruslah

sesuai dengan keadaan sesuatu kawasan dan bercirikan suasana tempat serta memenuhi kehendak pengguna.

Tahap ketinggian dan pembinaan bangunan yang berhampiran dengan pantai hendaklah tidak menghalang pemandangan ke arah laut dari tempat yang terletak lebih jauh dari pantai. Pembangunan juga perlu mematuhi nisbah kepadatan yang telah ditetapkan.

Unsur-unsur semulajadi yang terdapat di kawasan tersebut tidak patut dimusnahkan tetapi sekiranya perlu diusik ianya adalah pada kadar yang meminima. Unsur-unsur semulajadi hendaklah diserapkan dalam projek pembangunan yang dijalankan.

Sokongan Kerajaan

Bagi menarik minat pelancong dan menghadapi persaingan yang hebat dari pasaran-pasaran pelancongan yang lain, Kerajaan akan menjalankan usaha-usaha memperbaiki mutu, keselesaan dan keunggulan produk-produk eko-pelancongan khususnya. Kemudahan-kemudahan dan kelengkapan asas akan dipertingkatkan di kawasan-kawasan yang menjadi tumpuan pelancong. Ini termasuk penyediaan:

- Kemudahan-kemudahan penginapan yang bersesuaian dengan alam sekitar;
- Kawasan seperti chalet dan tapak perkhemahan, jalan-jalan masuk dan trek/trail perjalanan yang mengikut kontur kawasan;
- Tempat-tempat rehat dan tandas awam;
- Lampu-lampu dan lain-lain kemudahan.

Dalam usaha mengelak tumpuan pelancong di sesuatu kawasan eko-pelancongan, tindakan juga diambil untuk memperbanyak dan mempelbagaikan tarikan-tarikannya. Kawasan-kawasan eko-pelancongan yang baru akan dikenalpasti dan dimajukan. Banyak sumber-sumber alam semulajadi seperti kolam air panas, hutan bakau, tasik, empangan, hutan-hutan lipur dan sebagainya yang mempunyai potensi untuk dibangunkan sebagai produk eko-pelancongan.

Peranan Kerajaan dalam pembangunan eko-pelancongan lebih kepada peranan sebagai 'facilitator' dan 'regulator'. Pihak swasta perlu memainkan peranan yang lebih giat dan terarah dalam merealisasikan potensi eko-pelancongan di Malaysia. Apa yang lebih penting ialah supaya semua yang terlibat, sama ada pihak berkuasa tempatan, pengusaha-pengusaha pelancongan, rakyat tempatan ataupun pelancong sendiri mempunyai sikap sayang terhadap sumber-sumber alam semulajadi yang menjadi tarikan eko-pelancongan di negara ini.





PENGURUSAN ALAM SEKITAR DI PERSEKITARAN TEMPAT KERJA

Oleh
Jabatan Keselamatan Dan
Kesihatan Pekerjaan

JABATAN Keselamatan dan Kesihatan Pekerjaan (JKKP), yang dikenali sebagai Jabatan Kilang dan Jentera sebelum tahun 1994 dipertanggungjawabkan untuk menguatkuasa beberapa Akta dan Peraturan bagi memastikan keselamatan dan kesihatan serta kebajikan orang-orang yang sedang bekerja. JKKP memberi penekanan terhadap perlunya mewujudkan persekitaran di tempat kerja yang selamat dan sihat supaya tidak memberi sebarang kemudaratan kepada sesiapa sahaja termasuk pekerja dan juga orang awam.

Pada awal 70-an, JKKP telah memainkan peranan penting di dalam memelopori penubuhan satu sistem pengurusan alam sekitar. Pada tahun 1971 satu unit yang dinamakan Unit Mencegah Pencemaran telah ditubuhkan. Unit ini berperanan melakukan kajian ke atas bahan-bahan buangan industri serta bertanggungjawab mendraf Akta yang berhubung dengan pencegahan pencemaran. Di samping itu, Jawatankuasa Piawaian Kualiti Alam Sekeliling telah ditubuhkan.

Apabila Jabatan Alam Sekitar ditubuhkan pada tahun 1975, Unit Mencegah Pencemaran telah dibubarkan dan satu unit baru iaitu Unit 'Industrial Hygiene' ditubuhkan.

Unit 'Industrial Hygiene' (IH) menjalankan aktiviti yang tertumpu kepada pengukuran bahan pencemar udara di tempat kerja dan di kilang-kilang. Unit ini dikhaskan kepada satu bahagian pada tahun 1980. Dengan adanya pegawai terlatih dalam bidang IH, pengawasan biologi dan program perlindungan pendengaran di samping menjalankan kerja-kerja pengawasan bahaya-bahaya kesihatan di tempat kerja.

Peraturan Amalan-Amalan Kesihatan Industri
Beberapa Peraturan berkaitan dengan amalan kesihatan industri telah digubal dan dikuatkuasakan bagi melindungi pekerja daripada penyakit-penyakit perusahaan, bermula

dengan Peraturan-peraturan Kilang dan Jentera (Timah Hitam) 1984 diikuti dengan Peraturan-peraturan Kilang dan Jentera (Proses Asbestos) 1986, seterusnya Peraturan-Peraturan (Pendedahan Bising) 1989 dan Peraturan-Peraturan Kilang dan Jentera (Habuk Galian) 1989. Timah hitam adalah sejenis logam yang meracuni sistem saraf dan sistem darah. Pendedahan pekerja kepada habuk atau asap bahan ini berlaku di industri-industri pembuatan bateri, peleburan bijih besi, proses "soldering" komponen elektronik di kilang-kilang elektronik, pembuatan cat dan penyalutan lapisan timah hitam pada kabel-kabel telekomunikasi.

Asbestos pula berbahaya kerana ia boleh menyebabkan penyakit paru-paru yang dipanggil *asbestosis* dan boleh juga menyebabkan barah pada lapisan paru-paru yang dipanggil *mesothelioma*. Pemprosesan yang melibatkan asbestos biasanya terdapat di kilang-kilang membuat lapisan brek kenderaan, "plate clutch", atap dan siling, serta pembuatan paip gasket bagi enjin kenderaan bermotor.

Pendedahan kepada kebisingan boleh merosakkan pendengaran pekerja. Kebisingan pada paras 90dB(A) didapati boleh mengakibatkan 20 peratus daripada mereka yang terdedah kepadanya selama lapan jam mengalami hilang pendengaran dan boleh menyebabkan pekak. Masalah kebisingan berlaku dalam kebanyakan industri.

Habuk galian adalah berbahaya disebabkan oleh habuk halus yang dapat menembusi saluran pernafasan sehingga sampai ke dalam paru-paru. Habuk yang mengandungi silika boleh menyebabkan penyakit *silicosis* dan *fibrosis* yang serius dalam paru-paru. Pendedahan kepada habuk galian amat ketara di kuari pecah batu, pembuatan jubin, batu-bata dan pembuatan barangan seramik.

Persekitaran Tempat Kerja

Tempat kerja, terutamanya di kilang-kilang adalah persekitaran di mana pekerja terdedah kepada bermacam-macam bahan atau keadaan yang boleh mengancam atau menjejaskan kesihatan mereka. Bahaya kesihatan yang dimaksudkan termasuklah pendedahan kepada bahan-bahan kimia, ejen-ejen fizikal seperti bising dan haba dan ejen-ejen biologi seperti spora dan virus.

Sekiranya keadaan persekitaran di tempat kerja adalah dalam keadaan yang memuaskan maka sudah tentulah tempat kerja akan memberi kesan minima terhadap alam sekitar. Ini merupakan peranan JKKP secara tidak langsung kepada pengurusan alam sekitar di Malaysia.

Dalam usaha untuk mencegah berlakunya kejadian kemalangan besar industri yang melibatkan kemalangan jiwa dan kemusnahan harta benda termasuk alam sekitar seperti yang berlaku di seluruh dunia seperti malapetaka

Flixborough, Seveso, Maxico City, Bhopal dan juga Malaysia seperti letupan di kilang mercun Bright Sparklers, JKKP telah menubuhkan satu bahagian iaitu Bahagian Major Hazard pada tahun 1991.

Bahaya kemalangan besar industri biasanya melibatkan instalasi yang menyimpan, mengendali dan memproses bahan berbahaya dalam kuantiti yang besar. Dalam usaha mencegah berlakunya kemalangan besar industri ataupun mengurangkan kesan sekiranya berlaku, Bahagian Major Hazard sedang menggubal satu peraturan khusus bagi mengawal instalasi berisiko tinggi di negara ini.

Aktiviti-aktiviti JKKP yang lebih cenderung kepada mewujudkan persekitaran tempat kerja yang sihat dan selamat melalui penglibatan menyeluruh pihak pengurusan sesuatu tempat kerja sudah tentulah akan mengurangkan pencemaran persekitaran di tempat kerja dan seterusnya menyumbang ke arah mengurangkan pencemaran alam sekitar.





SARAWAK'S FIRST SMOKE-FREE INCINERATOR

By
Department Of Environment
Sarawak

INCINERATION of waste wood materials provides an abundant source of clean, free heat - a major saving on fuel-oil costs. The Baramas Complex in Miri, with its new Olivine incinerator, makes a first step in smoke-free, sawdust incineration.

It is said that the 1990s will be "The Decade of the Environment." If so, the timber industry by its very nature, will be one sector which can expect to be the focal point of much public attention.

A case in point is the Baramas Complex at Miri, Sarawak, with its first Olivine smoke-free wood waste incinerator in Southeast Asia. A second burner has already been delivered to the sister company at its Lawas Complex, and a third unit is being designed for installation at the new Kemena Complex under construction in Bintulu.

The design of these incinerators has been developed over the past 20 years by the Olivine Corporation of Bellingham, Washington, and there are now over 200 of them in service throughout the USA, Canada and Australia, including the first one installed 20 years ago.

Refractory Properties

The name is derived from the naturally occurring mineral, Olivine, which has exceptional refractory properties and which is the basic material from which the burners are constructed. In effect, the structure and the refractory are one and the same and there is no need for fire brick lining requiring repair and replacement. Actual erection of the burner took only three days. Another two days were spent on electrical and mechanical work, including the

installation and connection of the cyclone to the burner.

Successful test firing commenced on the fifth day. This compares very favourably with an average of 3 1/2 days to do the same job by a highly-experienced crew in the US.

The burner at Miri is a typical Olivine design for wood waste incineration. It consists of a cylindrical silo, eight feet in diameter and 24 feet tall constructed of 40 pre-cast slabs of Olivine refractory material. The foundation slab is ordinary reinforced concrete with a precast opening in the base to allow entry of the underfire air duct. Draft is provided by three air blowers driven at 3485 rpm by 5 HP electric motors.

One fan delivers underfire air to three circular air grates located in the floor of the fire pit and the other two fans provide overfire air via tangential air ducts entering through the burner wall about four feet above the floor slab. A hinged door provides access to the interior for startup and periodic inspections. Also, in this case, a steel chimney 5ft in diameter by 8ft tall of 16 gauge sheet metal was added to shield the adjacent wooden cyclone scaffolding from the extremely hot (up to 1900°F) exhaust gases venting through the top of the burner.

Continuous temperature monitoring of the exit gases is provided by means of a high temperature probe mounted in the refractory wall two feet below the top of the burner silo. This is connected to a recording device which automatically maintains a graph tracing of internal temperatures at all times that the burner is in operation. From a cold start, the

burner will reach its optimum working temperature of 1600°F in about 15 minutes. From that point on, fuel gases will generally remain in the range of 1400°F to 1800°F, depending on fluctuations in fuel input. Temperatures in the primary combustion zone closer to the burner floor probably exceed 2000°F.

Sawdust pickup

In the Miri application, the burner's function is to incinerate all the sawdust coming from a sawmill consisting of one 60-inch head-rig, two 44-inch pony saws and six 42-inch table band resaws. Pneumatic sawdust pickup for the entire mill is handled by one 75 HP suction fan which delivers the waste to a cyclone beside the burner. A sheet metal feed chute introduces the sawdust into the burner at a point six feet above the floor. As the sawdust enters the burner, high internal temperatures cause it to ignite immediately and burn in suspension. Under routine operating conditions there is no build-up of fuel on the burner floor. Total combustion is achieved without smoke or ash.

At the time of writing, the two pony saws were not yet operational. The six band resaws were producing an average of 90 sq.m. sawn timber per day on one eight-hour shift and the burner was incinerating all the sawdust output totally without smoke.

One-shift

Because of the one-shift operation, the burner has to be re-lit every morning. Other than that, the burner does not require any attention while operating and there is no full-time operator assigned to it. The two key elements which enable such a small, low-cost burner to achieve

this high degree of smoke-free combustion are the extremely high operating temperatures and the retention time of the combustion chamber.

At 1400°F to 1800°F sawdust is converted almost instantly into volatile gases. Then, the air blast of the overfire fans creates a whirling vortex effect which holds these gases within the burner silo long enough to achieve 100% combustion. Only clear heat waves are emitted into the atmosphere. No visible smoke escapes. The original design of the Miri incineration system called for the sawdust to be delivered from the cyclone into a fuel silo and then metered into the burner via an in-feed conveyor belt. Under this system, fuel input to the incinerator could be controlled at a constant, optimum rate, 24 hours a day if necessary.

In order to expedite mill startup and save the capital cost of the fuel silo, it was later decided to connect the cyclone directly to the burner. This arrangement is working well but occasionally, if all the mill bandsaws simultaneously produce an overload surge of sawdust into the burner, it will emit a brief puff of smoke lasting one or two seconds. This disappears instantly as the hot gas comes in contact with the additional oxygen supply outside the burner silo and combustion is completed.

The Olivine burner is virtually maintenance-free. The only three moving parts are the fan motors and these are fitted with lifetime-lubricated bearings. In the case of wood waste, because combustion is total, the ash build-up is negligible and it is not necessary to shut the burner down for periodic cleanout. Because the Olivine burner walls are also the refractory,

there is no fire brick requiring repair and replacement.

Additional blocks

In the case of existing burner installations where increasing volume of material for incineration eventually exceeds the capacity of the burner this can be compensated for by expanding the burner size. Olivine supplies additional precast refractory blocks to increase the height or diameter of the burner to the required size. For example, an increase in diameter from 8ft to 10ft will increase burner capacity by approximately 50%. The existing burner is dismantled and reassembled to its larger diameter by simply inserting the additional blocks in the structure.

As a case in point, the Miri unit is perfectly capable of incinerating the solid mill waste as well as the sawdust. However, in the initial stages of mill start-up this solid material is being used as landfill. When it becomes necessary to dispose of it by incineration, the burner capacity will be expanded simply by increasing its size and adding a solid fuel infeed conveyor.

Harnessing output

Incineration of waste materials, in effect, provides an abundant source of free, lean heat which can be utilised in many ways to achieve tremendous savings in energy costs. Heat developed in the incinerator can be passed through a boiler to generate process steam and drive turbine generators or it can be used directly in facilities such as hot air dry kilns or

rice mill dryers. Harnessing the burner heat output to a boiler is done very simply by installing a duct of the Olivine refractory material connecting the output end of the burner to the input end of the boiler.

However, in these later applications, boiler efficiency is usually derated by about 20%. If this reduction in steam output is not critical, then the loss is negligible when compared to the major savings in fuel cost. The environmental advantages of smokeless waste incineration, particularly municipal garbage, are obvious. At these high temperatures all organic material are totally consumed, glass bottles fuse into a clinker and aluminium cans simply disappear.

Landfill site

The resulting ash and solid residue, amounting to about 10% of the total garbage input, is completely sterilized and can be safely disposed in a landfill site. Instead of treating garbage disposal as a major operating cost, municipal governments could look upon it as a potential source of revenue in the form of fuel for power generation.

Installation and startup of the Miri burner was done by Corporated International Consultants of Tawau, Sabah, with technical assistance from Goodwill Management Corp. Ltd., and a representative from the Olivine Corporation. Goodwood Management of Hongkong and Manila are the exclusive sales agents for the Olivine burners in Southeast Asia. Future installations in this region will be handled by national contractors in each country under the supervision of Goodwood.





THE GREEN WATCHMENT

By
Environment Protection Society
Of Malaysia (EPSM)

THE Environmental Protection Society of Malaysia (EPSM) has been involved in the protection of the environment since its conception. Formed in January 1974 and based in Petaling Jaya, EPSM is the oldest environmental group dealing with development issues (as opposed to conservation).

The Environmental Protection Society of Malaysia has always advocated the prudent use of environmental resources and sustainable development and has paid special attention to issues connected with policy and regulations.

The EPSM has campaigned on urban pollution issues such as toxic waste management, and carried out studies on river pollution, solid waste generation and soil erosion. It has worked closely with the Department of Environment and other relevant agencies to plan and conduct studies to raise environmental awareness in the country. It has also been networking and co-operating with other non-governmental organisations (NGOs).

EPSM's activities have been guided by a number of objectives, namely: prevention of the deterioration of the environment as a result of human activities; the control of activities which are detrimental to the environment; initiation of measures to improve the environment; and stimulation of public concern for the state of the environment in Malaysia.

Due to the Malaysian socio-politico-economic environment in Malaysia, EPSM uses many methods for its environmental campaigns including letters or memoranda, signature campaign petitions and press statements, press conferences, publication of monitoring data and seminar forums.

When deemed necessary, EPSM also organised small demonstrations and protests to increase public awareness as well as, to a limited extent, product and service boycotts.

The EPSM initiated several environment protection projects. It helped to organise Malaysia's first Environmental Journalism Course together with the Malaysian Press Institute in 1979 and conducting a nationwide series of Envirowalks in 1984. Envirowalk is a fascinating activity that combines walks with CO₂, SO₃ and noise level monitoring in order to raise public awareness of the state of the environment they live in.

The EPSM has also conducted studies and launched a series of campaigns together with other public interest groups. These campaigns addressed a number of issues, including logging in a proposed National Park, the Anti Concorde Campaign (1977-978), limestone quarrying, the construction of a hydro-electric dam, human rights, radioactive and hazardous wastes, and hill conservation.

Many of the campaigns achieved some measure of success. For example, EPSM's campaign in the Endau-Rompin area helped put an end to logging in the area, and safeguard one of the country's national parks. The Penang Hill Conservation Campaign, begun in 1990, seeks to protect the serene environment of this site against a major tourism project.

The EPSM organised the Declaration on the Environment (1977) which marked the first attempt to enlist public support for the conservation and responsible management of the environment. A number of seminars and workshops were also organised to inform journalists about environmental issues and to establish a Malaysian Environmental Agenda for the 1990s.

Public education has also been enhanced through the publication of a quarterly magazine, Alam Sekitar, since 1976. This includes broad coverage of environmental-related topics. The magazine is circulated to registered members, subscribers, institutions of higher learning (both

local and overseas), NGO's (local and International), government bodies, etc.

EPSM is convinced that in order for environmental issues to be effectively resolved, there must be an expansion of the Malaysian public's awareness through a democratic process.

This can be accomplished by highlighting human rights activities and issues as well as cultivating progressive politicians, especially in the ruling parties. Another approach would be to utilise opportunities to influence official environmental positions by participating actively in joint committees being set up by the Federal and State Governments.

EPSM has served on various committees within both the Ministry and the Department of Environment. It played an active role in the Environmental Education Committee,

Environmental Quality Council and served on the Environmental Law Review Committee which was chaired by the former Deputy Minister of Science, Technology and the Environment, Mr Peter Chin Fah Kui.

There has also been active involvement in EIA Ad Hoc Review Panels, seminars to prepare Malaysia's position at the United Nations Conference on Environment and Development, as well as climate negotiations. Inputs have also been given on the Montreal Protocol, the Basel Convention, and the National Environmental Policy.

EPSM has tried to increase public awareness, public accountability and be a watchdog on environmental issues including the Environmental Quality Act over the last two decades. The future will see no let up in EPSM's struggle for the protection of our environment.



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