Biodiversity in Malaysia

Ministry of Natural Resources and Environment



Multilateral Environmental Agreements: Capacity Building and Implementation Project (MEA Project), Malaysia

The Danida funded MEA Project is based in the Conservation and Environmental Management Division (CEMD), Ministry of Natural Resources and Environment. The project aims to build capacity at the CEMD and other relevant stakeholders to support Malaysian participation in international negotiations and national implementation of commitments under selected MEAs such as The Convention on Biological Diversity (CBD) and United Nations Framework Convention on Climate Change (UNFCCC), including their Protocols.

The project also aims at building close working relations among all key stakeholders in conservation and environmental management through joint training activities, network building and mobilisation of relevant expertise and knowledge. The project is developing implementation strategies for the selected MEAs and will operationalise MEA implementation. The state of Sarawak has been selected for a state-federal pilot initiative in the management of wetlands

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Preface

Malaysia ratified the Convention on Biological Diversity (CBD) in 1994, and was the 65th country to do so. Alongside its obligation under the CBD, Malaysia has been promoting biodiversity conservation as an integral part of sustainable development, a policy theme of the Seventh and Eighth Malaysia Plans spanning 1996-2005. Within that period, a national policy on biodiversity conservation has also been adopted. Malaysia advocates a development path that emphasises conservation while maintaining economic development. Despite advocating such a development strategy, the challenges ahead for conserving and protecting the total biodiversity of Malaysia remain serious.

This booklet provides an overview of Malaysia's biodiversity, what Malaysians are doing to protect it and the international obligations that come with the signing of international agreements on biodiversity. It also suggests examples and ways that can be used to help local, state and federal authorities implement conservation and biodiversity management strategies.

The Earth's Living Heritage

Humanity is part of the web of life that connects each living thing to its environment and other life on earth. However, in the last century, the web's threads have been snapping. The fundamental units of life, the species, have been disappearing at 100 to 1,000 times the natural rates of extinction, giving rise to fears of large scale extinctions in the coming decades. The biological diversity of life on earth is under serious and continuing threat from the impacts of human activities. According to a report by the World Commission on Dams, 20% of freshwater fish have gone extinct, globally. A United Nations Environment Programme (UNEP) report published in 2002 indicates that a quarter of the world's mammals face extinction in the next 30 years. According to the World Conservation Union, previously known as International Union for the Conservation of Nature and Natural Resources (IUCN) that regularly monitors and publishes the list of endangered species (the Red List), 13% of all plants are endangered. Other scientific studies estimate that 22% to 40% of plants will be extinct by 2050. The Food and Agricultural Organization of the United Nations (FAO) estimated that three quarters of the genetic diversity of agricultural crops have been lost in the last 100 years. Of the 6,300 breeds of domesticated animals, 1,350 are endangered or already extinct. Current and also projected future loss of biodiversity constitutes a biological crisis, as species and varieties are irreplaceable when they become extinct. The slogan of the 1980s on biodiversity loss was "extinction is forever", indicating the finality of the extinction process. Future generations would not have the rich biological diversity that we have today. This global biodiversity crisis is the context in which we view the state of biodiversity and its conservation in Malaysia.

What is Biodiversity?

The term biodiversity was coined only in the late 1980s. It is an abbreviation for "biological diversity". Biodiversity combines the concepts of plants and animal as genetic resources, the diversity of species and the habitats in which they live, in one term. The present usage of the term is that biodiversity is the totality and variety of living organisms on earth.

Genetic diversity refers to the variation within and between populations of species, measured in terms of the variations of genes in the populations.

Species diversity refers to the number of species of living organisms on earth.

Ecosystem diversity refers to the variety of habitats, biotic communities and ecological processes in terrestrial, marine and other aquatic environments in a particular area, together with the processes and interactions that take place within and between these systems.

This encompassing definition is accepted in the Convention on Biological Diversity (CBD) and is also used in the country's Assessment of Biological Diversity in Malaysia in 1997. Hence, biodiversity includes diversity at the gene, species and ecosystem levels. The diversity of the species and the habitats and ecosystems within which they live, such as the terrestrial rainforests, the freshwater lakes and river systems, the coral reefs and marine ecosystems, all form the background to discussions on biodiversity in Malaysia. According to the World Development Indicators, while Malaysia has only 0.2% of the world's land mass, its diversity of flora and fauna species makes it one of the richest countries in the world in terms of biodiversity per unit area, second only to Indonesia in South East Asia. The 2001 Global Diversity Outlook recognised Malaysia as one of the 12 mega-diversity countries in the world.

1. Ginger inflorescence. Photo: FDPM
2. Millipede. Photo: FDPM
3. Slipper orchid. Photo: WWF-Malaysia / Stephen Hogg
4. Malaysian horn toad. Photo: FDPM
5. Whip snake. Photo: FDPM
6. Coconut crab. Photo: WWF-Malaysia / Anthea Phillips
7. Tapir. Photo: WWF-Malaysia / James Loh
8. Crater coral. Photo: MPS

Genetic Diversity

The focus of genetic diversity has traditionally been on agricultural biodiversity. Farmers had been selecting varieties of plants and animals for thousands of years, ever since origins of agriculture. Plants and animals selected were those that are suited to human needs and adapted to local environmental conditions.

The improvement of agricultural crops by selection over the centuries has resulted in a large number of varieties. For example, there are about 140,000 varieties of rice grown in different rice growing countries. However, with the introduction of modern high yielding varieties in the last few decades, the number of local varieties has declined very sharply in most countries. In Malaysia, three varieties of rice from Malaysia Agriculture Research and Development Institute (MARDI) now form the bulk of the rice grown. As a result, some of the traditional varieties are no longer grown and are lost unless they had been collected and stored in seed banks. This loss of biodiversity is the trend in most crops all over the world.

The situation is also the same for the most common farm animals, such as cattle, pigs and chickens. This gradual but steady loss of the genetic variety as a result of modern agricultural practices is termed genetic erosion. The loss of agro-biodiversity presents future risks to our well-being in two main ways. First, the loss of genes reduces the future options for plant and animal improvement through breeding from traditional varieties. Second, there would be a greater susceptibility to diseases and a decrease in ability to cope with environmental stress when the genetic base is small as modern crops tend to be genetically uniform. However, the loss of genetic diversity in Malaysia is not well documented.

Species Diversity

The number of species in Malaysia is not known with certainty especially the smaller organisms such as insects and worms. The best estimate is that there are more than 170,000 species in Malaysia. This is likely to be a conservative estimate, as there are still many species that have not been discovered and studied. The large number of species is due to the wet tropical climate, favourable conditions for the growth and evolution of plants and animals, as well as the presence of great diversity of habitats in Malaysia. These habitats include the seas, rivers, forests and mountains. Another factor is the great age of the forests, which have existed continuously for over 130 million years thus allowing for evolutionary diversification.

MALAYSIA'S KNOWN FAUNA AND FLORA SPECIES DIVERSITY

Organisms	Endemic species	Total species
Mammals	27	286
Birds	11	736
Reptiles	69	268
Amphibians	57	158
Marine Fishes	n.a.	4,000
Freshwater Fishes	n.a.	449
Invertebrates	n.a.	150,000
Flowering Plants	n.a.	15,000
Palms	n.a.	195 (PM), 128 (Sabah), 213 (Sarawak)
Orchids	n.a.	500 (PM), 2,500 (EM)
Ferns and Fern Allies	n.a.	1,159
Fungi	n.a.	400 (PM), 300 (EM)
Mosses	n.a.	432 (WM), 400 (EM)

Source: MOSTE (1997)

Note:

PM: Peninsular Malaysia
EM: East Malaysia (i.e. Sabah and Sarawak)

9. Mangrove forest. Photo: FDPM

Ecosystem Diversity

Malaysia has a great diversity of ecosystems. Most studies on the terrestrial ecosystems in Malaysia had been focused on the forests, as Malaysia was covered almost completely by forest about 100 years ago and also because timber from the forests were important economically. The 1997 Assessment of Biological Diversity in Malaysia classified forest ecosystems into two general types: Terrestrial/Dryland Forest and Wetlands Forest. This takes into consideration, factors other than altitude, like substrate type, and climate, to be representative of Malaysia's forest ecosystems.

FOREST ECOSYSTEMS

TERRESTRIAL/DRYLAND FOREST

- Lowland Dipterocarp Forest
- Hill Dipterocarp Forest
- Mixed Dipterocarp Forest
- Upper Dipterocarp Forest
- Montane Oak Forest
- Montane Ericaceous Forest, - including Sub-alpine Forest
- Heath Forest
- Forest on Limestone
- Forest on Ultra basic Soil
- Forest on Quartz Ridges
- White Meranti-Gerutu Seasonal Forest
- Schima-Bamboo Forest

WETLAND FOREST

Freshwater/Riverine Forest

- Riparian Forest
- Freshwater Swamp
- Gelam Swamp Forest
- Peat Swamp Forest

Estuarine/Coastal Forest

- Mangrove Swamp Forest
- Nipah Swamp

Source: MOSTE (1997)

Malaysia also has fresh water aquatic ecosystems such as rivers, lakes as well as marine ecosystems, all of which have large numbers of species of plants and animals.

Kinabatangan River and Floodplain

The Kinabatangan river is the largest river in Sabah with a length of 560 km, stretching from the highlands of eastern Sabah to the Sulu Sea. The floodplain covers about 4,000 square kilometers and is one of the richest areas in terms of both river and terrestrial biodiversity. It includes 50 species of mammals including 10 species of primates. There are at least 40 species of fishes, including sharks and rays that come into the freshwater river. The swamp forests and their distinctive fauna and flora are considered to be of global significance and as a result, the Sabah Wildlife Department had established a 26,000-hectare wildlife sanctuary for the conservation of biological diversity.

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Species Diversity of Mount Kinabalu

The richness of the flora and fauna of Malaysia is exemplified by the high numbers of species found on Mount Kinabalu of Sabah. It has 5,000 to 6,000 species of vascular plants of which about 2,500 species are trees. This diversity is more than that of the whole of Europe. Kinabalu has been called one of the richest and most diverse floras in the world by many botanists. The Kinabalu flora is a combination of the floristic elements from the Himalayan and Chinese flora as well as that of the Australian and New Zealand flora. It has many species of rhododendrons as well as various oak and laurel species, which one does not normally associate with the tropics. The richness of the plant and animal species is also a reflection of the diversity of vegetation zones as one goes from 152 metres above sea level to 4,095 metres at the peak of Mount Kinabalu. Kinabalu National Park, which includes Mount Kinabalu, was designated a World Heritage Site in 2001 because of its richness in species of plants and animals.

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10. Blue-eared kingfisher *(Alcedo meninting)* found in Kinabatangan, Sabah.
Photo: WWF-Malaysia / T.H. Teoh

11. *Rafflesia pricei* is one of the largest single flower in the world; its blossom attains a diameter of nearly a meter.
Photo: WWF-Malaysia / Balu Perumal

Orang Utan Conservation

The orang utan is one of the great apes that is facing extinction largely due to loss of their natural habitats and hunting pressure. In Sabah, one estimate is that there are only 5,000 to 10,000 of orang utans left, mainly concentrated in forests along the Kinabatangan River. The Sepilok Rehabilitation Centre, near Sandakan, was established to help the conservation of the orang utan displaced by habitat destruction and hunting. Although orang utans are fruit eaters, there is recent evidence showing that they are adapting their diet and eating a larger amount of leaves in logged-over forest areas of Kinabatangan. It is estimated by the Forest Department that there may be only 2,000 orang utans left in Sarawak and they are mainly found in the Batang Ai National Park and the Lanjak Entimau Wildlife Sanctuary. An orang utan rehabilitation centre was also established in Semengoh near Kuching to rehabilitate orang utans for eventual reintroduction back to the forest.

Leatherback Turtle

The leatherback turtle *(Dermochelys coriacea)*, the largest species of sea turtle, has been attracting tourists to Rantau Abang, a beach on the east coast state of Terengganu, for the last few decades. Every March, when the nesting season begins, thousands of tourists gather at the beach at night to see these giants come ashore and lay their eggs. In the 1960s, there were records of up to 10,000 turtles coming ashore annually. However, over the last three decades, there had been a steady decline in the number of turtles coming in to lay their eggs. One of the reasons for the decline was that nearby villagers collect and sell the eggs. Since 1961, there have been efforts by the Fisheries Department, assisted by universities and conservation groups, to buy and hatch eggs in artificial nurseries and then release the hatchlings to the sea. The decline in the number of turtles coming back was also caused by increased fishing activities in the South China Sea where drift nets and long lines were used. These activities have been causing the death of thousands of turtles. Even when the turtles come back to the beaches, it was found that the eggs have very low hatching rates. Some do not hatch at all. Studies have shown that most turtles hatched artificially were female because of the higher temperature in which they were incubated. The fall in the number of male turtles has resulted in difficulty for the female turtles to find male turtles to mate. By 2001, the number of turtles coming back was only 21 and none of the eggs hatched. In 2004, only three turtles came ashore and there were no record of the eggs hatching.

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Biodiversity at Risk

Up till about 100 years ago, most of Malaysia was covered by natural forests. The most rapid changes to the natural ecosystems had been in the last 50 years or so, when Malaysia embarked on a policy of rapid economic development. Parts of lowland forests which were suitable for agriculture were converted to commercial rubber and oil palm plantations as well as for other crops. As a result of the loss of their natural habitats, over collection and hunting as well as pollution, some species of plants and animals in Malaysia are considered endangered.

However, Malaysia had been aware of the problems of the loss of natural habitats and environmental degradation resulting from economic development and has addressed these problems as early as 1975 and in the Third Malaysia Plan (1976-1980).

12. The name orang utan means “man of the forest”. They are the only great apes found outside Africa.
Photo: WWF-Malaysia / Stephen Hogg

Why Biodiversity Matters

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Biodiversity and Food Security

Malaysians benefit from biodiversity in various ways. Our quality of life is dependent upon healthy ecosystems and habitats which supply various ecological goods and services, such as clean air and water. The many species of plants, animals and micro-organisms provide the food, medicines and other products that we need and use on a daily basis. The genetic diversity of the crops that we use is the basis of future improvement of the crops. This, in part, explains why the Government has joined the international community on protection of biodiversity, by becoming a party to several multilateral environmental agreements such Convention on Biological Diversity (CBD), Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention) , and Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Biodiversity affects us in many ways and these are outlined in the following sections.

Plants and animals including fish are the pre-eminent sources of food. Malaysia is thought to harbour some 185,000 species of fauna and 12,500 species of flowering plants. Biodiversity is an important component of food security as species diversity provides the material for future food and agricultural crops while the genetic diversity of present crops will be the basis of future improvement of these crops. Plant and animal genetic diversity is now regarded as an important agricultural resource. Agriculture in Malaysia depends on various species of food crops as well as cash crops. Malaysia is an important site for genetic diversity in fruits such as durian (*Durio zibethinus*), langsat (*Lansium domesticum*), rambutan (*Nephelium mutabile*) and mango (*Mangifera indica*). Wild animals are also important for the healthy growth and pollination of cultivated plants.

Many species of insects, birds and bats are pollinators and dispersal agents of fruits and other crops. Plant genetic resources are the raw material for plant breeding for increased productivity as well as for disease resistance and other characteristics. The greater unpredictability of weather patterns as seen in recent years has often been attributed to global climate change. There has been a noticeable increase in the frequency and severity of droughts and floods in many countries. Plants with the ability to withstand drought and flood conditions would be able to continue to produce food and ensure food security.

Biodiversity can be the source of new and more nutritious food in the future. FAO estimated about 10,000 to 50,000 species out of the 300,000 species of plants are edible. However, throughout history, only about 3,000 species have actually been used by one or more cultures as a regular source of food. Only about 150 to 200 species have been commercially cultivated as human food. This means that there are many species that can potentially be commercialised as food plants.

13. The Malaysian soil and climate provide abundant and diverse food throughout the year.

Biodiversity and Health

Species of plants, animals and micro-organisms are the basis of most traditional medicines. Rural communities in developing countries still depend on traditional medicines for their healthcare needs. Modern medicine uses plants and plant products as the basis for about a quarter of all their commercial drugs.

Pharmaceutical companies and research institutes see the rich biodiversity, especially of the tropics as a source of new drugs and carry out systematic collection of samples for chemical analysis and testing. This form of systematic search for useful compounds from plants is known as "biological prospecting". Biodiversity is being prospected for their use in new and old diseases. One well-known example of the potential of plants as a source of medicine is found in Sarawak.

Natural Compounds against HIV Virus

In 1986, botanists from the Sarawak Forestry Department, the University of Illinois and Harvard University's Arnold Arboretum collected specimens from the bintangor tree or *Calophyllum lanigerum* from the forests of Sarawak. They were making routine collections for screening of potential drugs for the National Cancer Institute of the USA. In their laboratory, they found that one of the components of the bintangor tree, Calanolide A was effective against the HIV virus responsible for AIDS.

Subsequently, a small company in Chicago, Medichem Research was given the right to test and develop the potential drug. Medichem Research then formed a joint partnership with the Government of Sarawak for the development and commercialisation of this drug. At the present moment, clinical trials are taking place in the USA and Malaysia. Another related species of tree, *Calophyllum teysmanii* was found to have another *chemical*, Calanolide B which also has anti-viral properties.

14a Found in peat swamp forests, the leaves of the Serapat Angin are traditionally used in preparations to treat nerve disorders and post-natal problems.
Photo: UNDP/GEF PSF Project (MAL/99/G31)

14b Mas Cotek, a fig plant with medicinal properties.
Photo: UPM / Manohar

Biodiversity and Fisheries

Malaysia's fisheries industry has burgeoned over the last two decades. Capture fisheries depend on the natural populations of fish species in the seas, rivers and lakes that can be caught. Marine catches have been steadily rising from less than 400,000 tonnes in 1965 to over 1.2 million tonnes in 2000. At this level, there are serious concerns about over fishing as declining fishing stock is indicative that the catches are above the maximum sustainable yield of the fish populations. Sustainable harvesting of fishery resources recognises the ecological limits of the fish populations. Realising the importance of sustainable fisheries, Malaysia has, among other management measures, introduced a zoning system in coastal waters which prohibits fishing vessels from encroaching on nursery and breeding grounds to prevent depletion of fish stock.

The importance of mangroves as a breeding ground for fish, shrimps, crabs and other marine species is now well understood. Both sea and river fish are dependent upon a variety of habitats for completing their life cycles. Studies conducted in Sabah on the coastal resources in the 1970s have shown that up to 65% of all commercial marine fish species spend part of their life in mangroves, estuaries and coral reefs.

Revitalising the Reefs: Community Action

In the northern peninsular state of Penang, the Penang Inshore Fishermen's Welfare Association has set up a trawler watch. During the day, the State authorities watch for illegal trawlers which over harvest fish and prawns in the area. The community reports any illegal activity to the authorities for action. The group also actively replants mangroves to provide more habitats for the breeding and feeding of the coastal fishes. The group also helps monitor river pollution. They recognise that all three activities are vital to sustain small-scale fishing activities. They have seen their income from netting river lobsters rise from nothing to RM60 per day as the estuarine ecosystem recovers.

With the decline of capture fisheries, aquaculture, the rearing of fresh and saltwater fish, has increased 130% between 1984 and 1999, according to a report by Earth Trends. Aquaculture is a form of agriculture, as fish is cultured in cages or in artificial ponds. They need to be fed and kept healthy. The need for improvement of the fish stock under aquaculture conditions would require genetic improvement through breeding and selection. Biological diversity would be crucial in this process.

15. Planting of mangrove saplings in the state of Penang. Photo: FDPM

16. Hill dipterocarp forests. (Insert: Canopy of Rengas tree, a timber species found in lowland forests. Photos: UPM / Awang Noor

Mangroves and the Tsunami of 2004

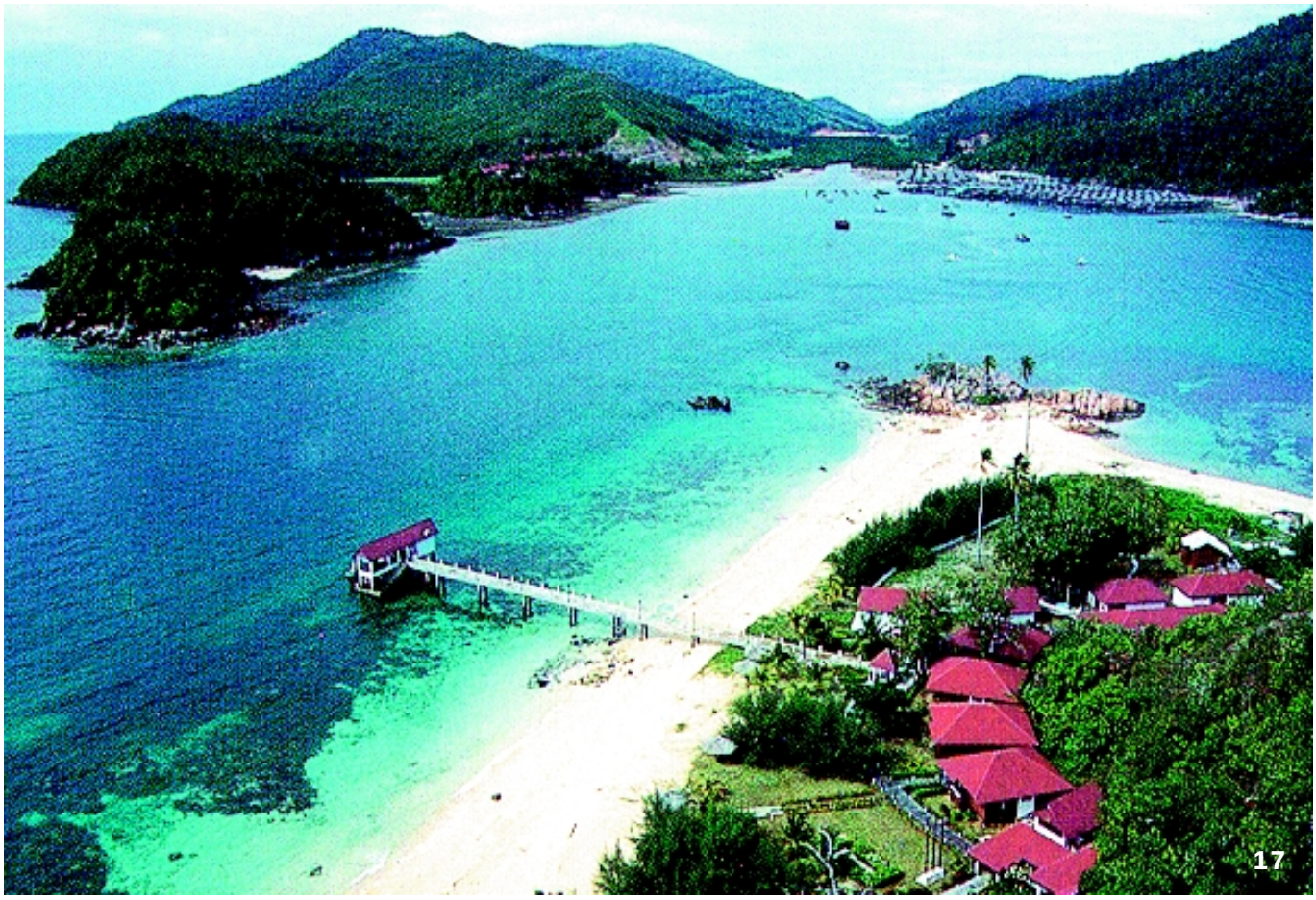
In February 2005, a special session was called by the Asian Wetland Symposium, to assess the damage done by the tsunami of 26 December 2004 to coastal wetlands, and look at a plan for rehabilitating affected areas. In their report they noted: "Certain wetland types played a role in reducing the tsunami impact, especially in locations further from the epicentre, including coral reefs and mangroves which broke the impact of the waves and absorbed some of the energy and protected areas further inland. Mangroves also stopped people being washed out to sea and trapped debris, reducing further damage."

The damage to the north coast of Penang Island where the beaches were exposed was more severe than the west coast, where there were mangroves to reduce the impacts of the waves. The mangrove forests of Pantai Acheh on the west coast of Penang reduced the impact of the waves such that by the time the waves reached the roads and houses, much of the energy of the tsunami had been dissipated. In view of the role played by mangroves in protecting against tidal waves, the national task force for mangrove replanting endorsed a replanting program of 4,250 ha in Peninsular Malaysia, 10,000 ha in Sarawak and 3,275 ha in Sabah for the Ninth Malaysia Plan (2006-2010). In 2005, a total of 500,000 saplings and trees of mangrove and other species had been planted.

Biodiversity and Forestry

The tropical rain forests of Malaysia constitute the core of biodiversity in Malaysia. The forests are a unique natural heritage which has evolved over 130 million years, resulting in a very rich flora and fauna. Besides the thousands of tree species, the forests are also the habitats of the animal life found within the forests. This includes 600 species of birds, 286 species of mammals, 140 species of snakes, and 80 species of lizards and myriads of insects and other smaller organisms.

Malaysia's forests had been and continue to be of great economic importance for its development. Timber from the forests had been a major income earner in Malaysia in the 1960s till the 1990s and played a critical role in Malaysia's economic development. Part of the forest lands in the lowlands suitable for agriculture was converted for rubber and oil palm plantations in the last few decades. In recent years, the land use pattern has stabilised and very little new forest land is being open up. There is now a much greater emphasis on sustainable forest management so that the forest resources will be available for future generations. Besides timber, there are also other non-timber forest products, such as gaharu, gums and resins which are collected and traded but they are economically of much lower value compared with timber. Malaysia's forests also play an important role in maintaining the ecological balance in the environment and hence helping to prevent natural disasters, such as floods and land slides. It also play a mitigating role in natural disasters.



Biodiversity and Tourism

The living corals of Malaysia's seas, the unique parasitic plant *Rafflesia*, endemic animal species, such as the orang utan and proboscis monkey, all draw tourists to our jungles and seas. Tourism is the second highest earner of foreign currency every year, showing a growth of 7.3% (comparing the months of July 2004 and 2005). Ecotourism is one of the fastest growing sub-sectors within tourism. The most optimistic projections show global growth in ecotourism at 30%. Malaysia with its outstanding biodiversity and scenic natural environment has been successfully promoted as an ecotourism and nature-oriented tourism destination in recent years. For example, recreational diving is high value form of tourism that attracts tourists from all over the world. This type of tourism depends on the diversity of coral reefs and quality of environment. Pulau Sipadan, Pulau Redang and Pulau Payar are examples of diving tourism. Sipadan and Layang-layang, and oceanic islands in the South China seas are considered to be among some of the world's best diving sites. Mulu National Park and Kinabalu National Park are World Heritage sites with biodiversity of global significance. These also attract nature loving tourists, both domestic and international.

Biodiversity and Ecosystem Services

Humans are recognising that healthy ecosystems provide vital "services" such as clean water, fresh air and prevent ecological disruptions such as floods and land slides. The ecological processes such as the biogeochemical cycles like the hydrological cycle and carbon cycle ensures clean water and fresh air as part of natural functioning of the ecosystem.

Coastal peat swamps, mangroves and even coral reefs all have a part to play in preventing coastal erosion. Forests provide natural protection against flash floods by the retention of rainwater in the soil reducing the amount of water runoff. Increased urban flooding has been directly linked to the destruction of water catchments and the growth of built-up areas. The trees in water catchments increase the water retention capacity of the soil so that water is released slowly into the streams and waterways during the dry season, thus ensuring water supply throughout the year.

17. Marine biodiversity of Pulau Redang Marine Park attracts many divers and snorkellers. Photo: MPS

Biodiversity and Indigenous Knowledge

Over the last 12,000 years, ever since humans have settled into an agricultural way of life, farmers have selected varieties of crops and livestock to meet various environmental conditions and diverse nutritional and social needs. This knowledge of plants and animals and their environment has been passed down over the centuries, and has allowed communities to adapt to changing conditions. Traditional rural communities, especially in developing countries still use a large number of species for medicinal purposes. This traditional knowledge has been used by pharmaceutical companies in their search of new drugs, especially from developing countries with high biodiversity and long tradition of the use of plants for medicinal purposes.

FAO estimated that three-quarters of prescription drugs manufactured today are based on the traditional knowledge of the local communities or indigenous people. Besides useful products for food and medicine from plant and animal species, communities have also incorporated components of biodiversity into their cultural life. Carving and traditional weaving have been influenced by both the availability of trees and rattans and by natural motifs. Traditional carvings of Iban houses, for example, incorporates designs of leaves, seed pods, tendrils, buds and flowers. Rattan baskets and containers are made using natural plant dyes, with jungle fruits providing colouring.

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Tourism and Indigenous Communities

The Semai, an indigenous community in Perak, is working with the Malaysian Nature Society (MNS) to develop an eco-tourism project that will help monitor and conserve the Rafflesia flower and the Rajah Brooke's Birdwing butterfly in the area. Rather than harvesting and collecting the buds and flowers for sale in the local market as traditional medicine and the butterflies for the tourists, the community is providing home-stay programmes with interpretive centre so that visitors can enjoy these protected species live and in situ.

Biodiversity and Biotechnology

Malaysia is also well-placed to tap into the growing biotechnology industry to develop medicines and other natural products. Biotechnology is seen as an industry with great potential. The Government believes that the application of biotechnology can be the catalyst to generate new wealth for the country. Hence, the importance Malaysia attaches to the development of biotechnology, as can be seen in the Biotechnology Policy.

Biotechnology ultimately depends on the availability of raw material which comes from biodiversity resources. Malaysia, with its rich biodiversity will be able to provide the starting materials for the biotechnological industries. Advances in biotechnology, including modern methods of cultivating and propagating crops and livestock have been made possible largely because of genetic diversity in parent stock.

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18. The traditional knowledge of indigenous communities contributes to conservation of biodiversity.
Photo: MNS / K.S. Cheang

19. Fungi play an important role in decomposing biomass in forests. Some may harbour bio-compounds useful to Man.
Bracket fungi (left), Cup fungi (right).
Photo: FDPM

Convention on Biological Diversity

One of the most important conventions that Malaysia has signed is the Convention on Biological Diversity (CBD) that came out of the Earth Summit in 1992. Being a framework convention, many of the implementation mechanisms are determined by the member countries that made up the Conference of Parties (COP). Malaysia has been actively participating in the COP meetings. Kuala Lumpur played host to the 7th COP (COP7) of CBD in 2004, reflecting Malaysia's commitment to the Convention.

While respecting the sovereignty of nations over their biological resources, the Convention is a strongly worded commitment to the conservation, sustainable use and equitable sharing of the benefits arising from the use of biodiversity. Ten years after the Convention was agreed upon, however, species loss was still occurring faster than it had been in 1992.

There have been many problems with the implementation of the Convention. These were identified by the COP workshop on the Strategic Plan for Biodiversity, held in the Seychelles in 2002. They included a lack of political will on the part of the international community and many nations, lack of capacity for implementation, continuing poverty that imposes other priorities on communities and countries and the loss of traditional knowledge that had help conserve biodiversity.

The World Summit on Sustainable Development held in Johannesburg in 2002 mandated countries to significantly reduce biodiversity loss. This has been recognised by COP7 in 2004 which set a target of reducing biodiversity loss by 2010. The emphasis on integrating economic development with biodiversity conservation and the recognition of poverty alleviation as a high priority in COP7, should allow the CBD to enter mainstream policy-making more easily, particularly in the developing world where economic development and poverty alleviation are pressing problems. Climate change and natural disasters were also identified as posing problems in implementing the Convention.

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OBLIGATIONS UNDER CBD

As party to the Convention, among the obligations that each country needs to do are as follows:

- Develop a national plan for biodiversity conservation;
- Research into what there is, and what's important, in terms of conservation. This includes monitoring of important species;
- Establishing protected areas and guidelines;
- Promote sustainable development, particularly around protected areas
- Help endangered and rare species to breed, by protecting them and their habitats;
- Protect native species through regulating both genetically modified organisms and foreign species that could compete for similar food and other resources;
- Promote sustainable, particularly customary, use of biodiversity resources;
- Protect indigenous and local knowledge and communities;
- Engage in public education and awareness building on biodiversity.

20. Kuala Lumpur was host to COP 7. Photo: MNS

Synergies of Multilateral Environmental Agreements

There are four global biodiversity-related Conventions to which Malaysia is a party: the Convention on Biological Diversity (CBD), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention), and the World Heritage Convention. The work undertaken by these conventions are complementary and mutually reinforcing. It is increasingly being realised that there should be cooperation and coordination in the field of sustainable development. For example, the CITES Strategic Plan 2005 states that numerous linkages exist between the aims of CITES and those of other multilateral environmental agreements.

Mechanisms of Implementation of CBD

Under the CBD, the COP is established to oversee the implementation of the CBD, where each party has a right to vote in the decision making of the COP. Each meeting concentrates on a few themes.

Besides the COP, the CBD has also established a scientific advisory body, ad-hoc expert working groups on specific areas and advisory committees. An open-ended intergovernmental scientific advisory body known as the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) is a subsidiary body of the COP and is to report regularly to the COP on all aspects of its work. Its functions include providing assessments of the status of biological diversity, assessments of the types of measures taken in accordance with the provisions of the Convention and responses to questions that the COP may put to the body.

Meanwhile, ad-hoc working groups are established on matters that require technical expertise or research. Advisory committees are formed to advise COP on various policies and other issues.

21. Towering above the forest canopy, the tualang *(Koompassia excelsa)* can reach 75 metres or 30 stories in height. It is best known for the immense honey combs which hang from its branches.
Main photo: WWF-Malaysia
Inset photo: UPM / Awang Noor

National Initiatives

Environmental Legislation

Peninsular Malaysia's first environmental legislation came before independence. Their first concern was to control the hunting of large game animals and the collection of birds. To protect animals, a number of parks and wildlife sanctuaries were established in the beginning of the 20th century. The first, the Chior Wildlife Sanctuary in Perak was established in 1903, under the Wild Animals and Birds Protection Enactment (1902). The largest national park was Taman Negara, then known as the King George V Park was created in 1939. Sabah and Sarawak, which joined Malaysia in 1963, established their own systems of national parks and wildlife sanctuaries from the 1970s onwards.

During the 1970s the importance of environmental legislation became more recognised at the federal level. The Protection of Wildlife Act, for example, was passed in 1972. Currently most environment-related legislation is sectoral based, meaning that conservation and protection responsibilities cross cut several departments. For example, the National Forestry Act (1984) is concerned with forestry conservation only. Concomitantly, wildlife and national parks management is the responsibility of the Department of Wildlife and National Parks. Under the Federal Constitution, land, water and forests fall under the jurisdiction of each state. Biodiversity conservation requires forests and land to be protected.

In 1993. the Fisheries Act (1985) was amended to provide for the establishment of marine parks and marine reserves. The Pulau Redang Marine Parks of Terengganu, the Pulau Tioman Marine Parks of Pahang and the Pulau Tinggi Marine Parks of Johor are among the marine parks established under this Act.

In 2004, a new federal Ministry of Natural Resources and Environment (NRE) was formed and this has improved greatly coordination and cooperation among agencies related to environment and natural resources.

22. Many species of wild orchids are found in Malaysia's forests. Background photo: WWF-Malaysia / Stephen Hogg Inset photos. Photo: UPM / Manohar

PARTIAL LIST OF LEGISLATION RELEVANT TO BIOLOGICAL DIVERSITY

Federal	Environmental Quality Act 1974
	Fisheries Act 1985
	Pesticide Act 1974
Peninsular Malaysia	Waters Enactment 1920
	Taman Negara (Kelantan) Enactment 1938
	Taman Negara (Pahang) Enactment 1939
	Taman Negara (Terengganu) Enactment 1939
	(The State Parks from the above three Enactments constitute Taman Negara)
	Aboriginal Peoples Act 1954
	Land Conservation Act 1960
	National Land Code 1965
	Protection of Wildlife Act 1972
	National Parks Act 1980
	National Forestry Act 1984
Sabah	Parks Enactment 1984
	Forest Enactment 1968
	Fauna Conservation Ordinance 1963
Sarawak	National Parks Ordinance 1956
	Wildlife Protection Ordinance 1958
	Forest Ordinance 1954
	Natural Resources Ordinance 1949
	Public Parks and Greens Ordinance 1993
	Water Ordinance 1994

Source: MOSTE (1998)

National Policy on Biological Diversity

The National Policy on Biological Diversity (NPBD) was launched in 1998. It includes strategies for improving biodiversity management. There is a heavy emphasis on research, both to map the nation's biodiversity and to find new commercial uses for Malaysia's flora and fauna products. It also includes enhancing capacity, working with local communities and the private sector, improving public education and periodic review of legislations.

NATIONAL POLICY ON BIOLOGICAL DIVERSITY

The Government of Malaysia formulated a National Biological Diversity Policy (NPBD), which was launched in April 1998. This reiterated Malaysia's vision "To transform Malaysia into a world centre of excellence in conservation, research and utilisation of tropical biological diversity by the year 2020". The NPBP focuses on using environmental resources in a sustainable manner and emphasises the importance of local and indigenous communities in helping to conserve the environment, and that they should reap financial rewards from sustainable environmental development. The policy includes 15 strategies for effective management of biodiversity:

1. Improve the Scientific Knowledge Base
2. Enhance Sustainable Utilisation of the Components of Biological Diversity
3. Develop a Centre of Excellence in Industrial Research in Tropical Biological Diversity
4. Strengthen the Institutional Framework for Biological Diversity Management
5. Strengthen and Integrate Conservation Programmes
6. Integrate Biological Diversity Considerations into Sectoral Planning Strategies
7. Enhance Skill, Capabilities and Competence
8. Encourage Private Sector Participation
9. Review Legislation to Reflect Biological Diversity Needs
10. Minimise Impacts of Human Activities on Biological Diversity
11. Develop Policies, Regulations, Laws and Capacity Building on Biosafety
12. Enhance Institutional and Public Awareness
13. Promote International Cooperation and Collaboration
14. Exchange of Information
15. Establish Funding Mechanisms

Source: MOSTE (1998)

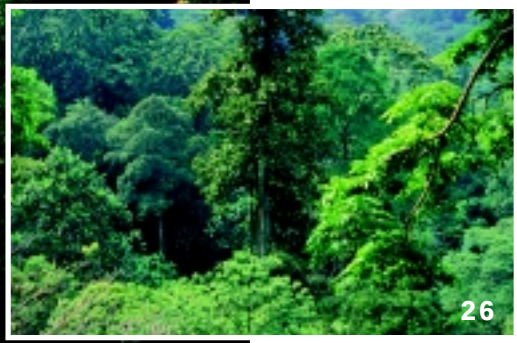
Limestone ecosystem

Limestone hills are particularly rich in plant species, having around 13% of known Malaysian species in just 0.3% of the land surface. This is because each hill contains dozens of different habitats, for example inside limestone caves

compared with the exterior limestone crags. The harsh soil also contributes to extremely specialised evolution, with plants (and animals) adapting to small niche environments.

23. Niah Caves, Sarawak.
Photo: Tourism Malaysia

24. The proboscis monkey *(Nasalis larvatus)* with its characteristic large fleshy nose and pot-bellied stomach is found only on the island of Borneo in Southeast Asia.
Photo: WWF-Malaysia / Stephen Hogg



Protected Areas

Malaysia has established a network of protected areas for the conservation of biological diversity. Some of these permanent reserved forests, national parks, wildlife reserves and sanctuaries, nature reserves, bird sanctuaries and marine parks have been established as early as the 1930s.

Permanent Reserved Forests

The forests of Malaysia constitute the largest areas of natural land ecosystems remaining in Malaysia. As such, it is an important source of biodiversity. About 60% of the Malaysia's land area is forested.

The National Forestry Act (1984) has established permanent reserved forest located in different parts of the country. The National Forestry Policy was revised in 1992 to take into account the importance of biological diversity conservation and the sustainable use of genetic resources as well as the role of local communities in forest development. Malaysia has about 14.4 million ha of permanent reserved forests. These are managed and classified under four broad categories.

- Production forest - areas that are managed so that they sustainably supply forest produce for domestic use and for export
- Protection forest - areas that are managed to ensure favourable climatic and physical conditions of the country, the safeguarding of water resources, soil fertility, environmental quality, conservation of biological diversity, and minimisation of damage by floods and erosion of rivers
- Research and Education forest - areas for research, education and conservation of biological diversity
- Amenity forest - for recreation, ecotourism and promoting public awareness in forestry

In the effort to protect and safeguard various forest and ecological types, the Forestry Department had set aside pockets of virgin forests within the permanent forest estates that would serve as permanent nature reserves and natural arboreta. Since its inception in the 1950s, a total of 135 virgin jungle reserves (VJR) covering 113,444 ha have been established in Malaysia. No disturbances such as logging or harvesting are allowed in VJRs. They are primarily for research purposes and for their intrinsic ecological value. They also act as ecological benchmarks of the original vegetation as well as a genetic reservoir of species for harvested forests.

National Parks and State Parks

Parks are gazetted and managed at both State and Federal levels. State governments have been proactive in gazetting important new areas for conservation, for example the limestone hills in Perlis and the Sedili Kecil Swamp Forest in Johor.

Sabah and Sarawak have special status when they joined Malaysia in 1963. They have jurisdiction on wildlife and forests and over the years have developed a well balanced and represented system of protected areas.

Wildlife Reserves and Sanctuaries

Wildlife reserves and sanctuaries are gazetted for the protection of various species of wildlife, such as mammals and birds. They play an important role in the conservation of large animals such as tigers, gaurs, tapir and elephants.

25. Taman Negara National Park, Pahang is a ASEAN Heritage Park.
Photo: Tourism Malaysia

26. Forests are home to biodiversity.
Photo: WWF-Malaysia / Dionysius Sharma

Marine Protected Areas

Malaysia has established a system of marine protected areas. These include marine parks of Peninsular Malaysia, fisheries prohibited areas, marine reserves as well as marine national parks in Sabah and Sarawak. In total Malaysia has designated 136 of such marine protected areas.

Malaysia's marine parks contain a great diversity of marine life, including many species of corals and fish. Two nautical miles around 40 islands have been gazetted as marine parks. Examples of marine parks are Pulau Tioman, Pulau Redang and Pulau Payar, Turtle Island Park, Tunku Abdul Rahman Park and Talang-Satang National Park.

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Biological Diversity in Marine Parks

A recent survey commissioned by the Marine Parks Section, NRE on the coral diversity of the marine parks of the east coast of Peninsular Malaysia established that the area encompassed by the parks has one of the richest coral diversity in the world with 221 species of corals, despite its relatively small area compared to other countries. The fish diversity is also of global significance because of the large numbers of species present. A total of 298 fish species were identified.

27. Corals provide excellent hiding places. Here a Blenny fish has made a home in a brain coral.
Photo: MPS

28. Lionfishes move gracefully. Their extended spines are venomous to ward off predators.
Photo: MPS

29. Tubastrea cup coral found in Coral Garden, Pulau Tenggol, Terengganu.
Photo: WWF-Malaysia / N.K. Tong

30. Pulau Sipadan is one of the best dive locations in the world to enjoy the sea's rich marine life.
Photo: WWF-Malaysia / N.K. Tong

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Local Initiatives

Local Agenda 21

The most powerful tool for biodiversity conservation by local governments is the Local Agenda 21, based on Agenda 21 of the Earth Summit. The aim of this initiative is to involve communities to work towards sustainable development at a local level. Important for biodiversity is the commitment to maintaining green areas within urban districts.

Green areas serve many purposes. They can help educate the public on the importance of conservation, they provide resting and watering places for migrating birds, they help maintain urban air quality and temperature and provide important rest and recreation areas to relieve the stress of urban life. A successful example of this is the Kota Kinabalu City Bird Sanctuary.

Kota Kinabalu City Bird Sanctuary

The Kota Kinabalu City Bird Sanctuary is a 24 hectare protected mangrove ecosystem, in the heart of the city. This makes it accessible for urban children and adults to learn about the wildlife, particularly migratory birds, which will benefit from this important reserve.

31. Mount Kinabalu is a jagged granite massif rising to 4,101 metres (13,455 feet), the highest mountain in South-East Asia within The Kinabalu Park. The park is a World Heritage site. Photo: Tourism Malaysia

WHAT IS AGENDA 21?

The 1992 'Earth Summit' in Rio de Janeiro was unprecedented in bringing together 172 governments, with a parallel conference of over 2,500 NGOs, to discuss issues of environment and development. Alongside the CBD and the UNFCCC, the Summit also agreed on Agenda 21, or the Agenda for the 21st century to make the transition towards sustainable development. Agenda 21 is a very comprehensive agenda for action and operates at the local, national and international levels. While Malaysia has yet to formulate a National Agenda 21, pilot Local Agenda 21 (LA21) projects were undertaken in Petaling Jaya, Krian, Miri and Kuantan. LA21 focuses on sustainable development and involved consultation with local communities.

Universities and Research Institutions

Local research into environmental sciences has intensified in the last two decades. Nevertheless, large gaps in scientific knowledge remain about Malaysian rainforests, the marine environment and the interactions between different species. Universities and other research institutions play an important role in filling these gaps. The rapid growth and development of public universities in the last three decades have greatly contributed to the increased knowledge of our flora and fauna. Government support of research on biodiversity have been increasing. Universities, besides their research on many aspects pertaining to biodiversity, have been crucial in helping build up the capacity of the country in the training of biologists and other professionals.

Research institutions have also developed greatly in the last few decades and a number are working on various issues related to biodiversity. For example, the Forestry Research Institute of Malaysia (FRIM) has an active programme in the study of plant species in Malaysia and in the coordination of the writing of the flora of Malaysia. Botanists working in the flora of Sabah and Sarawak have discovered a number of new species of flowering plants, thus adding to our knowledge of plant diversity. The Malaysian Agriculture Research and Development Institute (MARDI) is the leading research institute in agriculture involved in research, conservation, and utilisation of the genetic resources of our crops and fruits. It maintains a seed bank for rice varieties to help preserve the many varieties of the traditional rice grown.

NGOs

Non-Governmental Organisations (NGOs) are playing an increasingly important role in providing alternative viewpoints to development plans. By consulting NGOs and local communities planners can take the needs and wishes of these stakeholders on board at early stages of proposal writing and ensure continuous support for projects. NGOs also help monitor the implementation of environmental legislations, push for high standards in environmental management and conduct vital public awareness and research work.

Organisations such as the Malaysian Nature Society (MNS) and the World Wide Fund for Nature-Malaysia (WWF-Malaysia) have played significant roles in the conservation of biodiversity in Malaysia for the last few decades, in scientific work as well as in advocacy. In Sabah and Sarawak, the efforts of the environmental NGOs are geared towards the preservation of the environment and the natural forests. The needs of the indigenous people as well as the preservation of their culture and way of life are top priorities of the Sabah and Sarawak NGOs.

The Malaysian Environmental NGOs (MENGO) is a federation of 18 environmental NGOs. They undertake a variety of activities from awareness raising, policy analysis, field research, community development, capacity building, fund raising, advocacy, demonstration projects, education, training, campaigning, etc, on a broad spectrum of issues and initiatives, ranging from environment, consumer, community, gender, poverty, health, rights of the disabled, governance, ecotourism, sustainable livelihood, etc.

Important Bird Area - a Conservation Tool for Malaysia

The Important Bird Area (IBA) Programme aims to identify, document and conserve a network of globally important areas for the conservation of birds and their habitats through national and local level consultations involving NGOs, experts and government agencies.

55 IBAs covering an estimate of 50,944 km^2 have been identified in Malaysia; 18 in Peninsular Malaysia, 14 in Sabah and 22 in Sarawak.

Private Sector

Once seen as the environment's enemy, many large corporations have started to support environmental projects. Pushed both by increasing public awareness and increasing cost of environmental responsibility, they often work hand-in-hand with Government and NGOs to meet environmental requirements and standards. A number of corporations have undertaken to prepare annual reports on their environmental performance besides their financial performance. Following the Earth Summit in Rio in 1992, a Malaysian Business Council for Sustainable Development was formed

Regional Initiatives

Biodiversity knows no boundaries, and important ecosystems often ignore the niceties of international territory. This means Malaysia has to work bilaterally or multilaterally with its neighbours in the region to protect ecosystems and wildlife regardless of political boundaries. Malaysia has cooperated with Thailand, Indonesia and the Philippines in ensuring a more comprehensive approach towards conservation. A number of Transboundary Conservation Areas (TBCA) had been undertaken by ASEAN member countries.

ASEAN WORKING GROUPS ON ENVIRONMENT

The Association of Southeast Asian Nations or ASEAN was established on 8 August 1967 in Bangkok by five countries, namely, Indonesia, Malaysia, Philippines, Singapore, and Thailand. Later it was expanded to include Brunei Darussalam, Vietnam, Laos, Cambodia and Myanmar. Under ASEAN, five working groups on environment were established.

- ASEAN Working Group on Multilateral Environmental Agreements.
- ASEAN Working Group on Nature Conservation and Biodiversity.
- ASEAN Working Group on Coastal and Marine Environment.
- ASEAN Working Group on Environmentally Sustainable Cities.
- ASEAN Working Group on Water Resources Management.

32. "On taking it out of my net and opening the glorious wings, my heart began to beat violently, the blood rushed to my head. And I felt more like fainting than I have done in apprehension of immediate death". A.R. Wallace, The Malay Archipelago on catching a Rajah Brooke's Birdwing butterfly.
Photo: WWF-Malaysia / Stephen Hogg

Indonesia and Malaysia Transboundary Conservation Area (TBCA)

The Lanjak-Entimau Wildlife Sanctuary (187,000 ha) in Sarawak and Betung Kerihun National Park (800,000 ha) in West Kalimantan was proposed as a transboundary conservation area as they shared many landscape features as well as a common ethnographic history. Later, the Batang Ai National Park of Sarawak was added, making the 1.1 million ha TBCA one of the biggest conservation areas in Southeast Asia. The first phase was implemented in 1995. In 2004, another conservation area between Sarawak and Kalimantan was proposed and this was the Pulong Tau National Park in Sarawak and the Kayan Mentarang National Park in East Kalimantan. The 165,000 ha in Sarawak and 1.4 million ha in Indonesia would also make this conservation one of the largest in the region.

Heart of Borneo Conservation Area of Indonesia, Brunei and Malaysia

This proposal is one of the most ambitious proposals for conservation in the tropics. The proposed area is 22 million ha in size or about one quarter the land area of Borneo. It would involve the more hilly terrain of Brunei, East Malaysia and Indonesia. The island of Borneo is home to some of the world's most diverse ecosystems with about 15,000 species of plants. Borneo is also home to rare, large mammals, such as orang utan, elephants and the Sumatran rhinoceros. The Indonesian and Brunei governments, the Sabah Wildlife Department and the WWF have a team of researchers working on this project. In the last decade, over 350 new species have been found, including 30 freshwater fishes. The proposal will hopefully be implemented in 2006.

The Sumatran Rhino

As few as 300 Sumatran rhinoceros *(Dicerorhinus sumatrensis)* are believed to be alive, confined to Malaysia, Brunei and Indonesia. Also known as the 'hairy rhino', they live in both highland and lowland forests as well as in swamps. They are under threat from poachers interested in trading rhino horns which are valued for their purported medicinal properties.

33. Horns of the Sumatran rhinoceros have been used in traditional Chinese medicine to treat illnesses. Yet like our fingernail and hair, the rhino horn is made of keratin and has no healing properties.
Photo: WWF-Malaysia / Stephen Hogg

The Turtle Islands Heritage Protected Area between the Philippines and Malaysia

While concentrating on turtle conservation, this bilateral agreement signed in May 1996 recognises that turtle populations are dependent on the marine environment. It looks at preserving coral reefs and other marine flora and fauna as well as important nesting sites for the Green and Hawksbill turtles in the Philippines and Malaysia. This is one of the success stories on the conservation of the green turtle.

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Why Do Some Places Have More Endemic Species Than Others?

Some areas have evolved almost as islands, separated from similar conditions by the landscape. An example is peat swamp forests. Plants and animals have evolved to the specialised conditions there and they may have had little or no contact over millions of years with related species in similar conditions. They tend to evolve independently, leading to a vast diversity of life, each occupying its own niche. These would be endemic to the area, which means they are found there and nowhere else. Endemic species also tend to be high in islands.

ASEAN Heritage Parks

All ten ASEAN Member Countries are signatories to the ASEAN Declaration on Heritage Parks, a revised version of the ASEAN Agreement on Heritage Parks and Reserves signed by six ASEAN Member Countries on 29 November 1984. The new Declaration, signed on 18 December 2003, listed 27 sites as ASEAN Heritage Parks. It provides a framework for concerted action toward protected areas management in the ASEAN region based on the ecosystem approach. Active collaboration is also being undertaken to promote cluster and cross-border sites under the World Heritage Convention. ASEAN has adopted the Guidelines on Competence Standards for Protected Area Jobs with a view to assist protected area management authorities, training and educational organisations and conservation projects to improve human resource development, staff performance and training in protected areas.

ASEAN HERITAGE PARKS LOCATED IN MALAYSIA

Mt. Kinabalu National Park, Sabah
(also a World Heritage site)

Mulu National Park, Sarawak
(also a World Heritage site)

Taman Negara National Park

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34. The green sea turtle *(Chelonia mydas)* grows to 1-1.5 m in length and can weigh 200 kg, making it the largest of the hard-shelled turtles.
Photo: WWF-Malaysia / D.J.W. Lane

35. Rhinoceros hornbills *(Buceros rhinoceros)* remain together even outside of the breeding season. The males often feed their mates delectable morsels to maintain the pair-bond.
Photo: WWF-Malaysia / Stephen Hogg

Other Global Biodiversity Commitments

Cartagena Protocol on Biosafety

On 29 January 2000, the COP to the CBD adopted a supplementary agreement to the Convention known as the Cartagena Protocol on Biosafety. Malaysia together with Sweden played a key role in the early days of the CBD negotiations to introduce the biosafety provisions which paved the way for the Cartagena Protocol on Biosafety.

The Protocol seeks to protect biological diversity from the potential risks posed by living modified organisms resulting from modern biotechnology. It establishes an advance informed agreement procedure for ensuring that countries are provided with the information necessary to make informed decisions before agreeing to the import of such organisms into their territory. The Protocol contains reference to a precautionary approach and reaffirms the precaution language in Principle 15 of the Rio Declaration on Environment and Development.

To meet the national biosafety agenda, National Guidelines for the Release of Genetically Modified Organisms (GMOs) into the Environment was launched in 1997. The guidelines set the administrative regulatory framework for biosafety and cover the general scientific and technical aspects of the release of GMOs into the environment.

The NPBD highlights the need for a balance between safety, ethics, socio-economic and the developments in biotechnology. Thus biosafety will complement the biotech agenda in Malaysia including research and development in this field. In this light, Malaysia has developed a legal framework on biosafety which is envisaged to be tabled in Parliament in 2006.

The spirit of the Malaysian Biosafety legal framework is best reflected by the words of our Prime Minister Dato Seri Abdullah bin Haji Ahmad Badawi, :

".....while Malaysia is aware that biotechnology holds much promise, we are also concerned that biotechnological products should not pose any threat to the environment, or to human health and safety."

24 January 2005, International Conference on Biodiversity, Paris

36. The Malayan tiger *(Phathera tigris)* exclusively found in Peninsular Malaysia has been classified as a new subspecies since 2004. It is an endangered species. Photo: WWF-Malaysia / Stephen Hogg

CITES

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) aims to ensure that international trade in specimens of wild animals and plants do not threaten their survival. Because the trade in wild animals and plants crosses borders between countries, the effort to regulate it requires international cooperation to safeguard certain species from over-exploitation. CITES was conceived in the spirit of such cooperation. Today, it accords varying degrees of protection to more than 30,000 species of animals and plants, whether they are traded as live specimens, fur coats or dried herbs. For many years CITES has been among the conservation agreements with the largest membership, with now 169 Parties.

A summary of provisions are:

a) Includes animals and plants whether dead or alive; and any recognisable parts or derivatives thereof (Article 1);

b) Appendix I covers endangered species, trade in which is to be tightly controlled; Appendix II covers species that may become endangered unless trade is regulated; Appendix III covers species that any party wishes to regulate and requires international cooperation to control trade; Appendix IV contains model permits;

c) Permits are required for species listed in Appendices I and II stating that export/import will not be detrimental to the survival of the species (Articles 3 and 4).

Ramsar Convention

The Convention on Wetlands of International Importance especially as Waterfowl Habitat or better known as Ramsar Convention, reflects its original emphasis on the conservation and wise use of wetlands primarily to provide habitat for water birds. Over the years, however, the Convention has broadened its scope to cover all aspects of wetland conservation and wise use, recognising wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities.

The Ramsar Convention is the first of the modern global intergovernmental treaties on conservation and wise use of natural resources. Compared with those of more recent agreements, its provisions are relatively straightforward and general. The Convention entered into force in 1975 and as of 31 January 2006 has 150 Contracting Parties. More than 1,590 wetlands have been designated for inclusion in the List of Wetlands of International Importance, covering some 134 million ha. This Convention aims to protect wetlands under a broad definition that includes swamps, rivers, lakes, marine environments (to a depth of six metres) and artificial fish ponds, reservoirs or lakes. To become a party to the Convention, states must designate at least one area as a Ramsar site. The first site in Malaysia was Tasek Bera, and this has been followed by four others.

37. Pitcher plants found in the South-East Pahang Peat Swamp Forest. Photo: UNDP / GEF PSF Project (MAL/99/G31).

Tasek Bera

Tasek Bera is the largest freshwater swamp in Peninsular Malaysia. It has at least 94 species of fish, including the endangered Asian Arowana *(Scleropages formonsus).* In 1994, in recognition of its biodiversity significance and importance as a wetland of international significance it was declared a Ramsar site. The area covers 31,120 ha. Besides the fish species, the area includes 300 plant species, as well as 50 species of mammals, including tiger and tapir.

RAMSAR SITES IN MALAYSIA

Site	Designation Date	Area (ha)	Description
Tasek Bera, Pahang	10 November 1994	31,120	An alluvial riparian swamp system situated in the catchment of Sungai Pahang. It is an excellent example of a "blackwater" ecosystem and supports high species diversity which includes open water, a reed swamp area, and swamp forest with grasslands on the periphery.
Pulau Kukup, Johor	31 January 2003	647	An uninhabited and intact mangrove island surrounded by extensive intertidal mudflats. The island is important for flood control, physical protection and shoreline stabilisation from storms.
Sungai Pulai, Johor	31 January 2003	9,126	Johor's largest estuarine mangrove system which also includes seagrass beds, intertidal mudflats and an inland freshwater riverine forest. It represents one of the best examples of a lowland tropical river basin. It acts as a shoreline stabilisation and flood prevention for the adjacent villages.
Tanjung Piai, Johor	31 January 2003	526	Situated at the southern most tip of continental Asia, it is a coastal mangrove with intertidal mudflats. It is important for protection from sea-water intrusion and coastal erosion.
Kuching Wetlands National Park	8 November 2005	6,610	A saline mangrove system with important historical value. Harbours noteworthy species of fauna, and also a breeding and nursery ground for fish and prawn species.

The Way Forward

Mainstreaming Biodiversity Conservation in Development Planning

Given Malaysia's role to protect global biodiversity, it would be necessary to include biodiversity conservation as one of the key issues of sustainable development. The growth of civil society in Malaysia over the years has created greater public awareness, support and acceptance on the importance for sustainable development and conservation of biodiversity.

This has led to the mainstreaming of the issues related to biodiversity in the formulation of national policies. The implementation of existing environmental-related policies such as the National Policy on Biological Diversity, National Policy on the Environment, National Wetlands Policy, National Forestry Policy and more recently, the National Physical Plan, will ensure better management of biodiversity for future generations.

In the 1997 Assessment of Biological Diversity in Malaysia, a number of issues were identified to be addressed if Malaysia were to proceed towards sustainably managing its natural heritage. In particular, the federal and state relationships concerning various issues like natural resources and land management would need to be rationalised.

Strengthening the Institutional Framework

Established in 2001, the National Biodiversity and Biotechnology Council is chaired by the Prime Minister. It comprises relevant federal ministries and chief ministers of all states. Its aim is to give policy directions to strategies for biodiversity conservation and development of biotechnology.

In 2004, Malaysia strengthened its management of conservation at the federal level when the restructuring of the ministries led to the formation of the Ministry of Natural Resources and Environment (NRE). This has led to better coordination as some issues of forest resources use and conservation cut across a number of departments and agencies. Institutional capacity building of state and federal agencies is necessary so that economic and social development will take in consideration environmental conservation.

Institutional Related Issues

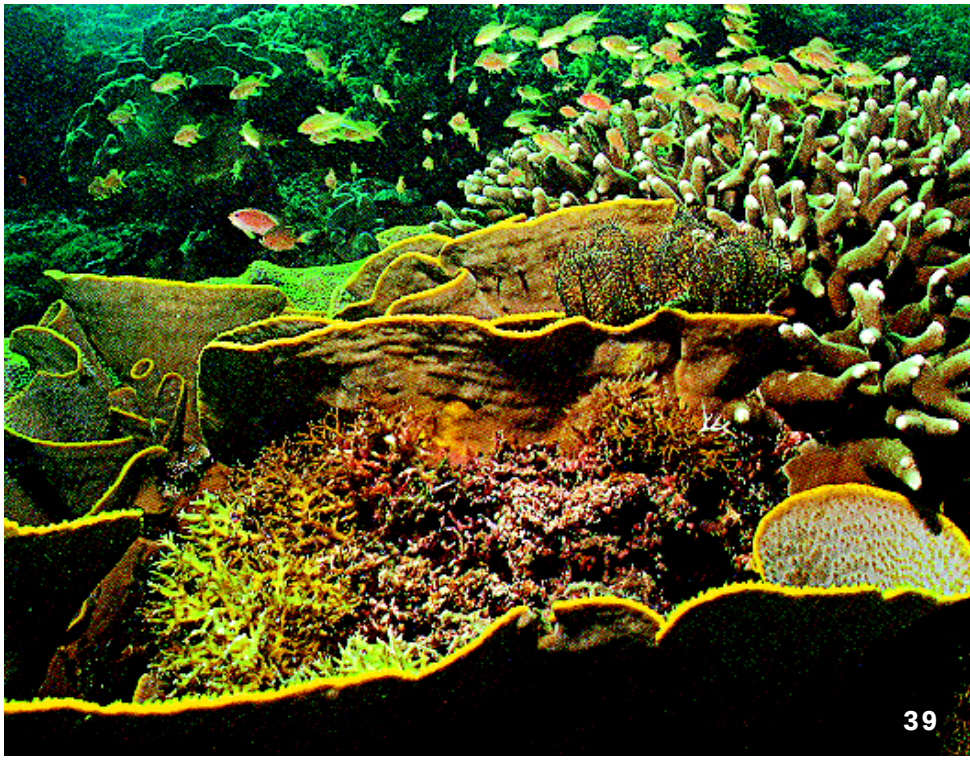
- Federal-State collaboration. As an ongoing issue, mechanisms for decision-making will continually be examined to find ways of working together for areas that cross borders, such as green corridors and water resources.
- Review of environmental and biodiversity related legislation will ensure its ongoing effectiveness and compatibility with recent developments. It entails review of current legislation protecting flora and fauna.
- Decisions on land use will include environmental considerations.

38. Waterfalls and rivers are common recreational areas for picnics and a fun day in the sun. Photo: Tourism Malaysia

Research and Knowledge Gaps

There are gaps in our knowledge of the plants and animals that live in Malaysia as well as the habitats in which they live. Therefore, research remains a top priority as rational and informed policy decisions cannot be made of conservation priorities without good scientific knowledge.

The recent establishment of some government committees with the participation of universities, research institutions and the private sector, on research, development and innovation would help address these knowledge gaps.



Ecosystem Mapping

More research is also needed on Malaysian ecosystems themselves. The forest types are classified mainly for forest exploitation and generally do not have detailed information on biodiversity. A distribution map of ecosystems in Malaysia would help establish priorities for the establishment of protected areas. This would require ecological research by government departments, research institutions and universities.

Species Inventory

There is still no comprehensive database of either flora or fauna in the Malaysian rainforests and oceans. This makes the work of assessing the value of unique natural areas difficult, and certainly it would be incomplete. Much of the potential of our biodiversity remains untapped. Even in a comparatively developed area, such as Kuala Kubu Bharu, just one hour outside of Kuala Lumpur, a new species of magnolia was discovered as recently as 1998.

Under the Eighth Malaysia Plan (2001-2005), nine scientific expeditions were carried out in forest reserves by the Forestry Department Peninsular Malaysia, and four expeditions were carried out by various agencies to document the biological diversity of our natural ecosystems. This has resulted in the discovery of new species. The documentation of the tree flora of Sabah and Sarawak has recently been completed. The next phase would be to write up on the flora of the non-timber species, in particular shrubs and herbs which had been less well studied compared to trees. In the Ninth Malaysia Plan (2006-2010), 15 scientific expeditions are being planned under the Forestry Department Peninsular Malaysia.

39. Healthy reefs with flourishing marine life need to be protected for future generations.
Photo: MPS

40. Hauntingly beautiful, pitcher plants are often elaborate and gaudy carnivorous plants with most species found in the island of Borneo.
Photo: WWF-Malaysia / Dionysius Sharma

41. The pitcher plant's tubular shaped leaf is lined with downward pointing hairs which prevent insects from climbing out and escaping. The bottom of the tube contains digestive juices that will consume the preys.
Photo: WWF-Malaysia / Ken Scriven

Identifying Gaps in Protected Area System

Despite some progress in the establishment of protected areas in Sabah, Sarawak and Peninsular Malaysia and the documenting of the biological diversity of protected areas in the last decade, there are still habitats that are under-represented in protected areas, such as limestone hills and coastal dipterocarp forests.

The gazettment of the Belum National Park and the Johor state forest encompassing Sedili Kecil Swamp Forest, for example, helped to provide more comprehensive protection to lowland, ridge and lower montane forests and alluvial swamps. There should be a comprehensive review of the adequacy of the present systems of protected areas for biodiversity conservation in Malaysia.

Financing Conservation

Financial support given for conservation, both in-situ (where the habitat occurs naturally) and ex-situ (species conservation in arboretum, zoos etc.) is not sufficient for the conservation of the total biodiversity in the country. In conservation, there are very few examples of financially self-sufficient parks or protected areas and therefore these organisations require government financing. One of the justifications for governmental support of biodiversity conservation is the potential economic value of plant and animal species which have yet to be discovered. Scientific expenditions and research are carried out to discover new species and their uses.

Besides such economic considerations, biodiversity is a natural heritage that we have a moral responsibility to preserve for the present as well as future generations.

In addition to the allocated government budget, external assistance from the private sector, other governments and international organisations would assist the conservation efforts.

42. View of Penang National Park.
Photo: DWNP

43. Marine conservation education project.
Photo: MPS

Teaching Children about Marine Biodiversity

Bringing together government agencies, private sector and NGOs, the Fisheries Department collaborated with the Ministry of Education to devise an educational kit for schoolchildren on marine biodiversity covering mangroves, seashores, coral reefs, oceans and seas. The kit consists of games and posters of the four habitats. It also includes indoor and on-site activities which make the children think on how they could contribute to conserving these habitats.

Public Education and Community Participation

Involving local communities in biodiversity conservation is often the key to the success or failure of a project. This should start with a programme to raise the awareness of the public as well as policy makers. Raising the standard of public education and awareness through schools, mass media and campaigns should be a priority. This can be achieved with the participation of the media and NGOs. Local communities, particularly indigenous communities have a wealth of local knowledge relating to plants and animals and their uses, in medicine, food and their cultural significance. The public can also act as a supplementary watchdog in aiding conservation efforts.

44 The media plays an important role in conveying environmental information to the public and acts as a watchdog against environmental destruction.
Photo: MNS / Kanitha

45. A view of the Petronas Twin Towers
Photo: Tourism Malaysia

46. The bunga raya or hibiscus, Malaysia's national flower.
Photo: Kevin K. Chan

Conclusion

The challenges of biodiversity conservation in Malaysia are many. In some aspects, Malaysia is fortunate because it is no longer a poor country and does not need to over-exploit its natural resources or harvest its resources unsustainably. The contribution of natural resources and the agricultural sector to the national economy has been important in the country's development. As the manufacturing and services sectors mature and increase their share to the country's economy, it has become less reliant on natural resources.

Globalisation introduces new challenges in terms of development strategies. According to some projections of technological trends, the coming decades will see the rapid development of biotechnology, much like the development of electronics and information technology of the last few decades. Malaysia has stated its intention of being in the forefront of this trend and to reap the benefits of technological utilisation of its biodiversity. Thus there is a need to conserve and sustainably use its biodiversity assets in order to keep options open for future development.

As the country progresses to become a developed nation by 2020, there is a need to define national priorities. The conservation of natural heritage, the improvement of environment, the enhancement of the quality of life would be important goals. The rich biodiversity in Malaysia is a natural heritage that Malaysia will hold in trust for people of the world. It is a responsibility and challenge that Malaysia will meet.

General Reading

Ministry of Science, Technology and the Environment Malaysia (1997) Assessment of Biological Diversity in Malaysia

Ministry of Science, Technology and the Environment Malaysia (1998) National Policy on Biological Diversity

Ministry of Primary Industries Malaysia (2004) Malaysian Rainforests: National Heritage, Our Treasure

Abbreviations

ASEAN	Association of Southeast Asian Nations
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species on Fauna & Flora
COP	Conference of Parties
Danida	Danish International Development Assistance
DWNP	Department of Wildlife and National Parks
FAO	Food and Agricultural Organization
FDPM	Forestry Department Peninsular Malaysia
FRIM	Forest Research Institute of Malaysia
GEF	Global Environment Facility
GMO	Genetically Modified Organism
IBA	Important Bird Area
IUCN	World Conservation Union
LA21	Local Agenda 21
MARDI	Malaysian Agricultural Research and Development Institute
MENGO	Malaysian Environmental NGOs
MNS	Malaysian Nature Society
MOSTE	Ministry of Science, Technology and the Environment
MPS	Marine Parks Section
NPBD	National Policy on Biological Diversity
NGO	Non-Governmental Organisation
NRE	Ministry of Natural Resources and Environment
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
TBCA	Transboundary Conservation Area
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UPM	Universiti Putra Malaysia
VJR	Virgin Jungle Reserve
WWF	World Wide Fund for Nature

Examples of Projects Related to Biodiversity

Sector : Forest and Biodiversity

Projects : Preparation of a Management Plan for the Johor Mangrove Swamp Forests (Johor State Forestry Department)

Sabah Bio-Diversity Conservation Project Management for Conservation and Sustainable Use of Peat Swamps and Associated Water Regimes in Malaysia (Ministry of Primary Industries, now known as Ministry of Natural Resources and Environment)

Implementations of the Obligations under the Ramsar Convention (Tasek Bera) (Pahang State Economic Planning Unit)

Support to Capacity Building Activities on Implementing the Cartagena Protocol on Biosafety (Ministry of Natural Resources and Environment)

Conservation of Biological Diversity through Sustainable Forest Management Practices in Malaysia (targeted research) (Ministry of Natural Resources and Environment and UNDP)

Master Plan and Capacity Building and Strengthening of the Protected Area System of Peninsular Malaysia Wildlife Department (Danida)

Support to Wildlife Master Plan Implementation through Improved Management of Totally Protected Areas, Sarawak Forestry Department (Danida)

National Biodiversity Communications Strategy MOSTE, CEMD (GEF)

Sector : Marine Biodiversity and Marine Parks

Project : Conserving Marine Biodiversity through Enhanced Marine Park Management and Inclusive Sustainable Island Development (Ministry of Natural Resources and Environment and UNDP)

Sector : Wetlands

Project : Conservation and Sustainable Use of Peat Swamp Forests and Associated Wetlands (Ministry of Natural resources and Environment and UNDP)

Peat Swamp management in States of Pahang, Sabah and Sarawak (Danida / GEF)

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URL : http://www.wwfmalaysia.org

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Tel : 603-7804 6770
Fax : 603-7804 6772
URL : http://www.wetlands.org/malaysia

Other useful websites:
Convention on Biodiversity
http://www.biodiv.org

Ramsar Convention
http://www.ramsar.org

CITES
http://www.cites.org

United Nations Environment Programme
http://www.unep.org

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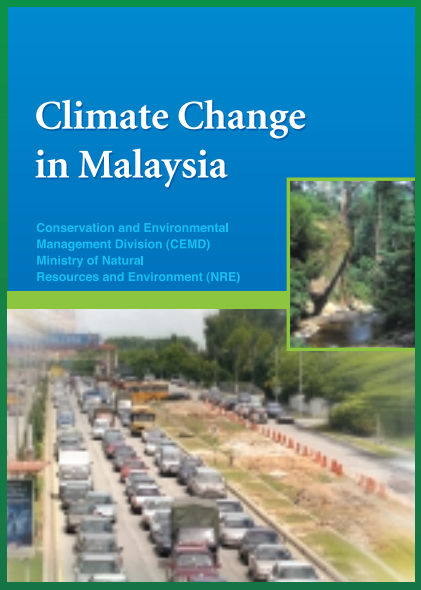

Also available with this booklet is the publication entitled "Biodiversity in Malaysia". This twin publication covers key issues on climate change and the impact on Malaysia. It looks at measures taken to tackle the problems and the challenges that lie ahead.