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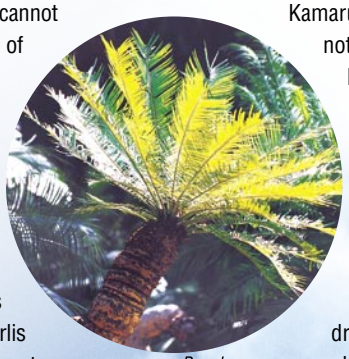
Environmental Conservation, Our Shared Responsibility

BIODIVERSE PERLIS
in all its glory

'Never judge a book by its cover' is a common admonition. But in the case of Perlis, the smallest state in Peninsular Malaysia covering an area of 80,302 hectares, the cover itself has so much to tell!

Arriving in Perlis by land or sea if one travels in through Kuala Perlis, the scenic and picturesque vast landscape of the hills and land paint not only a thousand but beautiful words about the biodiversity in the State. From the famous Perlis mangoes, *harum manis,* to the paddy fields and surrounding limestone hills to the mesmerising Timah Tasoh Dam, the main water catchment area for northern Perlis, and Chuping Hills during different times of the day, one cannot but wonder at the rich biodiversity of this small State.

There are many natural resources available in Perlis namely limestone hills, caves, and forest. The uniqueness of the limestone hill ecosystems and the richness of both the animal and plant species found in the state, notably in the Perlis State Park is undeniable. The ecosystem diversity consists of various *niche* associated with limestone hills, each functioning in tandem thus making it stable. The rich biological resources of Perlis include various species of plants and animals and many endemics or otherwise threatened species which offer economic potential in horticulture, medicinal plant industries, aesthetics, urban forestry, landscaping, ecotourism, etc. The limestone hills and caves provide minerals and materials for construction such as marble which contributes to small or medium industries in the State. The caves not only store immense amounts of underground water but also provide aesthetic value for ecotourism.



Bogak

Of the many caves in Perlis, several are awaiting discovery (Kasim Osman *et al.* 2002; Hymeir Kamarudin 1998). Perlis caves are attractive not only for their tantalizing geomorphological appearance, a result of the process of their formation, the flora and fauna and the web of life associated with it, but also for the related history and culture. In the past, the caves in Perlis have been mined for tin (e.g. Gua Kelam) and guano, the nutrient-rich bat droppings (e.g. Gua Wang Burma). Do you know that Perlis has the longest cave in Peninsular Malaysia? Gua Wang Burma situated in Perlis State Park is also the northern-most cave in Peninsular Malaysia.

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Tectaria shahidaniana G.Rusea (Source: G.Rusea)

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From the desk of the Director-General

Environmental Conservation, Our Shared Responsibility

If there is on Mother Earth a "Parliament of the Environment" accountable to all people of the world on the central issue of our continued existence, how shall we cast our Environmental votes on Election Day? Perhaps it will be useful to first say upfront what our vote cannot influence or do. We cannot vote for a change of planet; a change in human physiology or biochemistry; we cannot vote for more land or oceans, seas and rivers; or vote in new species of flora and fauna; or vote the recomposition of the atmosphere to pristine conditions; or vote that Earth redoubles its efforts to replenish natural resources that we so wantonly consume and destroy. And when we continue reflecting on this matter of casting our vote, each thinking person will slowly and surely realise that like casting our vote, living in the planet is a matter of individual empowerment coupled with environmental consciousness. We all can in some way exercise this wonderful 'power of one' to ensure future generations have a environmentally decent world to live in.

Life on earth and the environment is closely coupled. All life on Earth, through the chemistry of its atmosphere and oceans, the interaction of its fauna and flora and the manifold activities of humans should function effectively as a single self-regulated organism. The inter-related and inter-dependent ecosystems that make up this life supporting environment are living, complex, fragile and delicately balanced. Until the last century, human beings together with other life-forms, by far and large, co-existed in harmony with the planet's natural ecosystems well within its carrying capacity. Today mankind consumes natural resources at a faster rate than Earth can sustain. This has given rise to unprecedented transformations in ecosystems and losses in biodiversity and species extinction. Across the board of the many ecosystems on Earth, this same harsh truth prevails.

For convenience, the Earth's ecosystems can be categorised into five major ones: Agro, Forest, Freshwater, Grassland and Coastal Ecosystems. Each of these systems provide a distinct set of goods and services and are key reserves for life on Earth. Take for example the Coastal Ecosystem. The coastal zone is the intertidal and subtidal areas above the continental shelf to a depth of 200 m and adjacent land area up to 100 km inland from the coast. It contains a variety of habitats: peatswamps, estuaries, mangroves, tidal wetlands, seagrass beds, coral reefs, barriers islands and others. Malaysians are fortunate in that we have almost all of these types of habitats. The land belt 100 km from the coastline represents 22 percent of total world land mass but 40 percent of the world's population lives in this zone. Increasing population and economic development are putting stress on the coastal ecosystem. Besides over fishing and the use of destructive fishing methods, the destructions of nursery habitats and pollution which affects water quality are affecting fish catch from the sea. Clearly, the overall coastal ecosystem's capacity to deliver goods and services is declining while human demand continues to increase. How shall we vote on this issue in the 'Parliament of Environment'?

We can by way of example vote in support of the initiatives of Marine Stewardship Council (MSC) established in 1997. The MSC is an independent non-profit organisation. Its mission is "to safeguard the world's seafood supply by promoting the best environmental choice". It lists a set of Principles and Criteria for sustainable fishing that can be used by accredited third party certifiers to certify fisheries on a voluntary basis. Certification allows the use of the MSC logo or fish products to inform consumers. The principles recognised by the MSC to ensure sustainable fishery are:

- The maintenance and reestablishment of healthy population of targeted species;
- The maintenance of the integrity of the ecosystem;
- The development and maintenance of an effective fisheries management system, taking into account all relevant biological, technological, economic and social, environmental and commercial aspects; and
- Compliance with relevant local and national laws and standards and international understanding and agreements.

Increasingly such individual acts of conscience may be able to achieve much more than countries and governments. Similar trends have emerged with regard to consumer choice and power for products and reserves derived from forest ecosystems. An important sustainability criterion for forest resources is forest management certification. A set of Malaysian Criteria and Indicators (MC & I) at the national level and forest management unit level have been developed. The MC & I is based on the International Tropical Timber Organisation (ITTO)'s "Criteria for Measurement of Sustainable Tropical Forest Management (1992 and revised in 1998). Following consultation and consensus between social, environmental and economic stakeholder groups, the MC & I (2002) is being implemented with effect from early 2005.

Should we not 'vote' for furtherance of such endeavours?

Like in a democracy, every environmental vote counts for much. For unknown to mankind sometime in the 1980s, humanity crossed the sustainability barrier. That is, humanity was drawing from the natural capital of the planet as opposed to living off the interest. A powerful resource management tool called the Ecological Footprint Analysis has gained wide acceptance as a comprehensive tool for measuring the environmental impact of an individual, a city, a country, a region for the whole of humanity. What it does then is measure the ecological pressure humans exert in terms of depletion of resources and biodiversity through their economies and lifestyles. For the environmental voter, this is indeed a powerful tool!

In making sustainability measurable, the Ecological Footprint Analysis helps decision makers and the 'voter' operate the human economy within the Earth's ecological bottom-line of sustainability and therefore better manage our ecological assets. Individuals will be encouraged to take personal and collective actions in support of a world where humanity lives within the carrying capacity of the one and only life-sustaining planet we have access to. Are we ready now to cast our votes?

Dato' Hajah Rosnani Ibarahim
Director-General
Department of Environment, Malaysia

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Mohd. Kamil Yusoff *et al.* (2001) found that the water bodies, especially all the rivers and streams that originate from Perlis State Park, enjoy high quality status (DOE Class I).

During different times of the year, the biodiversity in Perlis can be appreciated on a larger scale. Examples include the Raptor Watch in October where thousands of birds cross the Nakawan Range in Perlis State Park from China and other temperate countries in the north during winter to migrate to Sumatera. In March, the journey is reversed. These events could actually be put in the biological tourism calender of the State. Wintry Perlis can also be witnessed from December to March each year when the country's only semi-deciduous forest located in Perlis sheds its leaves.

Eria ornata Source: G.Rusea

Dusky leaf monkey Source : Perlis State Park

Paphiopedilium niveum (Reichb.f.) Source: G.Rusea

Misai Kucing

Acampe rigida (Buch.- Ham. Ex J.E.Sm.) Source: G.Rusea

In 1999, a scientific expedition comprising participants from various disciplines was organised to the Wang Tangga area to supplement existing biodiversity data (Faridah Hanum *et al.* 2001). This expedition was initiated by the Perlis Forestry Department and Faculty of Forestry, Universiti Putra Malaysia. Among the interesting findings in Perlis was the re-discovey of the threatened *Macaca arctoides* (Stump-tailed Macaque or *berok kentoi*) which was thought to be extinct for several decades. This species also occurs in Thailand but not in other areas in Peninsular Malaysia. Malaysia's last remaining population is found in the Perlis State Park. The archaic cycad, *Cycas clivicola* (*Bogak*), an attraction of the limestones cliffs in Perlis is another beauty from Perlis. Cycads are older than palms but are often mistaken for palms. It is also found in the limestones of Pulau Langkawi, Perak and Satun in South Thailand. There are numerous ornamental species from Perlis with potential, amongst them being the orchids, palms, gingers, begonias, ferns, mosses and many trees. A new species of fern, *Tectaria shahidaniana* G Rusea was discovered recently besides many other new species of flora and fauna (Faridah-Hanum 2002). There are many new records (= recorded for the first time) of flora and fauna from Perlis (Faridah-Hanum *et al.* 2001). 51 species of mosses for example were new records for Perlis and one species, *Pinnatella calcutensis* was a new record for Peninsular Malaysia (Ahmad Damanhuri & Haja Maiden 2001). *Tetrastigma obtectum*, another new record for Malaysia is only known from Perlis. 16 species of cicadas (*riang-riang*) were also new records for Perlis (Zaidi *et al.* 2001a). Five new species of butterfly from the genus Muda are yet to be identified (Zaidi *et al.* 2001b). The limestone hills of Perlis house 22% of Peninsular Malaysia's endemics while 8 are endemic to Perlis (Kiew 1993). The vegetation and flora of the limestone hills are unique because of the adverse conditions prevailing in the limestone habitats. Just imagine – a small water body such as Tasik Meranti in Wang Tangga alone houses at least 56 species of algae (Ahmad Ismail *et al.* 2001)!

Timah Tasok Dam

Perlis State Park

When the nation ratified the Convention on Biological Diversity (CBD) in 1994, Malaysia was quick to adopt the National Policy on Biological Diversity in 1998 as an integral part of sustainable development. The policy consists of 11 principles and 15 strategies to effectively meet the six objectives outlined. The initiative taken by the Forestry Department of Perlis in particular and the commitment of the state government in general to establish Perlis State Park was in direct accordance with meeting at least four of the objectives in the National Policy on Biological Diversity, i.e. to ensure preservation of the unique biological heritage of the nation for the benefit of present and future generations, to maintain and improve environmental stability for proper functioning of ecological systems, to enhance scientific knowledge, education, social, cultural and aesthetic values of biological diversity, and to optimise economic benefits from sustainable utilisation of the components of biological diversity. With the amendment to the National Forestry Act 1984 by adding 'State Park Forest' to the existing 11 classes of forest under the Permanent Forest Estates (PFE) in Section 10(1), Perlis became the first State in Peninsular Malaysia to adopt this class of forest under the Perlis Forestry Department. In the year 2000, the Chief Minister of Perlis, Dato' Seri Shahidan Kassim declared an area of 5000 hectare encompassing the forest reserves at Wang Mu and Mata Ayer as Perlis State Park. This reserve became the 'model' for other newly established state parks in Peninsular Malaysia such as Endau-Rompin State Park, Selangor State Park, Gunong Stong State Park, and Royal Belum State Park, several of which are awaiting gazettement.

Perlis State Park is the first trans-frontier protected area in Peninsular Malaysia, adjoining the Thaleban National Park in Thailand at the Malaysia-Thai border. The Nakawan Range extends into Perlis State Park, making it the longest continuous limestone range in Peninsular Malaysia. The initiatives and commitment of the Perlis State Government with Perlis Forestry

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The Ecological Footprint

Planet Earth – Humanity's only Home

The universe contains about 100 billion galaxies, each with at least 100 billion stars. Our galaxy, the Milky Way, contains the Sun, our star. The Sun is the only star we know with a planet that supports life. Planet Earth has evolved for five billion years into a single, self-regulating system that nurtures and sustains life as we live it today.

Life and the environment are closely linked. Until the last century, human beings, together with all other life-forms, co-existed in harmony with the planet's natural ecosystems, well within its carrying capacity, and Planet Earth was in good health.

Millennium Ecosystem Assessment Report on the Health of Planet Earth

In 2005, more than 1300 scientists from 95 countries working over a period of four years compiled the United Nations Millennium Ecosystem Assessment Report (MA), the largest and most comprehensive international assessment of the planet's ecosystems. The Report found that:

- Approximately 60 percent of the 24 ecosystem services examined are degraded or used unsustainably. These free ecosystem services, ranging from erosion control to climate stabilisation (climate change is one grave symptom), to flood control, have been seriously undermined. They include the provision of food, water, timber, fibre and genetic resources; the regulation of water quality, waste treatment, soil formation, pollution and nutrient cycling; as well as cultural services such as recreation and aesthetic enjoyment.
- The world's people are consuming natural resources at a faster rate than the planet can sustain, and have made a bigger impact on the planet's ecosystems in the past 50 years than at any other time in history.
- This has given rise to unprecedented transformations in ecosystems and losses of biodiversity and species extinction, with serious consequences.

Overall, the Report establishes that human activity is affecting the health of the planet and its ability to sustain future generations - a trend that could significantly worsen over the next 50 years if human society does not alter its course. Rapid technological advances at an awesome pace in the latter half of the twentieth century, together with ever increasing consumerism, have taken their toll.

The MA Report urges significant changes in policies, institutions and practices to mitigate the consequences of ecosystem change. One major step would be to integrate ecosystem management within broader development planning frameworks and to accord value to free ecosystem services that are taken so much for granted.

The Human Ecological Footprint

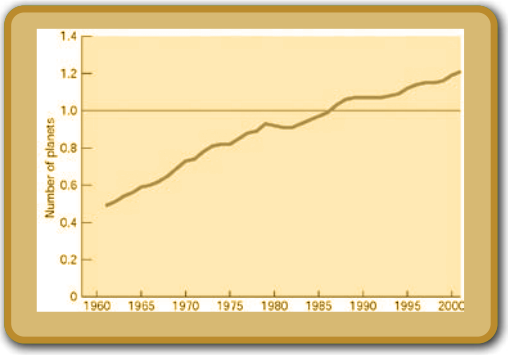
Unknown to mankind, some time in the 1980s, humanity crossed the sustainability barrier. For the first time in the planet's history, humanity was drawing from the natural capital of the planet as opposed to living off its interest. This was not picked up until Ecological Footprinting was conceived in the early 1990s.

Professor William Rees, originator of the Ecological Footprint concept, devised a unique resource management tool that measures the ecological pressure humans exert in terms of depletion of resources and biodiversity through their economies and lifestyles. Together with, Mathis Wackernagel, he co-authored the book, *Our Ecological Footprint: Reducing Human Impact on the Earth* (1996.)

The Ecological Footprint is calculated by analysing aggregate consumption (population x per capita consumption) and converting this to a corresponding land area which is based on the amount of ecologically productive land and water ecosystems available per person on Earth. This demand on nature changes with the amount of biologically productive area and its average productivity.

Since its introduction in the 1990s, this approach has won wide acceptance as a comprehensive tool for measuring the environmental impact of an individual, a city, a country, a region, or the whole of humanity.

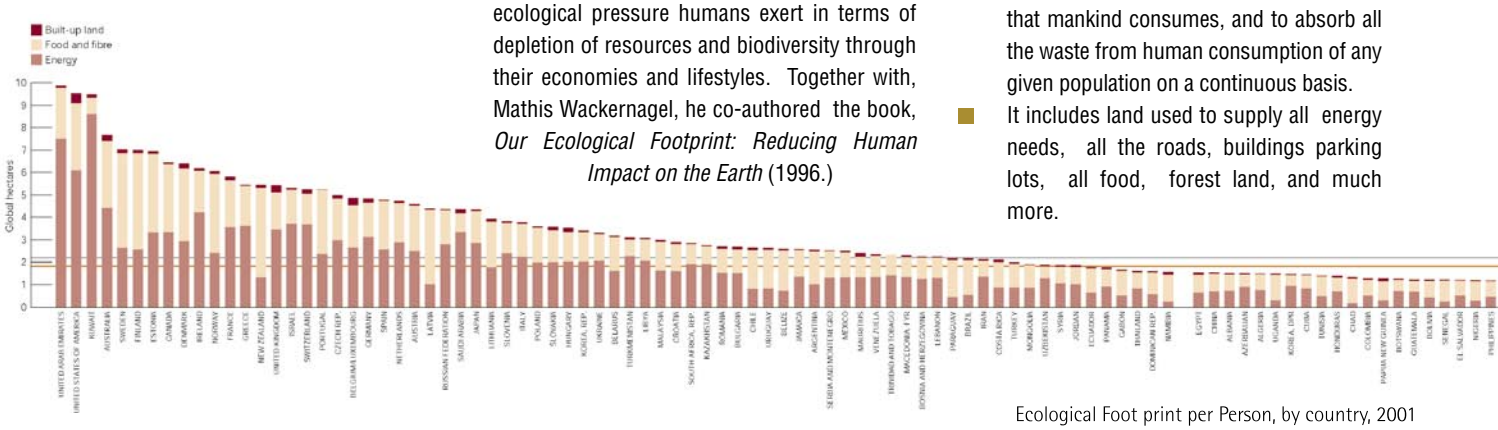
Humanity's Ecological Footprint, 1961-2001



What is the Ecological Footprint Analysis

The Ecological Footprint Analysis makes sustainability measurable. How does it do this?

- It is a tool that measures how much land and water area is required to produce all that mankind consumes, and to absorb all the waste from human consumption of any given population on a continuous basis.
- It includes land used to supply all energy needs, all the roads, buildings parking lots, all food, forest land, and much more.



Ecological Foot print per Person, by country, 2001

- It takes into account resources and ecological services consumed by people regardless of where they are located on the planet. The ecosystems that support wealthy urban consumer lifestyles may actually be located in other countries half a world away.
- It measures not only the natural resources people consume but also nature's ability to regenerate and renew these resources.
- It shows to what extent mankind dominates the biosphere at the expense of other species' critical needs.

The Ecological Footprint Analysis helps decision-makers operate the human economy within the Earth's ecological bottom-line of sustainability and therefore manage ecological assets more prudently. Individuals will be encouraged to take personal and collective action in support of a world where humanity lives within the carrying capacity of the one and only life-sustaining planet Earth.

Shrinking the Footprint through Natural Resource Accounting

Keeping track of the compound effect of humanity's consumption of natural resources and generation of waste is now possible and is one key to achieving sustainability. As long as our governments and business leaders do not know how much of nature's capacity we use, or how our resource use compares to existing stocks, overshoot goes undetected, increasing the ecological deficit and reducing nature's capacity to meet human and other species' needs.

Continued overshoot need not be inevitable. The Ecological Footprint Analysis provides a systematic resource accounting tool that can track resource and waste flows along with the amount and type of biologically productive areas needed to maintain them.

Footprinting is crucial as it gives a snapshot of human impact at a global, national, regional and personal level. Government officials can use the footprint as a tool to guide the nation / community towards a smaller footprint. It will support countries in finding ways to operate within planetary limits, and make the reality of planetary limits central to decision makers. It also helps individuals, organisations, and institutions frame policies, seek targets and track progress towards a world in which all may live within the carrying capacity of our one planet.

Adopting the Ecological Footprint

The Ecological Footprint methodology, still relatively new, has matured considerably over the past twenty years. Development and standardisation of this accounting method is currently coordinated by Global Footprint Network, founded in 2003, (Executive Director: Mathis Wackernagel), and its 50 partner organisations. The latest information on this can be accessed from Global Footprint's website at www.footprintnetwork.org.

Growing numbers of government agencies, organisations and communities are adopting the Ecological Footprint as a core indicator of sustainable resource use. Finland is the first nation to announce the adoption of the Ecological Footprint as an official standard for measuring sustainability.

The Challenges and Goals: Ecological Sustainability

To survive, humanity depends on the planet's ecological assets. The economy is embedded in the ecosphere and human life is dependent on the maintenance of ecological life support. Any depletion of ecosystems systemically undermines the well being of the planet and hence its people. In a sustainable world, society's demand on nature is in balance with nature's capacity to meet that demand.

Nature has been greatly undervalued, yet it is natural ecosystems and resources that sustain human life. Ecological wealth needs to be monitored in the same way as economic wealth.

The evidence is indisputable that humanity is living beyond the planet's ecological capacity to support a continually growing global economy while absorbing its enormous quantities of waste. The constraints of the planet's carrying capacity can no longer be ignored. This information must be widely disseminated with urgency so that every individual, community, city and nation may address this disturbing reality, if this generation is to leave a future for the world.

Footprint of Nations

The footprint of the United States of America is 9.5 global hectares whereas in Bangladesh it is 0.6 hectares. Malaysia's footprint is 3.0 global hectares, already needing more than one and a half planets if the rest of the world was to live as Malaysians.

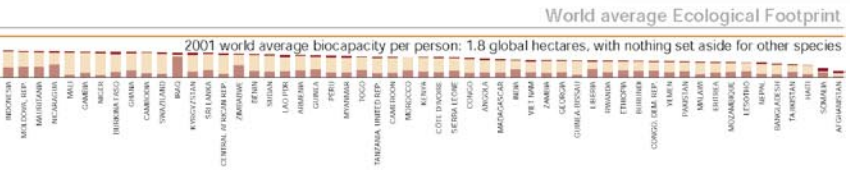
Where a nation's footprint is larger than its biocapacity, its economy is consuming more forests, cropland, and other resources than the country can supply and is overtaxing the domestic environment's capacity to absorb wastes.

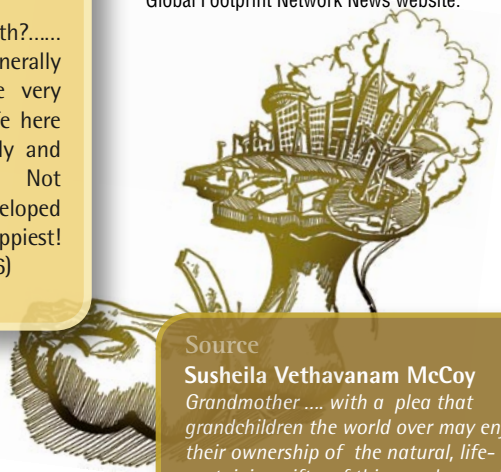
Footprint of Cities

A large part of the planet's resources are spent in and on cities. The way cities are built determines how much energy and resources are required to keep the city functioning. A lot of it is organised through local planning which provides the opportunity for a move to more sustainable cities. The Ecological Footprint Analysis of Greater London, released in 2002, is the first such analysis of a major world city (see page 15 for details).

The Happiest Country on Earth

The Happiest Country on Earth?..... ....VANUATU – "People are generally happy here because they are very satisfied with very little.....Life here is about community and family and goodwill to other people....." Not surprisingly, the most developed countries were not the happiest! (Ref : *New Straits Times*, 13/7/06)





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WWF World Wide Fund for Nature. Living Planet Report 2004.

Global Footprint Network News website.

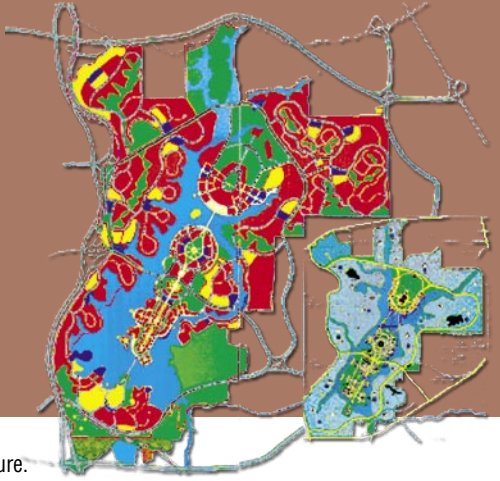
Source

Susheila Vethavanam McCoy

Grandmother .... with a plea that grandchildren the world over may enjoy their ownership of the natural, life-sustaining gifts of this wondrous planet

Email: smccoy@pd.jaring.my

Sustainable Land Use



Land, particularly the more productive classes of land, is finite in nature. But human needs for land are many and varied. Thus, the approach to land allocation that will satisfy these needs in the best and most equitable way must consider land in relation to all needs. Land is required for the production of food, fibre, fuel, timber, for settlement, for recreation, for extraction of minerals, for water catchments, and for a wide range of ecological purposes. The way land is used affects all aspects of life, in particular the standards of living, health, economic, social and political stability.

Due to an increase in population, land is forced to meet new accelerating demands but together with it comes new conflicts, between competing use of land and the interest of individual land owners. Classic symptoms of land use problems are migration to towns, low rural income, lack of employment opportunities, poor health and nutrition, inadequate subsistence production, shortage of fuel and timber, shortage of grazing land, low crop yields, desertion of farmland, encroachment on forest and wildlife reserves, conflicting farming practices, livestock and non-agricultural uses, and visible land degradation.

What is Land Use Planning?

Land Use Planning (LUP) aims to make the best use of limited resources by:

- Assessing present and future needs and systematically evaluating the land's ability to supply them;
- Identifying and resolving conflicts between competitive uses, individual and community needs, and needs between the present and future generation;
- Seeking sustainable options and choosing those that best meet identified needs;
- Planning to bring about desired changes; and
- Learning from experiences.

Hence, LUP is the systematic assessment of land and water potential, alternatives for land use and socio-economic conditions in order to adopt the best land use option.

Evidently, land itself is the focus of LUP. Therefore, good information about land resources is essential to LUP. LUP is not sectoral by nature. Even when planning for an individual sector is undertaken, strategic planning and the framework is established at the National level and the details of projects are deliberated at local level. LUP exercise can be applied at three broad levels: National, District and Local. At each level, there is need for land use strategy, policies that indicate planning priorities, projects aimed to tackle these priorities and operational planning (to execute).

Given the fact that LUP is an exercise that involves many groups of people working towards a common goal, the role of land users' decision makers and the planning team is foreseeable. Achieving public participation in planning is a challenge. The public must believe in the plan's potential benefits as well as in the fairness of the planning process.

Land and Land Use Policy Development in Malaysia.

Malaysia's experience in land use has been wide-ranging as it moves from an agriculture-based economy to an industrialising country. The New Economic Policy (NEP) was formulated in the aftermath of the 13 May1969 riots with two primary objectives, which were to be achieved within the Outline Perspective Plan Period (OPP)(1971-1990):

1. Reducing and eventually eradicating poverty by raising income levels and increasing employment opportunities for all Malaysians irrespective of race.
2. Accelerating the process of restructuring Malaysian society to correct the economic imbalance so as to reduce and eventually eliminate the identification of race with economic function.

The NEP thus shaped some of the important parameters for the formulation of land policy and land planning to cater for the two goals mentioned above.

At the end of the OPP period in 1990, the Government formulated the Outline Perspective Plan Two (OPP2) which embodied the National Development Policy (NDP) and set broad objectives, strategies and targets that guided Malaysia through the decade. The NDP aimed to attain balanced development to create a more united and just society. It emphasised growth with equity to enable all Malaysians to participate in the mainstream of economic activity, building on the enduring thrust of the NEP in eradicating poverty and restructuring society. (Government of Malaysia, 1991).

Both the NEP and NDP in essence have provided the framework for national development to take place. A substantial part of this national development has inevitably been in the form of physical development on land. Thus it can be seen that the success of these national development policies and strategies depended largely on complementary land legislation, land policy and a physical planning framework.

Land Policy

The National Land Code (1965) came into effect in January 1966. The Code provides a practical land administration system in the country. With reference to the planning requirements for development, the National Land Code (1965) provides guidelines on the procedures for planning applications. Although the NLC '65 has embodied a practical way to administer land for development purposes, it is faced with implementation and integration problems.

The biggest challenge in the implementation of the NLC '65 is the various State Land Rules. They differ from state to state and have significant effect on urban and rural land policy. Land is a state matter (Article 74 of the Malaysian Constitution) and each state has complete control over the use of its land. The States of Sabah and Sarawak have their individual land policy and planning instruments distinct from those that prevail in Peninsular Malaysia.

On 1 October 2002, a National Land Convention was held in Kuala Lumpur to initiate the formulation of a National Land Policy. The main objective of the policy is to ensure that land needed for urban and regional development is available in the needed quantities, at the appropriate locations, for the appropriate tenure and at the right time. In other words,

the policy is centered on sustainable land resource development, which will be the focal point of our land administration. The land use policy is envisaged to begin at the point when state government alienates a piece of land and issuance of land title takes place. As of now (2006), this policy is still at the proposal stage and is yet to take full form.

Planning Instrument

In 1976, two pieces of legislation were enacted to overcome the deficiencies of land use planning for Malaysia. The Town and Country Planning Act (1976) empowered the local planning authority to consider planning applications for the purpose of land development. Under this Act, Section 18 stipulates that land development may be controlled and initiated through the formulation and identification of a 'structure plan' and a 'local plan'. The structure plans are the general proposals of the local planning authority for development and the use of the land and are normally prepared by the Federal Town and Country Planning Department and put up for the adoption of the various States. However, changes often made by the States create uncertainties in planning, and give rise to cause for concern to land developers (Usilappan, 1994). The local plan can take the form of a zoning, density or layout plan of varying details indicating exactly what a landowner can or cannot do with his land.

The implementation idea of the Town and Country Planning Act 1976 (Act 172) to have a comprehensive structure plan and local plan for the whole country proved difficult because the act is an adoptive act leaving freedom to the state to adopt fully or partially any part of the act for implementation. It stipulates that every local authority shall be the local planning authority. This gave the local authorities the primary physical planning responsibility at a local level to the local governments via the local Government Act 1976.

In April 2005, Department of Town and Country Planning launched a book on National Physical Plan (NPP). As part of the Development strategy, the NPP's emphasises re-examination of the sectoral distribution of land use to ensure optimal use of land. To assist local planning, land is categorised according to their agricultural importance to the country, productivity and environmental sensitivity. It is then ranked to enable the determination of land for immediate temporary conversion to other uses or long term conservation.

The National Physical Plan (NPP) is intended to provide the framework for physical planning and fill the gap in the existing national development planning that is believed to have permitted the states and local authorities to be uncoordinated and unguided in their interpretation of their share in the national objectives.

Thus the function of the NPP incorporates:

i. Strengthening national planning by providing a spatial dimension to national economic policies;
ii. Coordinating sectoral agencies by providing the spatial expression to sectoral policies;
iii. Providing the framework for regional, state and local planning;
iv. Providing physical planning policies.

(NPP 2005)

In support of the objectives of NPP, the following plan principles are to be adhered to the NPP:-

P1: Develop the country as a single integrated unit;
P2: Promote areas of greatest growth potential;
P3: Maximise the use of the existing & committed infrastructure;
P4: Protect national heritage areas and locations;
P5: Encourage the development of regions based on their potential;
P6: Favor public transport over private vehicle use for inter-urban and intra-city movement;
P7: Strive towards compact urban forms with clear identity;
P8: Avoid disrupting ecological stability;
P9: Facilitate the development of the K-Economy; and
P10: Strengthen urban and rural linkages.

(NPP 2005)

In relation to the NPP's development strategies, the NPP is articulated as an asset of 36 policies. The primary concern of the NPP is to ensure that Malaysia is globally competitive for investments in manufacturing and services, in particularly in the sub-sectors of electronics, knowledge and communications technology, biotechnology, education, health tourism and related sectors. Simultaneously, it shall promote and support the development of resource-based, agriculture-based and craft and culture-based industries and services (NPP 2005).

The plan identifies the Federal and State Agencies responsible for planning, development and financial allocations as well as local agencies responsible for development control and land administration as the main users of NPP.

Conclusion

Ideally, land and land use policies should not be solely politically motivated. It should be on the basis of environmental consideration. Land use should be judicious and land policies imposed should be standardised, as well as dynamic. Established land related policies such as the National Forestry Policy, National Agriculture Policy, National Mineral Policy, and National Water Policy must be incorporated into our impending National Land Policy.

A Land Use Plan must not only appear comprehensive on paper but it must be viable for implementation. Creating consensus in support of development proposals is a critical aspect in implementing land use policy because apart from being a technical, efficiency-oriented exercise, planning is indirectly a political exercise.

A recently published article in *The News Strait Times*, 4 August 2006 quoted the Parliamentary Secretary of the Natural Resources and Environment Ministry, Sazmi Miah as saying the "National land policy would be the guideline for state governments in land administration and management covering various aspects including environmental conservation. The policy currently at proposal stage would see the country's land development being carried out in a holistic manner. The policy would also clarify integrated land development that involved central and state governments as well as relevant ministries".

It is hoped that the sincere efforts undertaken by the government with the formulation of the National Physical Plan and the imminent National Land Policy, will provide a general guide for development processes in Malaysia especially in terms of land use planning. The collectivity of these policies for decision-making will result in sustainable land use decisions.

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Sustaining Our Forests

Sustainability of forest implies that the invaluable forest resources have to be managed to ensure a continuous flow of goods and services in perpetuity for the benefit of human kind, that is, to satisfy the needs of current and future generations. Basic to this concern is the need to preserve the forest ecosystem and the environment.

To promote the implementation of sustainable forest management, the International Tropical Timber Organization (ITTO) has published the "Guidelines for the Sustainable Management of Natural Tropical Forest (1991 and updated in 1994) and "Criteria for Measurement of Sustainable Tropical Forest Management" (1992 and revised in 1998). The guidelines form the basis for the producer countries in the Southeast Asian region to develop their "Criteria and Indicators" for sustainable forest management. The development of sustainable forest management is still evolving with new findings being considered to improve the management prescription.

Forest Areas

The forested area in Peninsular Malaysia is divided into four major forest types, namely the Inland Dipterocarp Forest, Mangrove Swamp Forest, Peat Swamp Forest and Plantation Forest (Table 1). The management guidelines for the respective forest types depend on the stand stocking, size structures, and species composition. Malaysia had a total of 17.13 million ha of forested land in the year 2002.

The forested areas covered 19.54 million ha in 2002, or 60 percent of the total land area in the country. Production forests that are managed based on a sustainable basis cover 10.96 million ha, or 33 percent of the total land area. In Peninsular Malaysia, the production forest, mainly found in inland and classified as inland mixed dipterocarp forest, covers approximately 8.5 percent of the total land area (Table2).

Table 1: Distribution and extent of major forest types in Malaysia (million ha)

Region	Mixed Dipterocarp Forest	Swamp Forest	Mangrove Forest	Plantation Forest	Total Forested Land	Total Land Area	Percentage of Land Area under Forest
Peninsular Malaysia	5.40	0.30	0.11	0.08	5.89	13.16	44.8
Sabah	3.81	0.12	0.34	0.14	4.41	7.37	59.8
Sarawak	7.92	1.12	0.15	0.05	9.24	12.30	75.1
Malaysia	17.13	1.54	0.60	0.27	19.54	32.83	59.5

Figure is based on 2002 statistics for Peninsular Malaysia, Sabah and Sarawak

(Source: Anon 2004)

Forest Policy and Legislation

The National Forest Policy 1978 is the main guiding document for sustainable forest management in Malaysia. Some modifications have been made to the forest policy in 1992 due to concerns by the world community on the importance of biological diversity conservation and sustainable utilisation of forest genetic resources, as well as the role of local communities in forest development. The revised policy reflects these important aspects of forestry. Malaysia has also ratified several internationally-agreed conventions which include the 'Convention on Biological Diversity' (CBD), 'Convention on International Trade in Endangered Species of Wild Fauna and Flora' (CITES) and the 'Ramsar Convention on Wetlands' (Anon, 2004).

Managing Forest Resources

Forest resources can be grouped into timber and non-timber resources. As the timber resources consider a single forest produce, the non-timber resources include goods and services provided by the forest ecosystem other than timber.

Mixed Dipterocarp Forest

Forest management practices have been in operation since the early 1900s. Several silvicultural practices have been introduced to manage the inland dipterocarp forest. Harvest was initially very selective in the early days of forestry in Malaysia, and focused on felling of gutta percha (*Palaquium gutta*), as well as durable hardwoods like Chengal (*Neobalanocarpus heimii*). By 1948, the Malayan Uniform System (MUS) was employed. The system converted primary tropical lowland forest to even-aged stands containing a greater proportion of the commercial light red meranti timbers. Currently, the inland dipterocarp forest is managed under two management systems, namely Modified Malayan Uniform System (MMUS) and the Selective Management System (SMS). The MMUS entails removing of all crop trees greater than 45 cm diameter at breast height (dbh) in one single felling, while the SMS provides an option for selecting optimum management regimes based on pre-felling forest inventory data (Thang, 2002).

Under the SMS, a minimum cutting limit of 50 and 45 cm dbh are set for dipterocarps and non-dipterocarp trees, except for Chengal, set at minimum cutting limits of 60 cm dbh. Chengal is the most valuable timber as it is a heavy hardwood generally used as structural timber. A difference of at least 5 cm dbh was set for dipterocarps and non-dipterocarps to conserve a higher proportion of dipterocarps for the next cut. A prerequisite of the system is the 10 percent systematic line plot sampling before felling to determine stocking as a basis to decide the cutting regime. Tree marking of all trees earmarked for felling is carried out. The system requires 32 trees per hectare of between 30-45 cm or its equivalent be left behind as residual trees and the proportion of residual dipterocarps, 30 cm dbh and above, must be equal or higher than before felling (Thang 1997; Shaharudin 1997). A recently imposed measure is the maximum allowable harvest both for primary forest and regulated forest. This move will reduce the potential damage to residual stands particularly in timber rich forests and thus support the sustainable supply of timber for future cuts.

Peat Swamp Forest

The harvesting regime for the Peat Swamp Forest is managed under the "modified" SMS where higher cutting limits are prescribed due to a lower stocking of natural regeneration stand. Currently research is being taken by the UNDP/GEF project

Table 2: Distribution and extent of protected and production forest in Malaysia (million ha)

Region	Production Forest	Total *Protected Areas	Total Land Area	Percentage of Land Area as Production Forest
Peninsular Malaysia	2.80	5.36	13.16	21.3
Sabah	3.00	3.87	7.37	40.7
Sarawak	5.16	7.16	12.30	42.0
Malaysia	10.96	16.39	32.83	33.4

*Total protected areas include the protection forest under permanent forest reserve, Wildlife sanctuary, National park and State park. Figure is based on 2002 statistics for Peninsular Malaysia, Sabah and Sarawak. (Source: Modified from Anon (2004)

on Conservation and Sustainable Use of Tropical Peat Swamp Forest and Associated Wetland ecosystems. The Peat Swamp Forest is a delicate and complex forest ecosystem. Any disturbance due to removal of vegetation cover during harvesting has to consider the effects on its water regime. A sufficient quantity of water will ensure that plant materials continue to remain as peat. An increase in water loss will result in the decay of these plant materials. (Pahang Forestry Department 2005). The Forest Research Institute of Malaysia (FRIM) in collaboration with Forestry Department Peninsular Malaysia is conducting research on an appropriate harvesting regime for mixed peat swamp forest.

Mangrove forest

The mangrove forest is managed on a clear cutting system at varying cutting cycles of 20-50 years. Mature trees are felled with retention of several mother trees, and a three-meter wide river bank and coastal strip to ensure adequate regeneration and protection of the environment. The Matang mangrove forest is an exemplary example of long-term sustainable forest management. Matang mangrove is the single largest mangrove forest in Peninsular Malaysia covering more than 40,000 hectares of a continuous belt of trees within 19 forest reserves. Matang mangrove has been sustainably managed for almost 100 years, and still provides forest resources such as poles and charcoal for local consumption as well as export. It also provides a healthy ecosystem that preserves important fishery breeding grounds.

Managing non-timber resources (Natural forest)

The forest ecosystem is an important source of non-timber resources, providing food sources, medicinal plants, sandalwood, potential areas for eco-tourism areas and recreation, and supporting favorable conditions for preserving the environment.

The management of non-timber resources is an important activity under sustainable forest management to ensure sustainable utilisation of the resources to meet current and future generations. A study by Mohd. Azmi *et al.* (2002) estimated the average economic value of the non-timber resources to be RM1.011.61 per hectare. Bamboo contributes the highest value of RM 471 per hectare. The estimated realised economic value of non-timber resources by the local communities was RM210,717 per year. Among the non-timber resources, gaharu or sandalwood remains the most sought after product from the forest. Bamboo showed the lowest realised economic value due to low marketability although it supports the highest stock value.

The management of non-timber resources under sustainable forest management is crucial. Besides timber production, the forest is an important source of goods and services particularly for the local communities. The integration of the non-timber resources into sustainable forest management requires comprehensive resource planning. In the 4th National Forest Inventory of Peninsular Malaysia, non-timber resources are also recorded in the inventory, thus allowing for resource estimation at regional level.

Forest Management Certification

An important sustainability criterion for forest resources is forest management certification. A set of Malaysian Criteria and Indicators (MC&I) for Sustainable Forest Management (SFM) at the national level and forest management unit level has been developed for Malaysia. The MC&I is based on the International Tropical Timber Organization (ITTO)'s Criteria for Measurement of Sustainable Tropical Forest Management (1992 and revised in 1998). An independent non-profit organization, that is, Malaysian Timber Certification Council (MTCC) was established to plan and operate a voluntary national timber certification scheme to provide a means of verifying that timber products have been sourced from sustainably management forests. The MTCC scheme, which began in 2001, is being implemented using a phased approach (Anon 2004).

As part of the MTCC-FSC (Forest Stewardship Council) cooperation, a multi-stakeholder National Steering Committee (NSC), formed in April 2001 has developed the Malaysian Criteria and Indicators for Forest Management [known as the MC&I(2002) in short] using the FSC Principles and Criteria as the template. Consultation and consensus between social, environmental and economic stakeholder groups through several meetings of the NSC were held in Peninsular Malaysia, Sabah and Sarawak to identify appropriate regional verifiers. The MC&I(2002) is being implemented with effect from the beginning of 2005 (MTCC, 2005).

Conclusions

Sustainability of forest resources will remain an important agenda in international discussion. It therefore requires commitment from various sectors to achieve it. Sustainable forest management is not without cost. Continuous support and commitment from various sectors at national, regional and international levels including government institutions, private sector and the non-governmental organisations is needed to ensure that the forest will be managed on a sustainable manner for the benefit of future generations.

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Fisheries Conservation

One of the outcomes of the US NASA Space Program is the picture of the earth shot from space (Figure 1). It shows the whole earth as a big blue marble against the darkness of space and has been described as a spaceship hurtling through space (Boulding 1965).

This picture represents a change in how man views the earth. For thousands of years man has viewed the earth as an open system, with limitless resources and room for waste. When the world's population was small and technology limited, this view had little consequence on the environment. However, with the increase in population and the accelerating pace of technological development, the earth's capacity to supply inputs or services is under severe stress.

It is very clear now that man is living a symbiotic existence within an ecological system comprising interdependent plants, animals and microorganisms. Man is sustained by the ecosystem but it is increasingly obvious that the health of the ecosystem depends on man taking good care of it. This system view of the earth is a necessary prerequisite for the sustainability of the environment.

People and Ecosystems

In 2000 The World Resources Institute issued a special report entitled *World Resources 2000-2001: People and Ecosystems: The Fraying Web of Life.* The goals of the report are to look at the condition of the earth's ecosystem and to promote the ecosystem-oriented approach to managing the environment,

The Condition of the Earth's Ecosystems

The report is based on the 1999 study called 'Pilot Analysis of Global Ecosystems' (PAGE). The study looks at five major ecosystems: Agro, Forest, Freshwater, Grassland, and Coastal Ecosystem. Marine fisheries is within the Coastal Ecosystem.

The coastal zone is the intertidal and subtidal areas above the continental shelf to a depth of 200 m and adjacent land area up to 100 km inland from the coast. It contains a variety of habitats: peatswamps, estuaries, mangroves, tidal wetlands, seagrass beds, coral reefs, barrier islands, and others. Each habitat provides a distinct set of goods and services (Box 1).

The land belt 100 km from the coastline (estimated at 1.6 million km) represents 22 percent of total land mass but 40 percent of the world's population lives in this area. Increasing population and economic development are putting stresses on the coastal ecosystem. Besides overfishing and the use of destructive fishing methods, the destruction of nursery habitats and pollution which affects water quality are affecting fish catch from the sea.

In general, the report concludes that the coastal ecosystems are experiencing decreasing capacities to provide goods and services. In terms of food production, the growth in global marine fish production has declined to 0.6 percent for the mid-90s from 6 percent in the 50s and 60s. The conclusion for water quality is mixed. Biodiversity has declined as indicated by habitat loss, incidence of coral bleaching and threatened levels of certain fish species. The global effects of tourism and recreation are unknown although some areas have been degraded by tourism activities. The shoreline protection function has decreased – the recent tsunami experience is a grim reminder for Southeast Asia.

The Ecosystem Approach

While the overall ecosystem's capacity to deliver goods and services is declining, human demand continues to increase. New management approaches are clearly needed. The ecosystem approach is slowly gaining recognition. Box 2 shows the original list as adopted at the '2000 Convention on Biological Diversity'. The basic concepts of the ecosystem approach are:

- An ecosystem approach is an integrated approach. Currently, we tend to manage ecosystems for one dominant good or service such as fish, timber, or hydropower without fully realising the tradeoffs we are making. In doing so, we may be sacrificing goods or services more valuable than those we receive – often those goods and services that are not yet valued in the marketplace such as biodiversity and flood control. An ecosystem approach considers the entire range of possible goods and services and attempts to optimise the mix of benefits for a given ecosystem. Its purpose is to make tradeoffs efficient, transparent, and sustainable.

- An ecosystem approach reorients the boundaries that traditionally have defined our management of ecosystems. It emphasises a systemic approach, recognising that ecosystems function as whole entities and need to be managed as such, not in pieces. Thus it looks beyond traditional jurisdictional boundaries, since ecosystems often cross state and national boundaries.

- An ecosystem approach takes the long view. It respects ecosystem processes at the micro level, but sees them in the larger frame of landscapes and decades, working across a variety of scales and time dimensions.

- An ecosystem approach includes people. It integrates social and economic information with environmental information about the ecosystem. It thus explicitly links human needs to the biological capacity of ecosystems to fulfill those needs. Although

Box 1: Primary Goods and Services Provided by the Coastal Ecosystem

Goods	Services
• Fish and shellfish • Fishmeal (animal feed) • Seaweeds (for food and industrial use) • Salt • Genetic resources	• Moderate storm impacts (mangroves; barrier islands) • Provide wildlife (marine and terrestrial) habitat • Maintain biodiversity • Dilute and treat wastes • Provide harbours and transportation routes • Provide human and wildlife habitat • Provide employment • Contribute aesthetic beauty and provide recreation

Source: A Guide to World Resources 2000-2001

it is attentive to ecosystem processes and biological thresholds, it acknowledges an appropriate place for human modification of ecosystems.

- An ecosystem approach maintains the productive potential of ecosystems. An ecosystem approach is not focused on production alone. It views production of goods and services as the natural product of a healthy ecosystem, not as an end in itself. Within this approach, management is not successful unless it preserves or increases the capacity of an ecosystem to produce the desired benefits in the future.

Fishery Management and Conservation

To be effective, management needs a set of rules or guidelines. Since fisheries stocks can straddle between nations and international trade in fisheries products is important, legal guidelines for fisheries have been developed.

The United Nations Convention on the Law of the Sea (UNCLOS)

The UN International Law Commission began working on codifying laws relating to the ocean in 1949. After a series of conventions - UNCLOS I (1958), UNCLOS II (1960) - UNCLOS III (1973 – 1982) established the maritime zones – the territorial sea, the contiguous zone, the exclusive economic zone, the continental shelf, the high sea, the international sea-bed area and archipelagic waters. Provisions for the passage of ships, protection of marine environment, freedom of scientific research and exploitation of resources were also spelt out. It came into force on 14 November 1994. It should be pointed out that Articles 61.2 and 119.1 promote the goal of sustainable fisheries

The United Nations Fish Stocks Agreement 1995

The Agreement implements the provisions of UNCLOS III relating to straddling and highly migratory fish stocks. Some of its provisions, especially those concerning the application of the precautionary principle and the ecosystem approach to fisheries may be applied to the conservation and management of all marine capture fisheries. It came into force in December 2001.

FAO Code of Conduct for Responsible Fisheries (CCRF)

This voluntary framework combines the provisions of the 1982 Convention, the 1995 Fish Stocks Agreement and the Convention on Biological Diversity (Rio Conference), particularly Agenda 21. Within its 12 articles, the CCRF provides "the principles and standards applicable to the conservation, management and development of all fisheries" which covers the "capture, processing and trade of fish and fishery products, fishing operations, aquaculture, fisheries research and the integration of fisheries into coastal area management" (Article 1.3).

Box 2 The Marine Stewardship Council (MSC)

Established in 1997, The MSC is an independent nonprofit organisation with offices in London, Seattle and Sydney. Its mission is "To safeguard the world's seafood supply by promoting the best environmental choice". It lists a set of Principles and Criteria for sustainable fishing that can be used by accredited independent third party certifiers to certify fisheries on a voluntary basis. Certification enables the use the MSC logo on fish products to inform consumers.

The Principles recognise that a sustainable fishery should be based on:

- The maintenance and re-establishment of healthy populations of targeted species;
- The maintenance of the integrity of ecosystems;
- The development and maintenance of effective fisheries management systems, taking into account all relevant biological, technological, economic, social, environmental and commercial aspects; and
- Compliance with relevant local and national local laws and standards and international understandings and agreements.

At the end of 2005, 14 fisheries have been certified and more than 300 seafood products have been affixed with the MSC blue ecolabel.

Source: http://www.msc.org (Accessed 6 Aug 2006)

Ecosystem Approach to Fisheries (EAF)

Since the passage of the CCRF, the ecosystem approach to the management of natural resources is becoming more widespread. The 'Reykjavik Conference on Responsible Fisheries in the Marine Ecosystem' (October 2001) addressed the issue of introducing more ecosystem considerations into fisheries management. The '2002 World Summit on Sustainable Development' and the development of ecolabelling in fisheries by the Marine Stewardship Council provide further pressure for the adoption of the ecosystem approach (Box 2).

Even though it contains all elements of the ecosystem approach, the term was not specifically used in the CCRF. To supplement the CCRF, the FAO issued in 2003 a set of guidelines for the adoption of the ecosystem approach to fisheries (EAF) (FAO Fisheries Department 2003). Taking into account that fisheries can impact the structure, biodiversity and productivity of marine ecosystems and that the stocks should not be below their level of maximum productivity, the EAF principles state that:

(1) Fisheries should be managed to limit their impact on the ecosystem to the extent possible;
(2) Ecological relationships between harvested, dependent and associated species should be maintained;
(3) Management measures should be compatible across the entire distribution of the resource (across jurisdictions and management plans);
(4) The precautionary approach should be applied because the knowledge on ecosystems is incomplete; and
(5) Governance should ensure both human and ecosystem well-being and equity.

To make these principles operational, however, they need to be translated into policy goals and then to operational objectives (Garcia *et al.* 2003). There are many issues involved in making EAF operational, especially for developing countries, but they lie outside the scope of this short note.

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Is the World Running out of Fossil Fuels? Does it Matter?

> "The fifth revolution will come when we have spent the stores of coal and oil that have been accumulating in the earth during hundreds of millions of years. … It is to be hoped that before that, other sources of energy will have been developed, … but without considering the detail [here] it is obvious that there will be a very great difference in ways of life. … Whether a convenient substitute for the present fuels is found or not, there can be no doubt that there will have to be a great change in ways of life. This change may justly be called a revolution, but it differs from all the preceding ones in that there is no likelihood of its leading to increases of population, but even perhaps to the reverse." (Darwin, 1953)

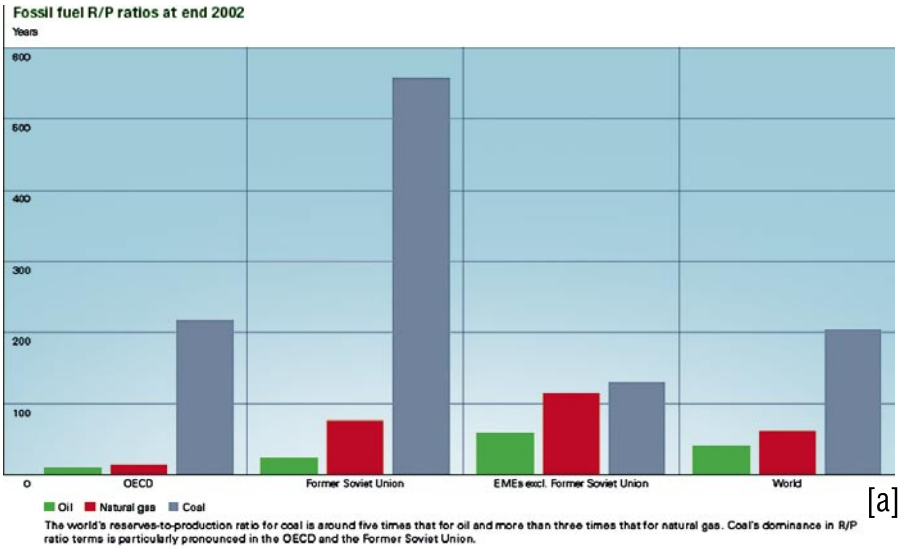
Fossil fuels are defined as a non-renewable primary source of energy. By definition alone, the world will run out of fossil fuels. The question is 'when, under what circumstances, and are we prepared'?

Fossil fuels had an important part to play in the development of mankind. Reviewing clear recorded history of almost 2000 years, fossil fuels coincide with the pinnacle of human achievement and development, "The Industrial Age". The impacts of this age which started in the early 1900s are enormous. One just has to think of life 170 years ago. Imagine life without petroleum, coal, gas and its associated 70,000 products. To many of the current generation, it is unimaginable, but in the context of human history, it is a miniscule amount of time that civilization depended on fossil fuels.

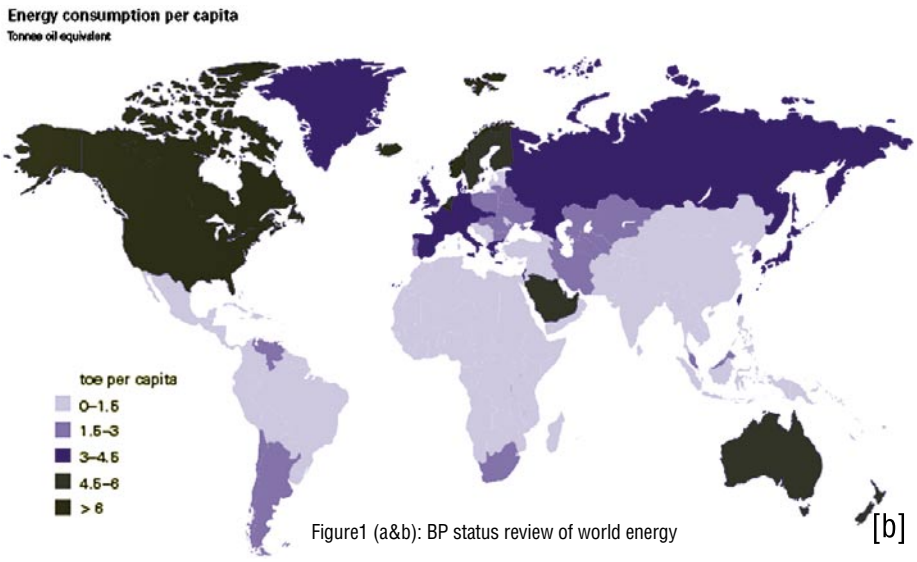
Fossil fuels provide energy, the driver of the universe. Fossil fuels have provided a source of energy never before seen. Issues encompassing wealth, development, quality of life, lifestyle, national identities and wars are directly related to energy availability and use.

A key product of fossil fuel advancement was the mass production of electricity. When electricity was discovered in 1780 by Benjamin Franklin, there was a considerable lack of knowledge with regard to its potential and definition. Electricity is the prime source of end user energy today. "Electricity is not a primary energy source, but rather an "energy carrier": zero mass, travels near the speed of light, and, for all practical purposes, it can't be stored"" (Duncan 2000). Electricity empowered a whole new generation of technology and inventions. Today if a world without electricity was imagined, it is analogous to the "Dark Ages". This is the difference electricity and fossil fuels made to human life. Here I would like to make a distinction between the primary source of energy (fossil fuels) and end use energy, electricity. "It is estimated that 42% of the world's primary energy in 1999 was consumed to generate electricity" (Duncan, 2000).

With reference to Figures 1 a & b, it is not comforting to know that the world's reserve per production ratio (R/P) value in years, that is the amount of a particular fossil fuel's availability in years assuming current production and consumption rates, is 40 years for oil, 70 years for natural gas and 200 years for coal. Further these figures are quite misleading because they are mostly from a collection of predictions that have accuracy ranges from 10% to 90% and they do not take into account an actual increase in demand from current rates. For example China and India are demanding a lot more energy for their growing robust economies. These figures also fail to consider the effects of discovering new reserves. "About 80 % of the oil produced today flows from fields that were found before 1973, and the great majority of them are declining." (Campbell & Laherrere 1998). Therefore in actual fact the R/P ratios could be a lot less. This then



[a]



[b]

Figure1 (a&b): BP status review of world energy

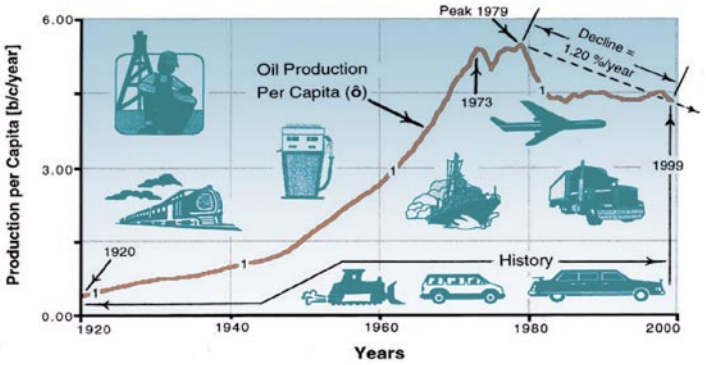


Figure 2: World oil production per capita

leaves the world in an interesting predicament. Figure 2 illustrates the decline in fossil fuels. Although world oil production (O) from 1979 to 1999 increased at an average rate of 0.75 %/year, world population grew even faster. Thus world oil production per capita (ô) declined at an average rate of 1.20 %/year during the 20 years from 1979 to 1999 (Figure 2) (Duncan 2000).

Does it Matter?

The terms fossil fuels and oil have been used interchangeably in the last few paragraphs, although one is the subset of the other, their decline is analogous and thus relevantly interchanged. Does the decline on dependence of fossil fuels matter? From an environmental view point, global warming due to the greenhouse effect is a clear imminent threat. The earth is in an interglacial period with the last few years at an above normal average temperature. Carbon levels, as carbon dioxide in the atmosphere, are near 750 billion tonnes. When fossil fuels were first burned, a century ago, there was 580 billion tonnes (Leggett,1999). Climate change specialists argue that an increase in even 200 billion tonnes risks serious consequences. The current reserves of carbon in fossil fuels below ground are estimated at 10,000 billion tonnes! That is why the usage of coal is not encouraged because of its high carbon emissions. However, there are signs that world coal consumption is on the increase but mainly due to countries like India and China.

Therefore a decline in dependence on fossil fuels is actually a good scenario. Global warming awareness has seeped into many multinational energy and oil companies around the globe. There is diversification in the energy market, and the focus is into renewables and less carbon intensive energy sources, for example natural gas, hydroelectricity, the hydrogen fuel cell, wind energy, biomass and solar energy. From an environmental viewpoint conclusion, regardless of the world not finding a sufficient energy source to replace fossil fuels, it is an excellent reality that fossil fuels will decline.

Human civilization, on the contrary, has rarely consi-dered the environment. Its only aim has been the constant improvement of standard of living. This fact is especially evident during the industrial age. It is now a critical period and the *Olduvai* theory illustrates this fact. The *Olduvai* theory was first proposed by R.C. Duncan (Duncan 2000), and Figures 3 & 4 are an illustration of the theory. The *Olduvai* theory is specifically defined as the ratio of world energy production and world population. It states that the life expectancy of Industrial Civilization is less than or equal to 100 years: from 1930 to 2030. The theory is tested against historic data from 1920 to 1999 (Duncan 2000). The theory predicts a world that is unable to supply its energy demands by 2012. From 2012 – 2030 it then cascades into catastrophe where electrical grids collapse, governments lose power, anarchy precedes, international organizations fail and global warming and new diseases threaten humans. 2030 onwards is said to be the new dark ages. As dramatic as it may seem, this theory does hold some ground because its predictions match energy usage patterns between 1920 and 1999. The final theory outcome is yet to be seen.

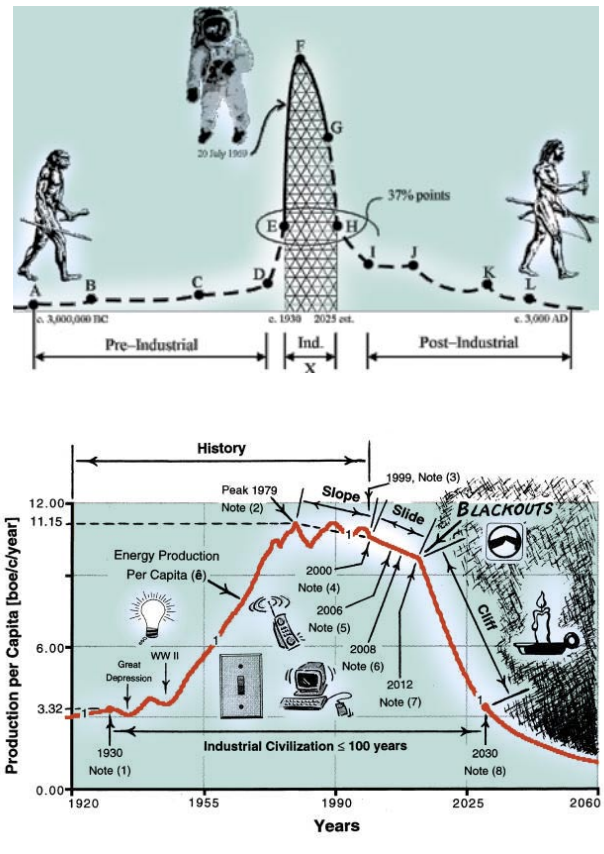


Figure 3 & 4: A simplification of the *Olduvai* theory

Conclusion

Comparing environmental concerns and the *Olduvai* theory, it is evident that the decline of fossil fuels and probable extinction does matter. It matters because the world has to adapt to these changes. Is civilization going to cope and find alternative energy sources? Are renewables capable of handling the colossal energy demand in future? Is the world population at a sustainable level with regard to its energy demand? Will the loss of mass produced electricity cripple economies? Could global warming overwhelm the human race? These are important questions yet to be answered. However it is clear in any of the situations discussed, the world and civilisation are now at the edge of a cliff or at the crossroads. The measures taken or implemented at this critical junction of time will determine the destiny of the world's energy needs and resources. The question here, is the world reactively going to pursue an energy strategy, or be proactive in predicting the coming decline of fossil fuels reserves and implement forward policies (renewables or alternative energy resources). It is an interesting time, at the turn of the millennium, where advances in nanotechnology, gene mapping, genetic engineering, quantum mechanics and space exploration are fueling a school of thought that make redundant the question of fossil fuels depletion. There is optimism that a breakthrough in technology analogous to the steam engine and internal combustion engine will solve the energy supply problem. The future remains to be seen.

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International Updates

The City Limits Project – A Resource Flow and Ecological Footprint Analysis of Greater London

"This study of London's footprint is particularly important because it is the first such analysis of a major world city. For the first time, we have an overall picture of London's metabolism, how resources are used and where action might be taken to increase our efficiency and become more sustainable… I welcome the publication of this study and commend it to everyone involved in achieving my vision of making London an exemplary, sustainable world city." – Ken Livingstone, Mayor of London (Sept. 2002)

Objectives of the City Limits:

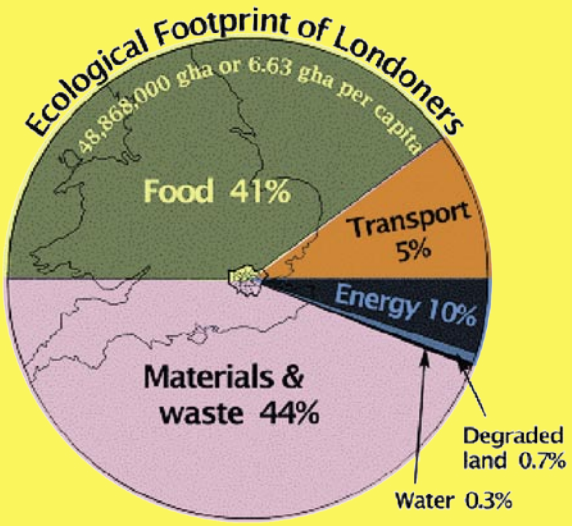
- To quantify and catalogue the energy and materials consumed by London and Londoners, and where possible, map the flows of these resources.
- To calculate the ecological footprint of the citizens of London.
- To compare the ecological footprint of Londoners with other regions.
- To compare the ecological footprint of Londoners with the globally available 'earth share' to estimate ecological sustainability.
- To quantify the ecological sustainability of a range of improvement scenarios.
- To assess the availability and quality of data required to carry out this type of analysis, and in certain instances make recommendations to improve data requirements for resource flow and ecological footprint analyses.

Major findings of the City Limits project were:

- The population of Greater London in 2000 was 7.4 million.
- Londoners consumed 154,400 GigaWatt hours (GWh) of energy (or 13,276,000 tonnes of oil equivalent), which produced 41 million tonnes of CO_2.
- Londoners consumed 49 million tonnes of materials. On a per capita basis, this represents 6.7 tonnes.
- 27.8 million tonnes of materials were used by the construction sector
- 26 million tonnes of waste was generated, of which 15 million tonnes was generated by the construction and demolition sector, 7.9 million tonnes by the commercial and industrial sector and 3.4 million tonnes by households.
- 6.9 million tonnes of food was consumed, of which 81 percent was imported from outside the UK.
- Londoners traveled 64 billion passenger kilometers (pass-km), of which 69% was by car.

- Water consumption reached 876,000,000,000 litres, of which 28 percent was leakage.
- The ecological footprint of Londoners was 49 million global hectares (gha), which was 42 times its biocapacity and 293 times its geographical area. This is twice the size of the UK, and roughly the same size as Spain.
- The ecological footprint per London resident was 6.63 gha. This compares with the UK average ecological footprint of 6.3 gha, and exceeds the global 'earthshare' of 2.18 gha.
- The ecological footprint of London tourists was estimated at 2.4 million gha, which equates to an additional 0.32 gha per Londoner.
- The predicted 'earth share' in 2050 is estimated at 1.44 gha per capita. For Londoners to be ecologically sustainable by 2050, a 35 percent reduction by 2020 and an 80 percent reduction by 2050, of their ecological footprint will be needed.
- Ranges of 'business as usual' and 'evolutionary' scenarios were prepared to reflect current practice and existing improvement targets. 'Revolutionary' scenarios were prepared to demonstrate that a combination of technological and behavioural changes could achieve interim sustainability targets for 2020.

Ecological footprint of Londoners, by component, showing actual size and the UK.



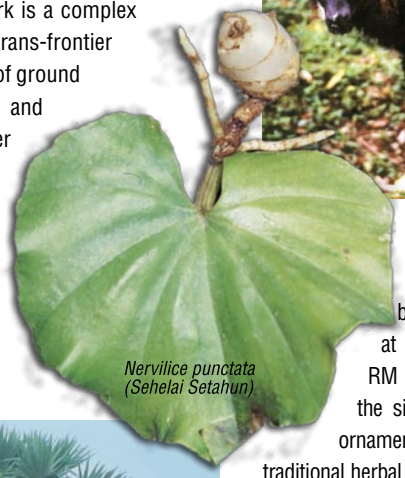
Graphic taken from *City Limts* Executive Summary (page VI)

from page 3

Department and WWF Malaysia led to the establishment of Perlis State Park. The Park was developed according to the management plans drawn by WWF Malaysia consultants and funded by the Danish International Development Assistance (DANIDA). The Perlis State Park not only houses the different ecosystems and species but also a host of goods and services to the people residing in the vicinity of the Park specifically, and the population of Perlis generally.

Conclusion

As far as biodiversity is concerned, Perlis is a land of glory. It has integrated the biodiversity component for sustainable development at the local level in many aspects of life such as preserving the forested area and the different ecosystems in the State ranging from the seafront in Kuala Perlis to Gunung Perlis, the highest peak in Perlis. The Nakawan Range which extends from Thailand to Perlis covering part of Perlis State Park is a complex forest ecosytem, a trans-frontier forest that stores a lot of ground water, filtering them and providing clean water for the people of Perlis. The numerous caves in Perlis not only provide attraction for ecotourists but also store water hence maintaining the hydrological cycle. The Perlis State Park not only protects the intricate complexity encompassing the biological resources and ecosystems but also provides clean air to breathe, sequestrate carbon dioxide and maintain temperature. Besides, the numerous interesting and unique flora and fauna species, which contains all the wild genes, are 'biological insurance' for now and generations to come for Perlis and the country. These wild biological resources are genuinely the resources needed for value-adding in the biotechnology of new and more nutritious food, fruits, medicinal plants, pharmaceuticals and nutraceuticals, to name a few.



Nervilice punctata (Sehelai Setahun)

Pokok Tai

Is the diversity in Perlis dwindling? Well, if we are not careful, it can be gone forever. Besides forest fires which often break out during the dry spells, quarrying activities in the State will cause habitat loss and hence the intricate life and complexity that come with it. Many attractive plants such as orchids, gingers and begonias are finding their way to the nurseries in cities. Another example is the cycad, *Cycas clivicola* (*bogak*) which makes a beautiful but costly ornamental, selling at prices ranging from RM 150 to RM 5000 per plant depending on the size. Demand for these plants as ornamentals and as raw material for traditional herbal preparations also raises the issue of over-exploitation of plant resources from the forested areas in Perlis. Certain species of fauna found in the forests of Perlis may also find their way to restaurants as dishes.

Serow Source: Perlis State Park

Pokok Tui

Local community awareness on the importance of conserving biodiversity in Perlis with themes such as 'Biodiversity in Our backyard' and instilling the idea of 'Our Biodiversity' can be an effective means besides monitoring and controlling illegal harvesting of biological resources and encroachment. Perlis is also more advanced than other States in Peninsular Malaysia in having an *ex-situ* conservation of medicinal plants from Perlis in Taman Herba at Bukit Ayer since 1999. Certainly, the rich biodiversity in Perlis must be conserved for the well-being of Malaysians for now and the future generations

Cymbidium lancifolium Hook (New record for Perlis)
Source: G. Rusea

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Source
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Macaca arctoides (berok kentoi) Source: D Sharma

Activity Highlights

Department of Environment, Malaysia

May 2006

DOE Environmental Awareness Camp (KeKAS)

Organised by DOE in collaboration with the Ministry of Education, it was held at Institute of Biodiversity, Lanchang, Pahang from 26-29 May 2006. Forty teacher trainees and 20 lecturers from 10 Teacher Training Colleges in West Malaysia were trained as KeKAS facilitators.

July 2006

ASEAN Workshop: Zero Burning and Fire Prevention Management

This Workshop was held in Kuala Rompin, Pahang, Malaysia on 18 – 20 July 2006. This Workshop was organised by The Department of Environment of the Ministry of Natural Resources and Environment, Malaysia in collaboration with the ASEAN Secretariat and Global Environment Centre. The primary objective of the workshop is to promote the ASEAN policy on zero burning and the implementation of zero burning techniques among practitioners in plantation companies, timber concessionaires, experts and regulatory agencies as well as the fire prevention management. Thirty-one participants from all ASEAN Member Countries (Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam) and the ASEAN Secretariat attended the workshop. Field visits were conducted to demonstrate zero burning techniques during land-clearing of logged-over forests and disposal of biomass during oil palm replanting.

July-August 2006

16th Inter-University Environmental Debate

Organised by DOE in collaboration with the Malaysian Universities Debate Council (MADUM), Dewan Bahasa dan Pustaka (DBP) and Ministry of Higher Education, the 2006 Debate saw participation from 20 teams from 20 Malaysian institutions of higher learning. Universiti Sains Malaysia (USM), Penang hosted the event from 28 July – 1 August 2006. The Final Debate between UIAM and UM, held on 1 August 2006, was officiated by YB Dato' Seri Azmi Khalid, Minister of Natural Resources and Environment.

INVITATION TO PARTICIPATE
Bandar Lestari – Environment Award 2005/2006

In line with the National Policy on the Environment, the Department of Environment of the Ministry of Natural Resources and Environment in collaboration with the Local Government Department of the Ministry of Housing and Local Government and with technical support from the Institute for Environment and Development, the Bandar Lestari-Environmental Award Programme has been initiated. For further enquiries, please contact : faizul@doe.gov.my

OBJECTIVES

- To recognise the efforts and contributions of Local Authorities with regard to environment sustainability of policies and actions.
- To enhance awareness of environmental sustainability with support of local communities.

ASSESSMENT CRITERIA

- **Physical Environment**
- **Ecological Initiatives**
- **Urban Services**
- **Environmental Governance**
- **Education and Awareness**

Upcoming Events

2006 Malaysia Environment Week (MASM 2006)

Malaysia Environment Week 2006. will be held from 12 to 18 September 2006 in Kangar, Perlis. The launching ceremony will be officiated by YAB Menteri Besar Perlis and the Minister of Natural Resources and Environment. The theme for MASM 2006 is "Environmental Conservation, Our Shared Responsibility".

Environmental Awareness Camp

The second camp will be held in November 2006 at Taman Negara Endau Rompin. For further enquiries, please contact : azlinaomar@doe.gov.my

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