

***Class f: Forest sanctuary for wildlife***

These are forest lands where indigenous wildlife exists and which should be reserved for the protection of biodiversity. Sanctuaries may be established for the protection of one or a few species, but generally they are intended for the protection of all species. Such forests are established to prevent the extinction of the already dwindling endangered species of flora and fauna in the country, and access are restricted only to authorised persons undertaking activities compatible with the purpose of the sanctuaries.

***Class g: Virgin jungle reserved forest***

These are forests which are established to serve as permanent nature reserves and natural arboreta, as controls for comparing with the exploited and silviculturally-treated forests, and as undisturbed natural areas for general ecological and botanical studies.

***Class h: Amenity forest***

Under the National Forestry Policy, these forests are defined as forest land which are conserved for various purposes such as recreation, education, research and protection of the country's unique flora and fauna.

***Class i: Education forest***

These are forest lands which are earmarked or reserved for the purposes of furthering education and creating better public awareness with regard to the vital role of forest in the preservation of a balanced physical, social and economic environment.

***Class j: Research forest***

These are forest lands earmarked or reserved for research purposes. Among the research plots which have been set up throughout the country are Silvicultural Plots, Phenological Plots, Forest Plantation Plots, Ecological Plots, Big Tree Plots, Hydrological Plots, and Growth and Yield Study Plots.

***Class k: Forest for federal purposes***

These are forest lands earmarked or reserved for federal purposes such as the setting up of Continuous Forest Inventory (CFI) Plots and Research Stations.

#### **4.0 IMPORTANCE OF THE FORESTS**

Forests play a very significant role in furthering resource-based industrialisation and the socio-economic development of Malaysia. Besides, they have long been recognised as an important contributor to environmental stability and better quality of life for the country. They protect, maintain and safeguard fresh-water supply and help keep the climate stable and reduce the level of the carbon dioxide content. The forests also enrich the soil and prevent soil erosion. Forest products are wide-ranging, from timber to furniture, medicines, food, paper and many

other daily necessities. The major contribution of forests in Malaysia is described below.

#### **4.1 Environmental Protection and Conservation**

Protection of the environment is important to Malaysia. The creation of Permanent Forest Estates (PFE) is to ensure that there will be substantial natural forest cover to maintain the quality of the environment. To further conserve various forest and ecological types in their original condition, Malaysia has set aside pockets of virgin forest. These pockets, known as Virgin Jungle Reserves (VJR), were established to serve as permanent nature reserves and natural arboreta; as controls for comparing harvested and silviculturally-treated forests; and as undisturbed natural forests for general ecological and botanical studies.

The protection forests within the PFE are further classified into soil protection forests, flood control forests and water catchments. Currently, the extent of water catchment forests (forested watersheds) for major dams are 270,000 ha which are located in Kedah (Pedu and Muda dams), Terengganu (Kenyir dam), and Perak (Temenggor dam). Additionally, two watershed management research programmes have been initiated to provide hydrological data in different types of land use. These are the National Programme for Experimental and Representative Basins and the Forest Hydrological and Conservation Programme which are wide-ranging and multi-disciplinary in concept and approach.

Harvesting is carefully controlled to minimise damage. For instance, the effect of harvesting operations on soil erosion and sedimentation on river systems are being controlled by the enforcement of regulation and guidelines for logging operations. Thus, the documentation and implementation of the "Forest Harvesting Guidelines", the "Forest Engineering Plan" and the "Standard Road Specification". Steps are currently being taken to formulate Environmental Impact Assessment (EIA) guidelines specifically for the various forestry activities as required under the Environmental Quality Act, 1974 (Amended 1995).

Malaysia has also recognised the urgent need to conserve genetic resources of endangered forest tree species and is currently undertaking a project on *in situ* conservation of forest genetic resources. This project will inventorise the current VJR in order to assess the stocking and distribution of species for effective resource conservation.

#### **4.2 Forest Industries**

In recent years, the forest industries of Malaysia have rapidly moved away from the manufacture of low-value primary products. The main forest industries today consist of sawmilling, panel product industry (veneer, plywood, particle board, blockboard, and fibreboard) moulding/joinery industry and furniture industry. Others include secondary and tertiary processing industries such as timber treatment, laminated board, boxes and crates, pencil factories, match factories and parquet flooring plants. Realising the role of forest industries in improving the socio-economic level of the rural population, steps have been taken to encourage the setting up of small-scale, rural-based industries using non-timber forest produce such as rattan and bamboo as raw materials (Figures 5 and 6). A list of important forest-based industries is in Table 3.

**Table 3: Forest Industries in Peninsular Malaysia**

| Type Of Industry                      | Number (units) |
|---------------------------------------|----------------|
| Sawmill                               | 710            |
| Plywood/Veneer Mill                   | 49             |
| Moulding plant                        | 111            |
| Furniture/woodworking/joinery factory | >2300          |
| Blockboard plant                      | 12             |
| Chipboard plant                       | 4              |
| Moulded particleboard plant           | 4              |
| Medium Density Fibreboard plant       | 4              |
| Woodwool/wood cement board plant      | 2              |
| Rubberwood mill                       | 106            |
| Kiln Drying plant                     | 120            |
| Timber treatment plant                | 117            |
| Pallets/boxes/crates factory          | 200            |
| Laminated board plant                 | 16             |
| Pencil factory                        | 3              |
| Parquet flooring factory              | 25             |
| Wooden House prefabrication plant     | 10             |
| Match factory                         | 4              |
| Rattan/bamboo factory                 | 73             |
| Woodchip plant                        | 1              |

Malaysian timbers are graded in accordance to the Malaysian Timber Grading Rules (MTGR) prior to use both domestically and for export. It should also be noted that the MTGR have gained global acceptance as internationally-recognised tropical timber-grading rules.

Except for a small number of integrated timber complexes that have been established by State Economic Development Corporations, most of the timber industry in Malaysia is owned by the private sector. The forest industry have been identified as one of the resource-based industries to be further developed as an important export-oriented sector. It is the Government's objective to make Malaysia a major producer of high value-added, wood-based products in the world market. Specifically, it is envisaged that Malaysia should become an important furniture and joinery/mouldings centre. Various policy measures have been implemented to create an environment conducive to the accelerated growth of the sector. However, the forest industries sector still has to brace itself for an environment of stiff competition, growing protectionism and mounting pressures of environmentalism and conservation, if it is to successfully carve a niche for itself in the international market.

#### **4.3 Socio-Economic Contribution**

As a natural renewable resource, the forest has contributed significantly towards the socio-economic development of Malaysia. The importance of forestry in Malaysia can also be seen from its contribution to Malaysia's foreign exchange and earnings. Income from forestry and related industries has consistently been among the top five income-earners for the country and for a few years in the 1970s it was even among the top two. The forestry sector also provides

income and employment for a large section of the population. It has been estimated that at least 0.5 million people are associated in one way or another with the forestry sector. This can be further elaborated as follows:

- (i) The total export value of timber products (excluding rattan and wooden furniture) amounted to nearly FOB RM 3 billion, constituting about 2% of the total gross export receipts of Peninsular Malaysia at FOB RM 144 billion. At the national level, the total export value of timber and timber products (including rattan and wooden furniture) recorded almost FOB RM 14 billion or 9% of the total export receipts of the country at FOB RM 154 billion.
- (ii) Revenue derived from the forest in the form of royalties, premium, forest development fund, and others represent a considerable and important proportion of the State Government's total income, while at the federal level, export cess and income tax are collected. The total forest revenue collected by the various State Governments in Peninsular Malaysia amounted to RM 391 million. Of this total, RM 270 million or 69% of the total revenue was used to finance State forest administrations and development.
- (iii) The forestry sector provided direct employment for more than 92,000 persons and about 80% are in the downstream industries including sawmilling, plywood/veneer, moulding, furniture and other wood and non-wood factories. More than RM 500 million were paid out in terms of annual salaries and wages for workers involved in the forestry sector.
- (iv) Total investment estimated in the major wood-based industries in Peninsular Malaysia was RM 1,834 million. Of this total, RM 933 million or 51% were in the sawmilling industry, RM 672 million or 37% in the plywood/veneer industry and RM 229 million or 12% in the wood-moulding industry.

Apart from their monetary value, forests have many intangible functions and an aesthetic value. They also play important protective functions such as the maintenance of environmental stability, minimisation of damage to rivers and agriculture land by floods and erosion and the safeguarding of water supplies. It must be stressed that the success and development of the agricultural sector depends very much on the protective role of the forest.

The non-wood forest produce is now becoming as important, comparable to timber, with the increase in demand. Harvesting it is also less destructive than logging. These non-wood products include rattan, bamboo, fruits, resin and others of ornamental and medicinal value. The food security provided by the forest is very important in the rural areas, and to the large populace who live within its vicinity, particularly in Sabah and Sarawak.

#### **4.4 Educational and Social Benefits**

The rainforest of Malaysia provides us with many opportunities for education and recreational enjoyment such as bird-watching, hiking, swimming, mountain-climbing and camping. A waterfall in the forest, for instance, is a source of beauty and enjoyment, and inspires picnickers, tourists and holiday-makers to relax and unwind.

The need for recreational areas in the forest was recognised, and in 1967, following the advent of high economic growth and rapid urbanisation in the country, such areas were developed to cater for outdoor recreation, including picnicking, camping, hiking and swimming. Now there are at least 98 of these areas, popularly known as *Hutan Lipur*, in every shape and sizes, each with its own uniqueness all over the country.

The forest provides excellent 'natural laboratories and classrooms' for students, researchers, scientists and artists. They can increase their knowledge in the fields of botany, zoology, chemistry, geography, geology, medicine and others by studying the forest. The forest enriches our lives in many ways. Such recognition has made Malaysia strongly committed to ensuring the sustainable management of its natural resource.

A variety of fruits are found in the natural forests which are of economic value to local communities. These include *Parkia speciosa* (Petai), *Durio zibethinus* (Durian), *Mangifera spp.* (Macang), *Pithecellobium jirinya* (Jering), *P. bubalinum* (Kerdas) and *Baucaria spp.* (Tampoi). The demand for these fruits has been on the increase and they fetch high prices in the cities and towns. Malaysia has embarked on traditional fruit tree planting to meet this demand. More than 2600 ha of *P. speciosa*, *D. zibethinus* and other fruit trees have been planted along fringes of forest reserves near existing villages to supplement the needs of the rural population and improve their subsistence requirements. This obligation is a social gesture to incorporate community forestry into the hearts of the people who live in its vicinity, and help to reduce the encroachment or unnecessary felling of trees.

For centuries Malaysians have been using rattan and bamboo for numerous applications. Passed on from generation to generation, the use of these materials has expanded into a productive industry, although the sustainability of supply is being threatened due to over-exploitation and necessitates complementary cultivation. Thus, in addition to planting in the natural forest, rattan, for instance, is also being planted in rubber plantations and in between rows of some fast-growing forest plantation.

Out of the 50 bamboo species found in the forests, 11 are currently commercially viable. About 250,000 tonnes are harvested annually, both from cultivated and natural stands. Among the items fashioned from bamboo are handicrafts, utensils, chopsticks, traditional brushes, furniture and scaffolding material for the construction industry.

Remedies for ailments and wounds are also found in the forest. In Malaysia, effective cures has long been derived from roots, leaves, stems, fruits, fungi, flowers and even the bark of certain trees and plants for traditional herbal medication to treat wounds, snakebites, diabetes, fever, kidney ailments, high blood pressure, migraine, poisoning, digestive problems and a variety of other ills.

These diverse resources and benefits have resulted in the forest being looked upon as a valuable asset which merits continued management and reinvestment. Malaysia is spending much time, money and effort towards forest regeneration and rehabilitation to ensure its perpetuity and sustainability of these natural resources.

## 4.5 Forest Conservation and Biodiversity

Malaysia is fully aware of the immense diversity of biological species in its rainforest. These rich species of flora and fauna are an important natural heritage. Hence, in line with the concept of sustainable forest management, development and conservation, Malaysia has, over the years, established a network of protected areas for the conservation of biological diversity. Some of these national parks, wildlife reserves and sanctuaries, nature parks, bird sanctuaries and marine parks have been gazetted as conservation forests since the 1930s. The largest national park is the Taman Negara covering 434,351 ha. It was gazetted in 1939 and consists of virgin forest of various forest types. Currently, Malaysia has 1.39 million ha of conservation areas protected by legislation (Table 4), of which 1.06 million ha are located outside the Permanent Forest Estate (PFE) whilst another 0.33 million ha are within.

**Table 4: Areas Under National Parks, Wildlife and Bird Sanctuaries in Malaysia, (million ha)**

| Region              | National Park | Wildlife and Bird Sanctuary | Total |
|---------------------|---------------|-----------------------------|-------|
| Peninsular Malaysia | 0.43          | 0.31                        | 0.74  |
| Sabah               | 0.26          | 0.14                        | 0.40  |
| Sarawak             | 0.08          | 0.17                        | 0.25  |
| Malaysia            | 0.77          | 0.62                        | 1.39  |

An additional area of 1.42 million ha is under consideration for future reservation: about 0.67 million ha are in Peninsular Malaysia, located in the Permanent Forest Estate and 0.75 million ha are in Sarawak comprising ten national parks and four wildlife sanctuaries. Priority for conservation is given to special habitats such as wetland areas, open lakes ecosystem, quartz-ridge forests and limestone formations.

In this context, Malaysia has drawn up a comprehensive list of plants and animals to be protected. Currently, many of these, such as the *tiger*, *rhinoceros*, *slow loris* and even the *birdwing butterfly* are fully protected by law. The Department of Wildlife and National Parks in Peninsular Malaysia runs active programmes to conserve the larger mammals. In Sabah and Sarawak, the Forest Departments manage wildlife rehabilitation centres for wild animals with special emphasis on the *orang utan*. Complementing these efforts are many other programmes, co-ordinated by a National Steering Group, to conserve the plant genetic resources of the country. One such programme is the conservation of wild fruit trees. The Forestry Departments in Peninsular Malaysia have also recognised the urgent need to conserve genetic resource of endangered forest tree species and are currently undertaking the project on *in situ* conservation of forest genetic resource. This project will inventorise existing Virgin Jungle Reserves (VJR) in order to assess the stocking and distribution of species for effective resource conservation. Malaysia is also included in a current project on Planning Practical

and Cost-Effective Strategies for Genetic-Resource Conservation of Commercial Tree Species in Tropical Asia and the Pacific being undertaken by the ASEAN Institute of Forest Management (AIFM) for the International Tropical Timber Organisation (ITTO).

These VJRs are pockets of virgin forest representing various forest and ecological types in their original condition and were established to serve as permanent nature reserves and natural arboreta which can act as controls for comparing harvested and silviculturally treated forests and for general ecological and botanical studies. Since its inception in 1950, a total of 72 VJRs covering 21,271 ha have been established throughout Peninsular Malaysia while Sabah has a total of 48 VJRs covering an area of 88,299 ha. These VJRs represent samples of the many types of virgin forest found in the country and are located in the PFEs. Sarawak has virgin areas known as Totally Protected Areas (TPA) covering a total of 110,000 ha.

To ensure that the detrimental effects on the environment arising from forest harvesting are minimised, Malaysia has embarked on comprehensive studies to monitor and evaluate the impact of forest harvesting on yield of water in hill forest and sediment yield downstream resulting from logging activities. These study areas are located in the Sungai Tekam Experimental Basin for the lowland forest established in 1973, and the Jengka and Bukit Berembun Experimental Basins for the hill forest established in 1978. Initial results from these studies indicated that hydrological parameters, such as water yield, water quality and sediment yield, reverted back to their original conditions, i.e. prior to logging, within a period of three to four years. These studies have since been continued to be monitored by the Forest Research Institute of Malaysia.

#### **4.6 Forestry and Ecotourism**

Malaysia has a wide range of forest habitats, stretching from the mangrove and riparian fringes to the montane forests. Peninsular Malaysia alone has an area of 745,997 ha established as national park and wildlife reserves not including the 72 VJRs and 79 recreational forest areas. In Sabah, 265,794 ha are managed as national parks while another 141,200 ha are wildlife reserves. The total area of Sarawak under national parks and wildlife reserves is more than 252,870 ha (MPI, 1988).

Forest makes up an important resource for recreation. The literature of forestry abounds with references to the intangible benefits provided by forest recreation. In Malaysia, the increasing demand for forest recreation has longed been anticipated (Sheikh Ali, 1983). The number of recreational forests that were set aside in The First Malaysia Plan (1966 – 1970) was only two and this increased to 25 in the Third Malaysia Plan (1976 – 1980) and to 37 in the Fourth Malaysia Plan (1980 – 1985) because of the continued demand (Jalil and Chee, 1983).

The population of Malaysia was growing at a rate of 2.7% annually in the 1970s (Drysdale, 1981) and the current rate has remained fairly consistent at 2.3% (FAO, 1995). A larger percentage of this population (now close to 20 million) will be youthful and well-educated (Wan Sabri Mansor, 1983). Coupled with increased income, leisure time and better mobility, the rapid rate of industrialisation and urbanisation experienced by the country has increased awareness and need for more recreational spaces which are clean and peaceful, away from the urban concrete jungle.

Forestry has an important role to play in nature tourism (Laarman & Durst, 1987) which requires efficient management of the natural resources and an understanding of the role of trees in the ecosystem. Many forested areas are suitable for ecotourism. Facilities available within the national parks are generally adequate for this purpose. If managed on a commercial basis, they are able to cater for both domestic and international tourists (Yap, 1992). The potential of ecotourism in Malaysia is enormous. It can serve a dual purpose of enhancing public awareness and appreciation of aesthetic conservation efforts as well as the ability to tap an economic return from the forested areas without excessive damage to the natural beauty and resources.

## **5.0 DEVELOPMENT OF FOREST MANAGEMENT**

The forests in Peninsular Malaysia have been systematically managed since the beginning of this century when the first Forest Officer was appointed in 1901. Over the years, ecologically and environmentally sound forest conservation and management practices have been developed to ensure forest renewal and sustainable yield of timber and other products. The earlier silvicultural management systems were primarily concerned with improving the existing timber crop for future exploitation. Very few timber species were harvested, then, and trees were felled selectively according to the requirements of good forest management, such as the removal of the overmature trees, and those which might compete with favoured species (Thang, 1986).

Market demands, however, increased tremendously after 1960s and coupled with aggressive land development projects and nation-building after independence, over-exploitation was rampant. This led to a crisis situation whereby it was forecasted in 1980 that by year 2000, Malaysia would become a net importer of timber as opposed to enjoying the status of a top exporter, then. If this happens, the balance of trade would certainly be affected and, subsequently, the wood-based and related industries would either be forced to scale-down or close down altogether. This could lead to retrenchment of workers and higher prices of timber products. The social, economic and political implications of the consequences should never be underestimated. In fact, rumour was rife that the timber trade was destined to be a sunset industry and timber merchants were busy diversifying into other trades. Positive measures, however, including intense research activities and reduction of the allowable annual coupe, were undertaken to face and prevent the impending timber crisis from happening in the country.

The great concern regarding forest management in Malaysia, can best be understood by tracing the past developments of previous silvicultural and management practices. The history of forestry practices can be conveniently divided into three major eras, namely: the Pre-World War Era (Before 1940); the Pre-Independence Era (1940 – 1957) and the Post-Independence Era (After 1957). These periods were marked with very distinct and interesting political, technological as well as economic developments which, to a large extent, have affected the management of the Dipterocarp forests in the country.