

Forest Sustainability IN MALAYSIA

➤ INTRODUCTION

Forest sustainability was not invented by man but forged by the Almighty over geological period in the immensely complex processes we now call the laws of nature. Barring tectonic shifts in the evolutionary process and irreversible catastrophic events in the history of the planet, the forest ecosystem at any one time has remained sustainable. The Nusantara region has for over 130 million years enjoyed a relatively stable tropical climate which enables uninterrupted evolution of the great Dipterocarp Forest Formation in all its glory and unmatched biological diversity. No other region on earth has experienced this long stretch of environmental stability, which has spawned the myriad assemblage of species bequeathing Malaysia as one of the twelve mega biodiversity centres on earth.

We will look into how the sustainability process work in nature and how modern man through his management tools strive to maintain and enhance forest sustainability to meet his management objectives in the context of Malaysian forestry. At the outset too the concept of resource sustainability and its crucial link with resource safety will firstly be addressed.

➤ CONCEPT

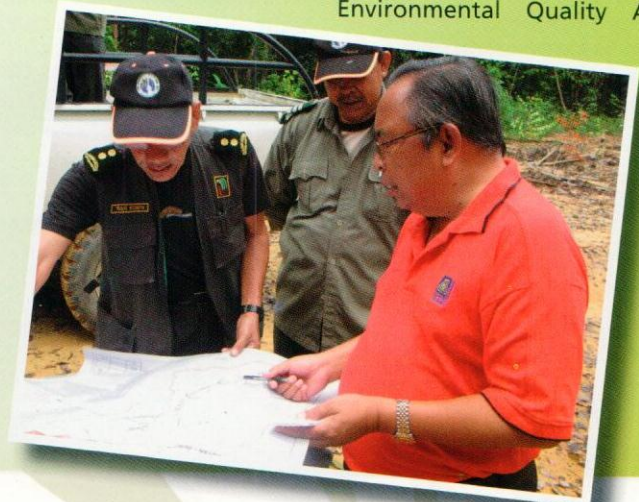
In its essence forest resource sustainability simply means that what is taken out from the forest stand (say, Xm^3 volume of timber) must be replaceable. The process of ensuring this is what we call sustainable forest management (SFM for short). The concept can be further expended to include other forest products, beyond the usual timber, both tangible and intangible such as water and recreation. And environmental sustainability may be widened to embrace both physical and social dimensions. In a more wholistic definition the ITTO (International Tropical Timber Organization) defines SFM as: *The process of managing forest to achieve one or more clearly specified objectives of management with regard to the*

production of a continuous flow of desired forest products and services without undue reduction of its inherent values and future productivity and without undue undesirable effects on the physical and social environment.

➤ RESOURCE SECURITY

Forest resource security is conditional to and implicit in sustainability. If forests are easily encroached by man, as with illegal logging or conversion to subsistent farming, with inadequate or non-existent laws and regulations to curb such practices, the forest will eventually disappear and species becoming extinct.

Malaysian forests are fortunate to be very well protected with over twenty relevant documents to safeguard her resources, floral and faunal diversity, environment, the wellbeing of forest workers and forest-dependent local communities. For these we have the National Policy on Biological Diversity (1998), National Forest Policy (1978), National Forestry Act (1984), National Parks Act (1980), Environmental Quality Act



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(1974), Protection of Wildlife Act (1972), Aboriginal Peoples Act (1954) and Occupational Safety and Health Act (1994) to mention some of the more important ones.

➤ FOREST SUSTAINABILITY PRACTICE IN MALAYSIA

Pre-modern forest exploitation

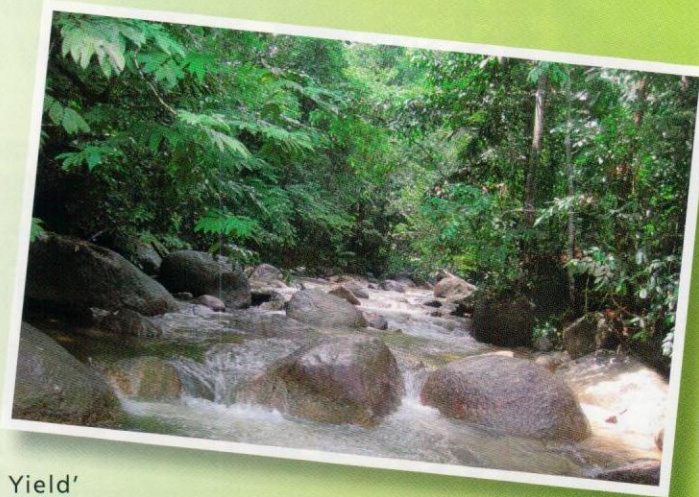
Forest sustainability is the essence of the ecosystem's long-term survival which evolved over geological epochs in a relatively stable climate and environment. The advent of man in the Nusantara imposed values on forest resources and the beginning of exploitation. However, pre-modern societies had negligible impact on the forest environment upon which they derived practically all the essentials for existence and culture. We can still find traces of this ancient influence, not unimportantly, in our pantun imageries, dance choreography, batik art, sculptures, enriched vocabulary, roots of wisdom, philosophy and spirituality, and shamanistic religion (still being practiced by indigenous tribes). The low-impact exploitation, from mostly sparse population density, probably did not dent the sustainable capacity of forest ecosystems. Forests appear not systematically managed during our medieval period of history. At least, there was no written record of conscious management left by the forefathers.

Modern forest management

Modern forest management in the country came with British occupation, at the dawn of the twentieth century, introduced originally from Indian practice with some tempering via Burmese experience. The generic regeneration system adopted was the tropicalised version of the temperate (European) shelterwood system where the overstorey timber is removed after regeneration is established in the understory, often through management. In the tropics, the seedlings and saplings were generally already naturally established and consequently these were termed 'advanced regeneration'. In the decades before the Second World War, forest management was basically in its infancy and exploitation was quite limited in scale with logging mainly low-impact and animal (buffalo) powered. The earliest recorded systematic management, the RIF (Regeneration Improvement Felling), did not explicitly adopt sustainability as a management concept but its focus on stand improvement after harvesting unconsciously points in the same direction.

The Malayan Uniform System (MUS)

The first real adoption of the sustainable principle was the implementation of the MUS shortly after the war in the fifties. Indeed, it was with the acceptance of the 'Sustained



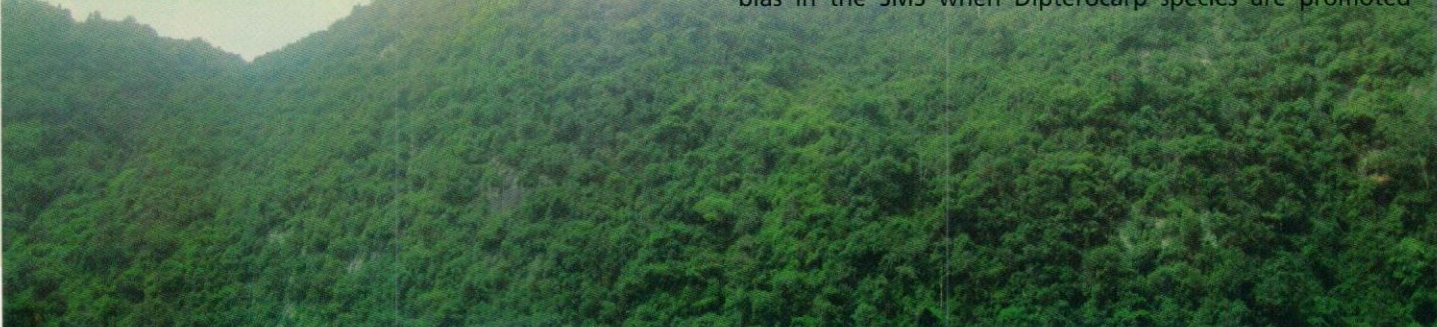
Yield' principle underlying the MUS when sustainability was designatedly practiced in our forest management. As the name implies, timber yield under the MUS was ensured not to exceed the capacity of the forest to replace itself over a rotation period of 60 years; which means that if you remove X m³ of commercial timber at year one, then the logged residual stand is expected to replace the extracted volume within 60 years.

The concept was well and good for commercial three species but not for overall stand tree biodiversity. Non-commercial species, a much longer list, were eliminated down to 5cm diameter, through cutting and girdling, in post-felling treatment in order to drastically promote the commercial component. Great wastage characterizes the MUS in addition to great impact on the residual stand since more volume (hence more trees) were harvested.

The high-waste MUS which was hitherto practiced in the more accessible lowland Dipterocarp forest (LDF) became untenable when most of the forests gave way to massive land conversion of the great rural development programme of the 70's to uplift rural poverty. In consequence, the main production base shifted almost overnight to the hill Dipterocarp forests (HDF) where practically most of the country's FMUs are now located.

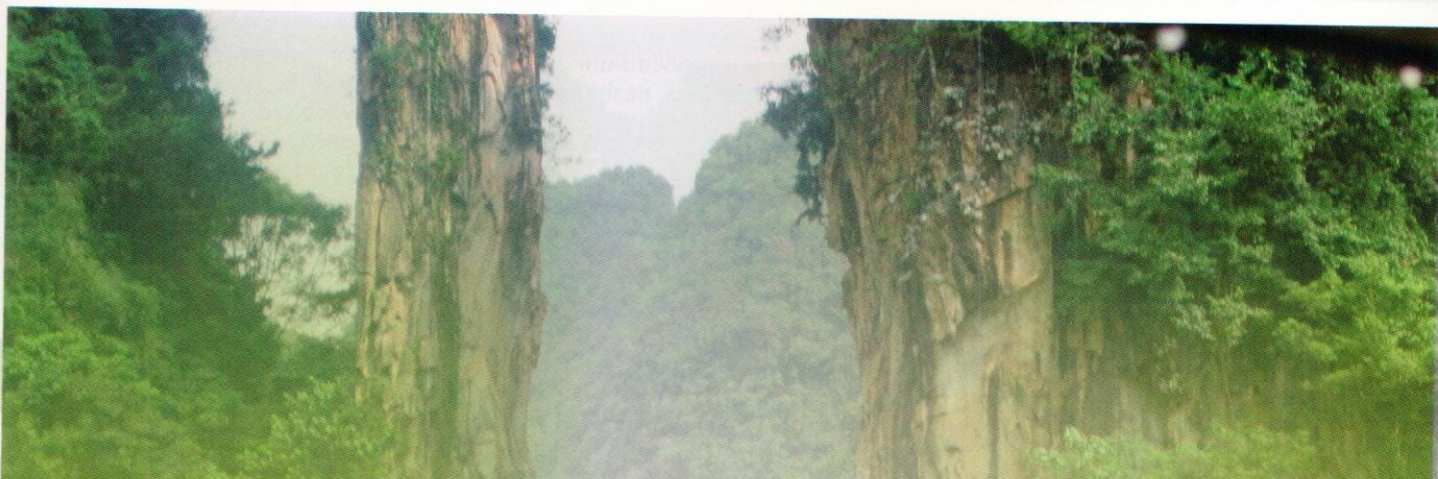
The Selective Management System (SMS)

The MUS, a monocyclic 60-year system was later replaced by the SMS a bicyclic system with a 25-30 year cutting cycle. The change greatly increases sustainability particularly in terms of biodiversity. Unlike the MUS, non-commercial species are not removed after logging thus maintaining a high degree of tree biodiversity. There is however an element of intended bias in the SMS when Dipterocarp species are promoted



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over commercial non-Dipterocarps through differential cutting girth limit that is designed to eventually shift the Dipterocarp/Non-Dipterocarp ratio, in quantitative terms and over several cutting cycles, in favour of the latter group. The species composition is however still maintained.

Most of the post-harvest treatments under SMS are designed to augment natural sustainability particularly in assisting and expediting the forest regeneration process which is the core of any management system. The pre-harvest inventory ensures that the volume extracted per unit area is sustainable through the system of tree marking to regulate felling. More importantly is the '32-tree' rule that ensures the regenerative capacity of the residual stand is not impeded. There must be at least 32 trees per hectare of commercial species above 30cm diameter, or its equivalent, for retention before the stand can be designated for harvesting. This capacity is further enhanced by the requirement of leaving four healthy commercial species per hectare, well-spaced and of bearing age, to serve as mother trees in the residual stand.

Just in case nature may default on this crucial role, the SMS resorts to artificial 'enrichment planting' of residual stands found deficient in regeneration following a post-harvest inventory. This literally means that the SMS carries a double insurance policy to ensure the forest stand is effectively regenerated following harvesting. To preserve species composition, only locally occurring species are planted. The costly treatment is increasingly not observed since the pre-

harvest measures (32-trees and mother trees requirements) appear sufficient to ensure adequate regeneration.

Reduced Impact Logging (RIL)

It is when RIL was introduced and incorporated into the SMS that Malaysian forest management made a quantum leap in forest sustainability. As the name implies RIL are measures to minimize harvesting damages to the residual stand through observing a set of rules to maximize ecosystem integrity and expedite post-harvest recovery. Roding and road construction is kept minimal and its density closely controlled to reduce stand destruction, soil disturbance and erosion. A system of bridges, side drainage, culverts, silt traps and river buffers ensures surface erosion of exposed soil is minimized and silt loads reduced in river waters.

Directional felling of tagged trees is carefully controlled in order to minimize damage to residual stands. Wildlife supporting trees, for food source and shelter, including lianas, are preserved and excluded from felling and cutting. In all, RIL ensures that the regenerative capacity of the post-harvest stand, hence the health and sustainability of the forest ecosystem, including its floral and faunal diversity, are minimally affected by the harvesting process. And given this intended effect, the regenerative capacity of the residual stand is enhanced further when combined with post-harvest silvicultural treatments prescribed under the SMS.

Forest Certification, the MC&I

Malaysia is a leader in forest certification in the tropics and a pioneer, among very few countries, in having her own certification scheme, the MC&I (Malaysian Criteria and Indicators). Forest certification is the apex of forest sustainability and usually attempted to when forest management standards in the country have attained fairly high level which is of global recognition. International schemes, such as the FSC (Forest Stewards Council) are usually used as benchmarks in forest management just as the ISO is the internationally recognized standards for high quality management. The MC&I, evolved under the stewardship of the MTCC (the Malaysian Timber Certification Council, the responsible government agency) has incorporated the latest standards which are branded as the MC&I (2002) based on FSC principles. The scheme has been successfully applied to all FMUs (Forest Management Units) in the country.

Certification ensures the safety, health, integrity and sustainability of the exploited forests while simultaneously



Fact

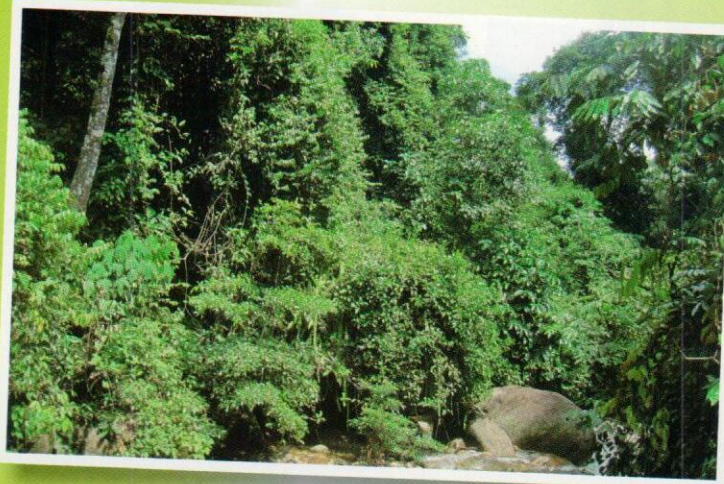
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Sustainable forestry practices can ease the pressure on our forests. The Collins Almanor forest in California contained 1.5 billion board feet of standing timber when harvesting began in 1941. Sixty years and 2 billion board feet later, this sustainably managed forest still holds 1.5 billion board feet of standing timber, and supports great blue heron rookeries, black bears, rubber boas and bald eagles.

Source: <http://ecoeearth.info/>

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ensuring that the rights of local communities, dependent on and affected by forest activities, and also that of forest workers, are observed and not disadvantaged by forest operations. The approach is wholistic covering the physical environment together with its social and economic components. The main incentive is market penetration of selective markets, particularly in the west, which place high premiums on imported wood-based products originating from certified and hence sustainable production forests.

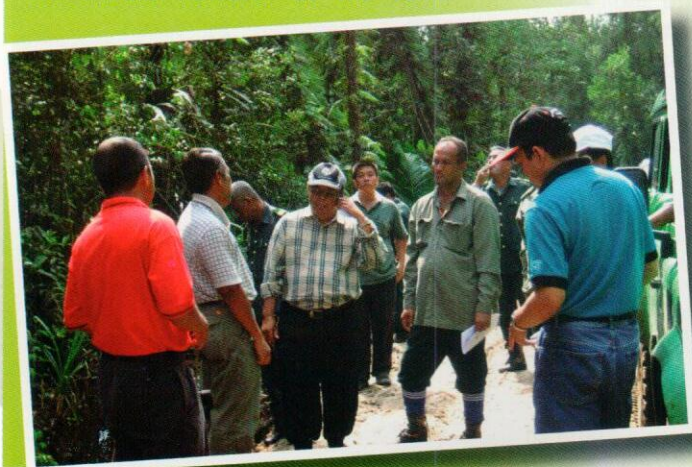


It is important to note that such volume manipulation between species groups is only practiced in the production forest designate for timber exploitation. The National Forestry Act, 1984 (Amendment 1993) ensures another ten (10) other function categories for permanent forest reserves are collectively devoted to conservation and protection. The Act also empowers state authorities to formulate rules and regulations for the multiple use of the FMUs including for conservation and protection of plant life, wildlife and water production and for objects of interest either geological, archeological, historical, ethnological, scientific, scenic or aesthetic.

High Conservation Value Forest (HCVF)

The MC&I (2002) gives prominence to HCVF as stated in Principle 9 which states that "Management activities in high conservation value forests shall maintain or enhance the attributes which define such forests. Decisions regarding high conservation value forests shall always be considered in the context of a precautionary approach.

Undoubtedly the concept is important and designed to preserve forest-based species, sites and even certain cultural practices from extinction, the antithesis of sustainability. We should however at the same



time not be mesmerised by this new label and be overawed by its apparent novelty. Forest managers should recognise that the spirit of HCVF in Malaysian forest management exists as early as the MUS decade. Its Sustained Yield concept, and later the haloed Sustainable Forest Management (SFM) concept underlying the SMS, the RIL and the host of post-harvest treatments, plus the high resource security imbued in the voluminous forest and forest-related policy, laws and regulations are all essentially instruments to

forge sustainability, the core of HCVF. We have in fact been practicing sustainability decades before a high sounding label was attached to it which indeed reminds me of the down-to-earth saying, kicap lama, botol baru (old sauce, new bottle).

HCVF is an important instrument in conservation and preservation, which inculcates the needed sense of urgency in a planetary environmental turmoil seemingly on the verge of self-destruction; no dispute on this, period. This urgency is however more felt in developing economies addicted to resource squandering or in post-industrial ones, with hangover guilt complex of similar past sins. Fortunately, we are not in either category. Although we should be guided by HCVF in conserving our forest-based assets into the future, our forest managers should however remain mindful that, in the context of Malaysian forest management, and in its evolution, resource sustainability has always been at its core. HCVF should thus wisely be perceived in its proper perspective and never as novelty.

➤ THE FUTURE

Forest resource security and sustainability should continue to be the guiding beacon of forest management in the future. The stakes and negative implication to our future economy, indeed our environmental safety and quality of life, are just too high if we do otherwise.

Let me illustrate this point; not many years ago, Selangor state earned about RM30 million from timber revenue but RM300 million in water consumption coming from forest water catchments. In Larut Matang, on the mangrove-protected coast of Perak, revenue from traditionally produced charcoal and mangrove poles for piling, is pittance compared with the hundreds of million ringgit earned from the coastal fishing industry. These golden eggs as it were, will vaporise overnight, if you kill the goose, the forest ecosystem that produce them.

In the same vein, it also makes sense to preserve and sustain forest biodiversity. Beyond its heritage value, which we should rightly be proud of, biotechnology, no doubt with active

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contribution from UPM scientists, will unlock a multibillion ringgit industry from its vast inventory of chemicals and drugs still trapped in the forest ecosystem, nurtured and readied as it were in a 130 million-year evolution. Such immense largesse from Providence is indeed humbling and our kesyukuran (thankfulness) here is in order.

Despite the high visibility of timber production, future forest vales will mainly derive from non-timber, often intangible and elusive. It is difficult to tag a value to forest-inspired quality of life, sense of wellness and happiness. The cultural

traits and identity inherited from our forest-conditioned forefathers are in fact priceless. Economists are beginning to put values to the benign and protective role of forests such as flood mitigation, soil conservation and fertility, slope stability, coastline protection, carbon sequestration and climate stabilisation. Our law and policy makers should appreciate such largesse given by Providence. On this operating scale forest revenue from timber production can be considered insignificant and immeasurably asymmetrical to the immense but hidden value accruing through landscape security and protection.

Box 1: The Forest Regeneration Process

Every piece of forest has a capacity to renew itself if disturbed or damaged, quite analogous to the human skin's ability to heal its wound. The normal of disturbance occurring under natural condition is the uprooting of a forest giant, a long-lived dominant in the uppermost storey, thus creating a forest gap and incurring some damage to neighbouring trees and vegetation. The surrounding soil is seldom disturbed aside from the uprooting.

Far from an anticlimax, the demise of the giant is actually the beginning of a very important process in the dynamics of the forest, its regeneration which ensures its ultimate and long-term survival. The crown opening immediately and drastically changes the microclimate at the floor of the gap creating a condition conducive to the growth of regeneration (seedlings and saplings) already present under the shadows of the fallen giant. This feature of 'regeneration-in-waiting' is typical of the Dipterocarp formation. Without the opening, and particularly the attendant increase of light intensity on the forest floor, the regeneration will eventually perish to be replenished during the next seeding period, the iconic and unpredictable large-scale 'mast flowering' of the Dipterocarps, which occurs anytime within a two to ten-year cycle. The forest gap regeneration is the normative process of forest renewal in the Dipterocarp formation. The growing space thus created is slowly 'filled up' by growing and competing seedlings in a classic 'survival of the fittest' dynamics over a 60-year succession period until eventually the surviving and emerging successor replaces the long-gone fallen giant. The forest stand at its developmental peak, the climax stage, is literally a mosaic of regeneration gaps at various stages of succession, but mostly in the maturing stage, in an ecological condition that can be described as a dynamic equilibrium.

In catastrophic natural events, such as in mass windthrows under typhoon-scale storms, or massive landslips on mountain or hill slopes, or forceful flooding and mudflows in upper riverine valleys, the destruction can be total wholesale tree felling with considerable vegetation and soil disturbance. The healing process will entail a long-drawn succession period exceeding a century before the climax stage is restored. In extreme cases, the succession gets deflected for a much longer period with long dominance of secondary vegetation we call the belukar, but the succession process will eventually restore the climax stand and overall sustainability of the forest.

The Devine Providence we call nature has evolved the sustainable capacity of the forest through its healing processes of regeneration and succession to deal with disturbances at all scales, from the commonly recurring crown gap openings to the rare catastrophic events.

The end of a forest giant is mainly due to windblow, the immediate cause, which usually occurs following a long-drawn deterioration process of structural weakening due to fungal decay or termite infestation of its foundation, i.e. its root and basal stem. Healthy trees seldom topple over unless under unusually forceful wind storm.

Profile



Name : **Prof. Mohd Basri Hamzah**
Position : **Consultant Fellow**
Lab : **Laboratory of Sustainable Bioresource Management (BIOREM)**



Quiz 1

What type of supermarket bag is more ecofriendly, paper or plastic?

- a) Paper
- b) Plastic
- c) Either is fine
- d) None of the above

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