



**MALAYSIA WATER RESOURCES MANAGEMENT FORUM  
09-10 JUNE 2014, PERBADANAN PUTRAJAYA, PUTRAJAYA**

# **“SUSTAINABLE FOREST MANAGEMENT : IMPLICATIONS FOR WATER RESOURCES CONSERVATION”**

**By**

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# **OUTLINE OF PRESENTATION**

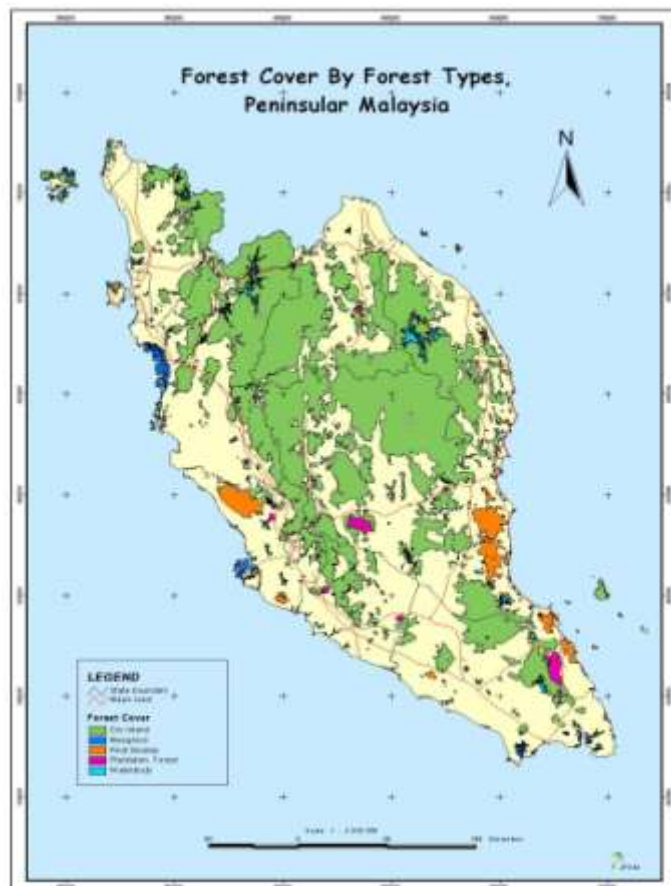
- 1. Introduction**
- 2. An Overview of Forest Resources in Malaysia**
- 3. SFM Practices In The PRFs in Peninsular Malaysia**
- 4. Issues related to water resources conservation**
- 5. The Way Forward**
- 6. Conclusions**



# IMPORTANCE OF FORESTS AS WATER RESOURCES

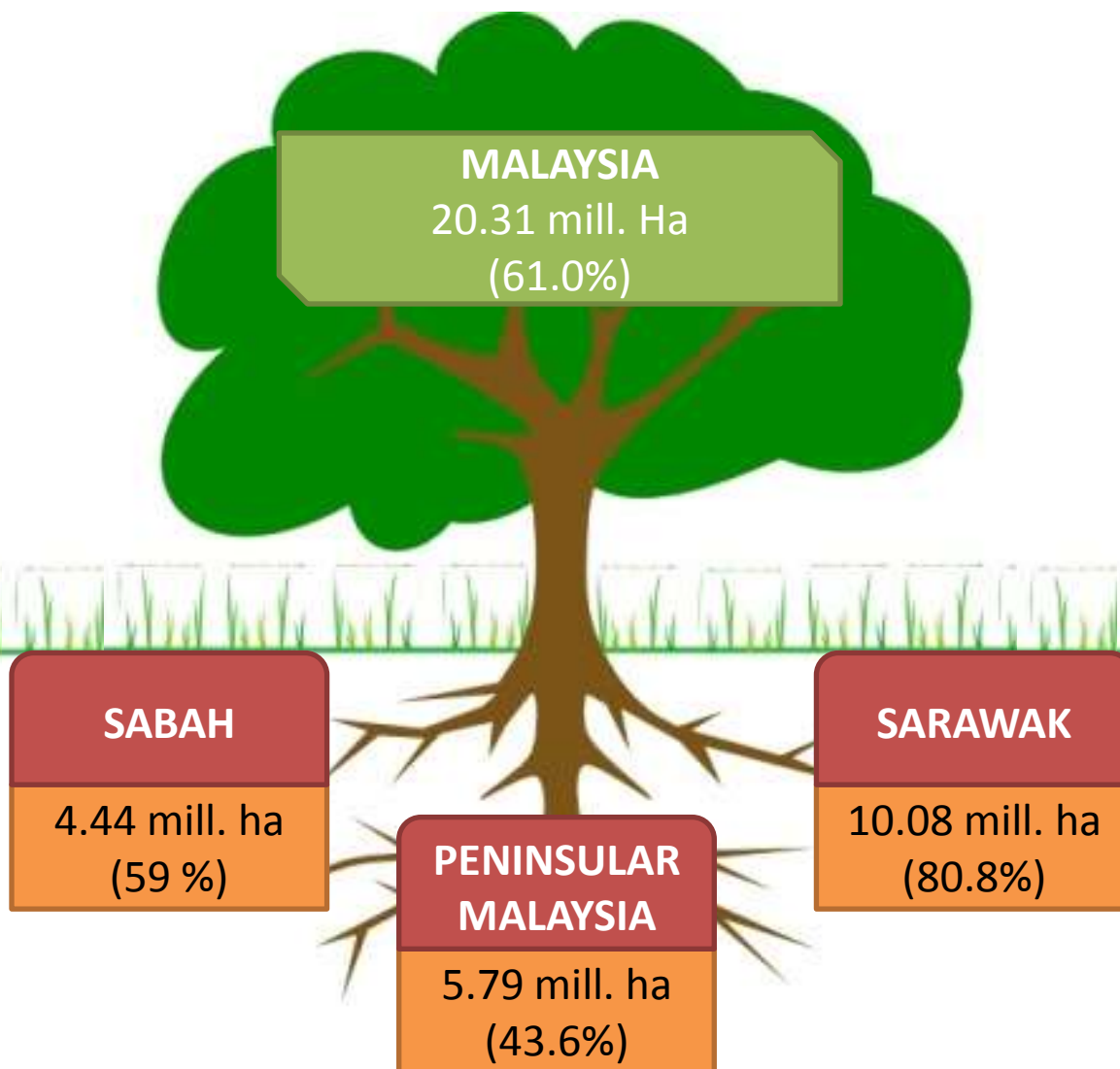
- Water is a vital element of natural resources and essential for our daily livelihood
  - Consumptive water use : irrigation, industrial and domestic water supply, mining and fisheries
  - Non-consumptive use : hydropower, recreation and fisheries
- Forest plays important roles in influencing the availability and quality of water supply
- Approximately 97% of the fresh water for agriculture, industry, household and recreational uses in P. Malaysia is derived from streams and rivers that flow from forested water catchments
- Important to manage our natural forests in a sustainable manner

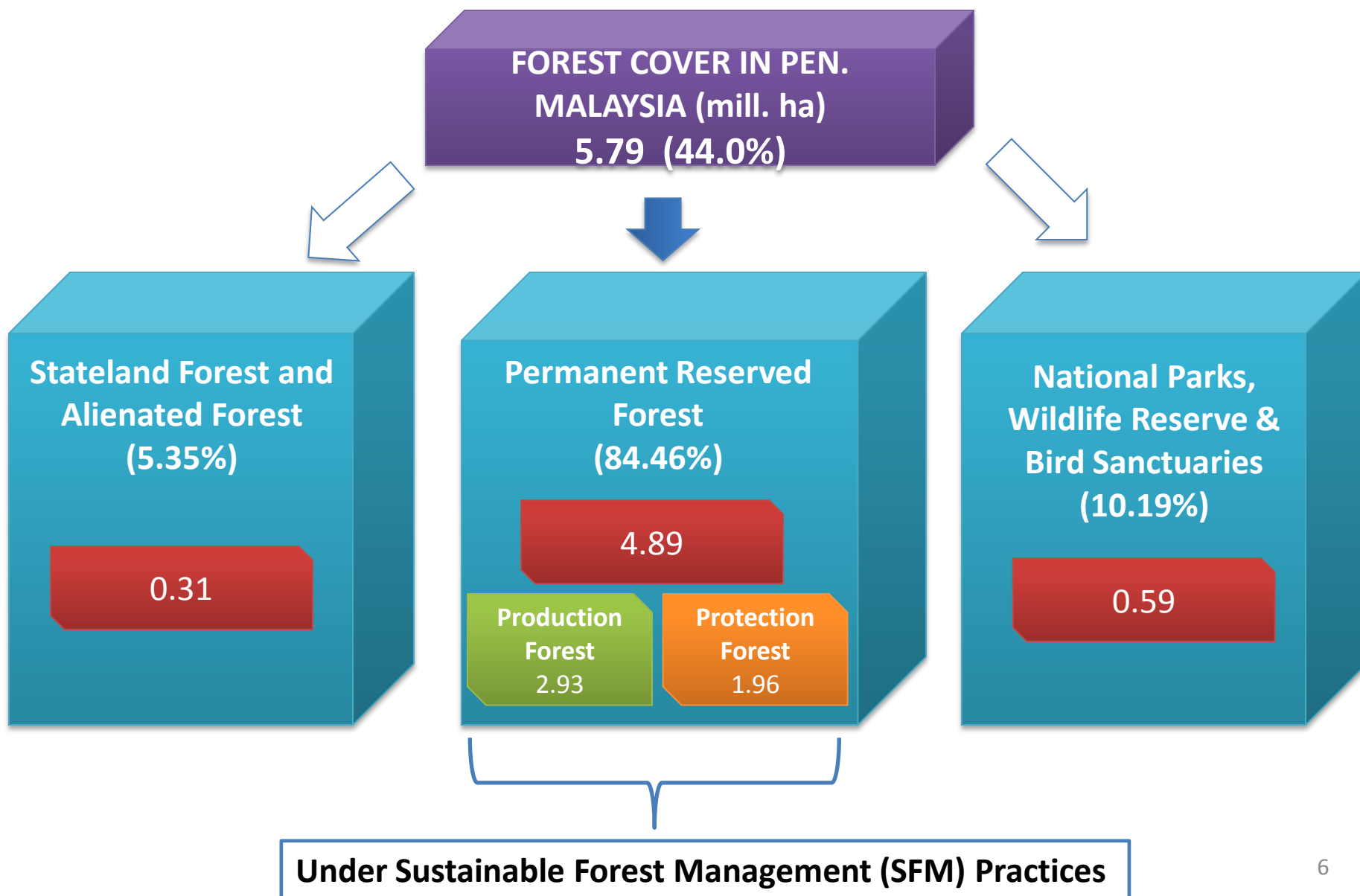
# FOREST COVER IN MALAYSIA





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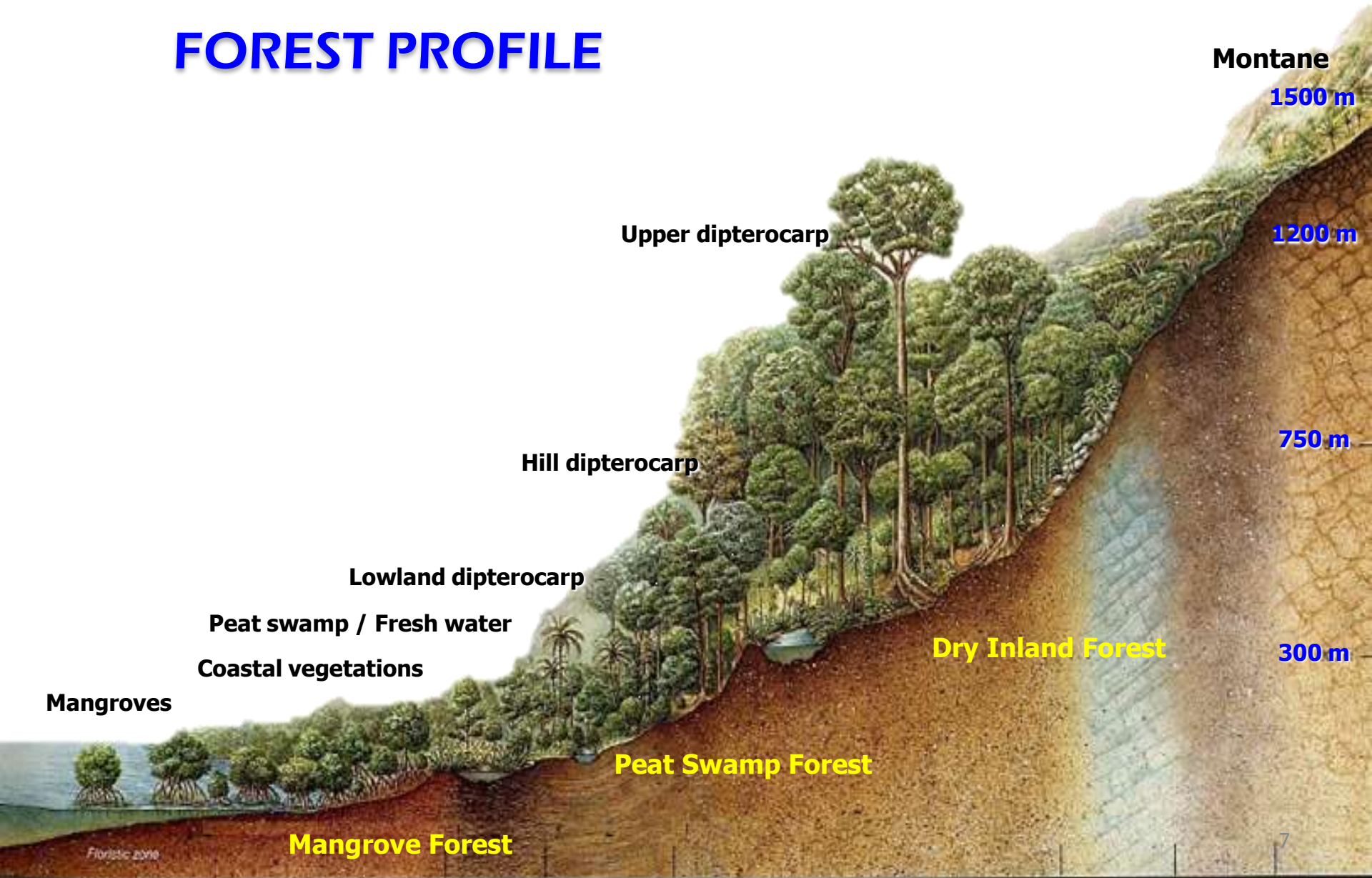








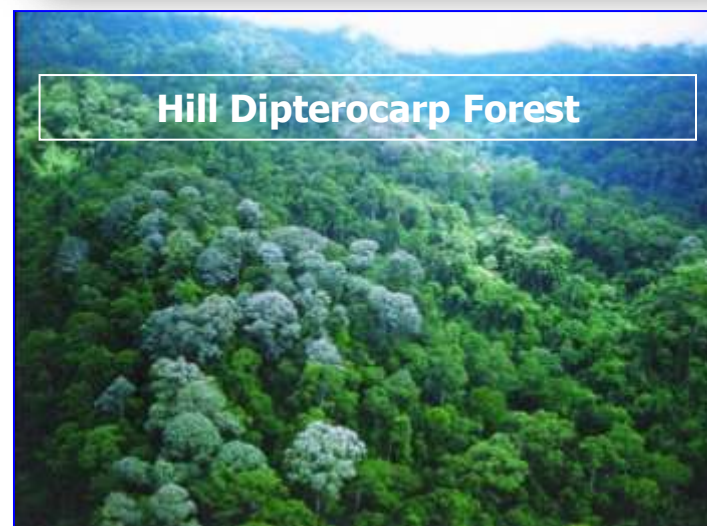
# FOREST PROFILE







# MAJOR FOREST TYPES

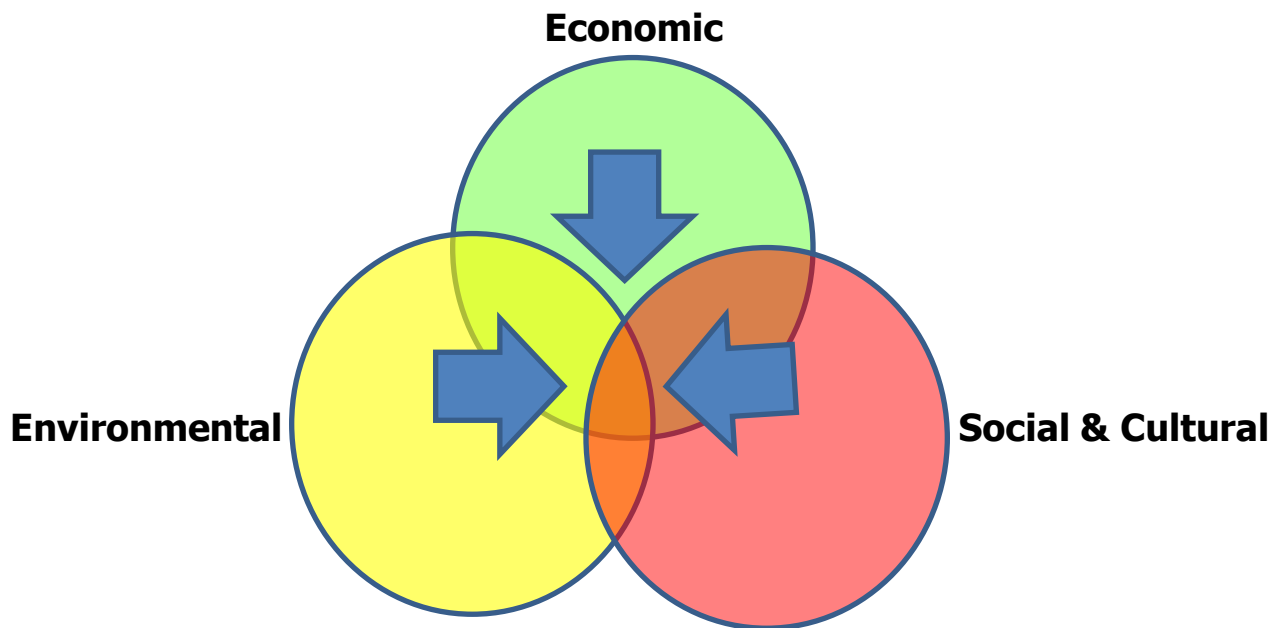




# THE CONCEPT OF SFM

**SFM - “The process of managing permanent forest land to achieved one or more clearly specified objectives of management with regard to the production of continuous flow of desired forest products and services without undue reduction in its inherent values and future productivity and without undue undesirable effects on the physical and social environment”**

**ITTO 1992**





## THE 3 MAIN PILLARS OF SFM

### Economically viable

.... this requires that the benefits to the group in question exceed the costs incurred, and that some form of equivalent capital is handed down from one generation to the next

### Environmentally sound

.... this entails an ecosystem being able to support healthy organisms, whilst maintaining its productivity, adaptability and capability for renewal; it requires forest management respects and builds on, a natural process

### Socially acceptable

.... this reflects the relationship between development and social norms, an activity is socially sustainable if it conforms with social norms, or does not stretch them beyond a community's tolerance for change



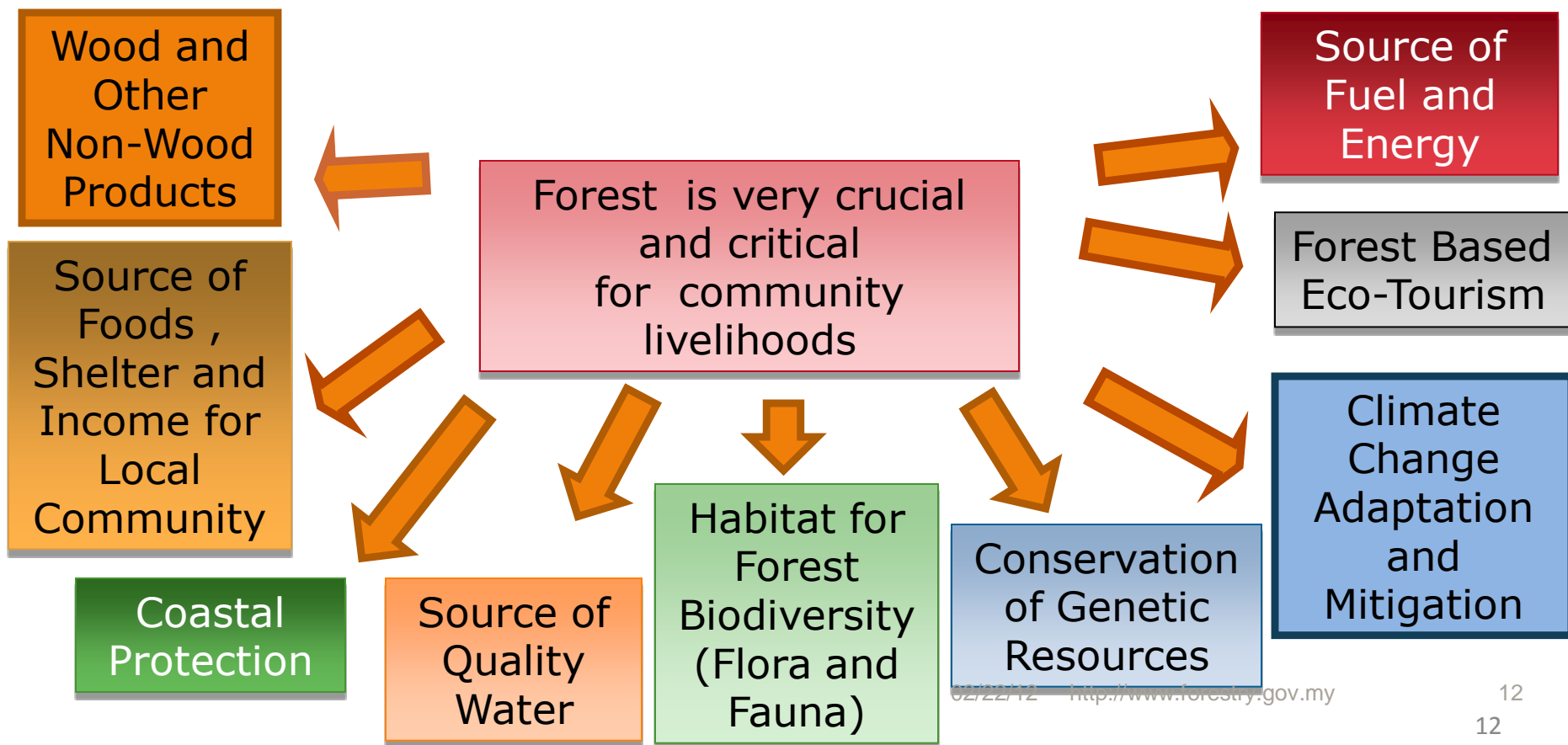
**Embedded in the SFM practices**



# **SFM PRACTICES IN RELATION TO WATER RESOURCES CONSERVATION IN PENINSULAR MALAYSIA**

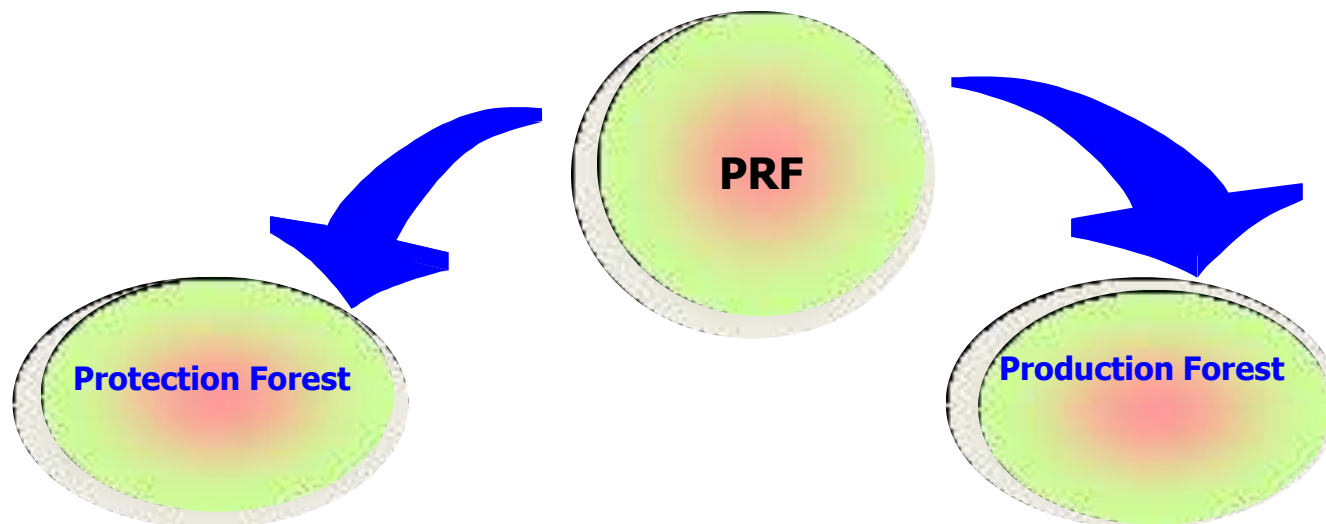


## Our Forests are more than just about trees "Looking Beyond Trees"





# SUSTAINABLE FOREST MANAGEMENT PRACTICES



- For ensuring favourable climatic and physical conditions of the country
- Safeguarding of water resources
- Soil fertility
- Environmental quality
- Preservation of biological diversity
- Minimization of damage by floods and erosion to rivers and agricultural land.

- For the supply in perpetuity, at reasonable rates of all forms of forest produce which can be economically produced within the country and are required for agricultural, domestic, industrial purposes and for export.



## **CLASSIFICATION OF PRFs INTO FUNCTIONAL CLASSES**

Section 10, NFA 1984, allows PRFs to be classified into any of the following twelve (12) functional classes to promote sustainable forest management taking into account the multiple roles/uses of forest:

1. Timber Production Forest under sustained yield
2. Soil Protection Forest
3. Soil Reclamation Forest
4. Flood Control Forest
5. Water Catchment Forest
6. Forest Sanctuary for Wildlife
7. Virgin Jungle Reserves
8. Amenity Forest
9. Education Forest
10. Research Forest
11. Forest for Federal purposes
12. Forest State Parks



# **WATER CATCHMENT FORESTS**

**Water catchment forests : Forest areas within PRFs which contain river basins with a network of drainage systems originating from precipitation and have a natural topographical border. Areas within PRFs suitable to be gazetted as water catchment forests include :**

- i. Catchments for dams used as sources of raw water for domestic use;**
- ii. Catchments for water intakes which supply raw water straight to supply pipes;**
- iii. Catchments for rivers used for recreational purposes**



## GAZETTED WATER CATCHMENT FORESTS

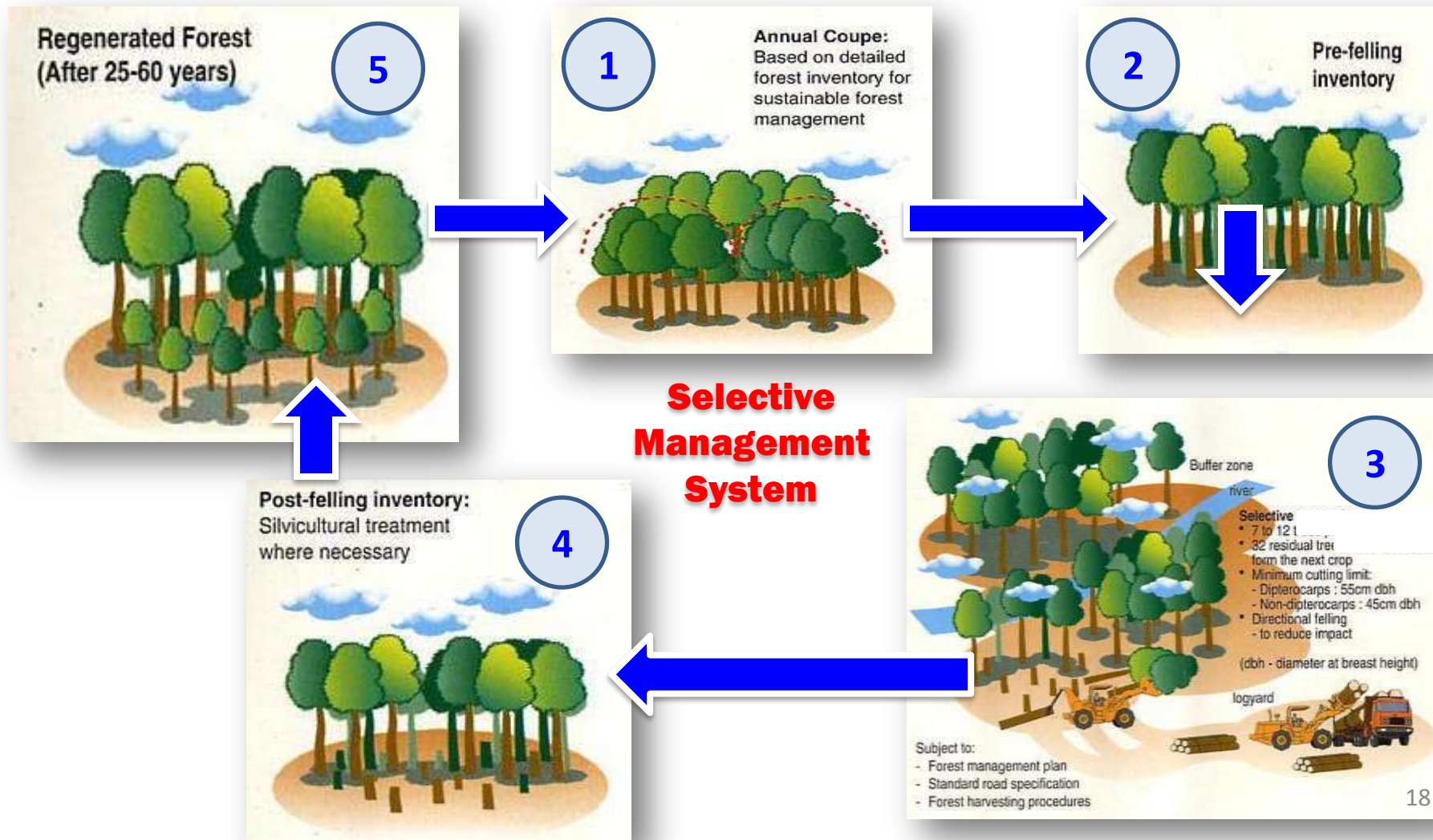
State	Area Gazetted (ha)
Johor	85,598
Kedah	31,219
Kelantan	35,898
Melaka	1,240
Negeri Sembilan	51,020
Pahang	258,707
Perak	159,866
Perlis	4,380
Pulau Pinang	3,121
Selangor	44,543
Terengganu	49,107
Federal Territory	0
Total	724,699





# **SFM PRACTICES IN PRODUCTION FORESTS**

# SELECTIVE MANAGEMENT SYSTEM (SMS)





## REDUCED IMPACT LOGGING (RIL)

Timber harvesting in the inland forest of the PRFs is carried out by using the RIL technique.

RIL: The implementation of an intensively planned and controlled set of forest harvesting guidelines, which results in **low level of damage to the residual trees, soil and water** so that the productive capacity of the forest after logging is sustained together with its ecological functions.



## Essential Components of RIL

### **Pre-Felling operation:**

- Demarcation of Compartment Boundary
- Conduct Pre-Felling Inventory
- Determination of minimum diameter cutting limits
- Marking and mapping of selected trees for felling, mother trees for retention, trees for protection and direction of felling
- Demarcation of river buffer zones
- Planning of feeder roads, skid trails and log-landings
- Preparation of forest harvesting plan





## Essential Components of RIL

### **Felling operation:**

- Construction of forest roads
- Felling, winching and skidding, bucking and transportation of logs
- Monitoring

### **Post-Felling operation:**

- Rehabilitation of skid trails, log landings and logging camps
- Preparation Forest Harvesting Closing Report
- Conducting a Post-Felling Inventory
- Silviculture Treatment



## **RIL essential for water resource conservation**



### **Marking of Protected Areas**

- Areas with elevation above 1000 m;
- Areas of slopes greater than 40°;
- Buffer strips of permanent water courses (min. 10m on both sides)



### **Construction of Feeder Roads**

- Density  $\leq 40\text{m/ha}$
- Road gradient  $\leq 20\%$  ( 11.3°)



## **REDUCED IMPACT LOGGING**

- **Construction of Skid Trails**
  - Density  $\leq 300$  m/ha
  - Gradient  $\leq 36\%$  (  $20^\circ$  )
  
- **Construction of log-landings and logging camps**
  - Used by several logging licenses
  - At least 50 m from water course
  
- **Preparation of Harvesting Plan**
  - Gives background of the licensee, harvesting activities to be undertaken, summary of trees to be felled, list of mother trees and map of area to be harvested etc.



**Pre-Felling inventory**





**Demarcation of  
River Buffer zone**



**Marking of Feeder Road Tree**



**Marking of Mother Tree**



Construction of feeder roads, skid trails and log-landings which adhere to **sound engineering and environmental standards**







## Winching of logs to the planned skid trails



**Log Fisher**



## Application of **appropriate felling** and **bucking** techniques







**Rehabilitation of skid trails**



**Post-F inventory**



**Enrichment planting**





# GUIDELINES AND RULES RELATED TO SUSTAINABLE FOREST HARVESTING

- Forestry Manual 2003
- MS ISO 9001:2008 - Management of Sustained Yield Timber Harvesting In Permanent Reserved Forest of Inland Natural Forest
- Guidelines for Reduced Impact Logging in Peninsular Malaysia (RIL)
- Code of Practices for Forest Harvesting in Inland Natural Forest in Peninsular Malaysia
- Guidelines for Forest Road Construction 2010
- Malaysian Criteria and Indicators for Forest Management Certification [MC&I(2002)]





## **FOREST MANAGEMENT CERTIFICATION AS A TOOL TO ASSESS SFM**

Forest Management Certification is a process of third party audit of the forest management practices of natural forest in a Forest Management Unit (FMU) to assess compliance with the requirements of a prescribed standard leading to an award of a Certificate for Forest Management.

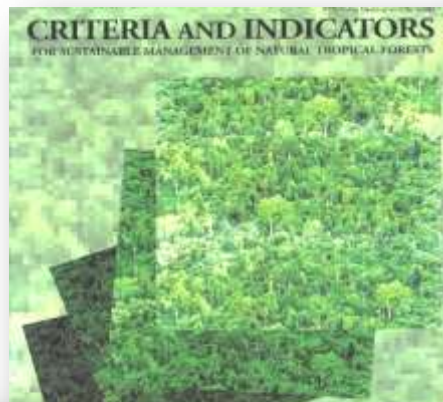
The MC & I (2002) has been the standard used for the forest management certification of natural forest in Malaysia under the Malaysian Timber Certification Scheme (MTCS) since October 2005. This MC & I was formulated based on the 1998 ITTO Criteria and Indicators for Sustainable Management of Natural Tropical Forests.





# FOREST MANAGEMENT CERTIFICATION

- 8 FMUs in Peninsular Malaysia awarded Forest Management Certificates





# ISSUES RELATED TO WATER RESOURCES CONSERVATION

## 1. Definition of watershed and water catchment

Dictionary of Natural Resource Management defines 'watershed' as an area of land, which may or may not be under forest cover, draining water, organic matter, dissolved nutrients and sediments into a lake or stream; while 'catchment' is defined as the total area draining into a given reservoir or impoundment area. Based on this definition, all forested areas can be considered as watershed areas.

The perception of the general public is that no timber harvesting should be carried out in watershed areas. As it is, timber harvesting activities are permitted by the Forestry Department within the forested watersheds. This to certain extent gives rise to confusion among the general public.

In the context of Forestry Department, no timber harvesting will be carried out in 'water catchment forest' gazetted under Section 10(1)(e) of the National Forestry Act 1984.



## **ISSUES RELATED TO WATER RESOURCES CONSERVATION**

### **2. Concern by the general public on the impacts of forest harvesting activities on watershed functions and services**

- **Stringent measures undertaken in forest harvesting under SMS using RIL techniques**
- **Hydrological studies indicated that**
  - **selective forest harvesting leads to increase in water yield but return to its original level after 7 years**
  - **water quality and sediment yield would revert back to their original conditions, that is prior to logging within a period of 1-3 years when proper planning is incorporated before and during forest operations**



# ISSUES RELATED TO WATER RESOURCES CONSERVATION

## 3. Impacts from other land uses

- SFM practices coupled with an effective enforcement of prescribed procedures have a direct influence on stream water quality within forested and upper reaches areas. However, as water travels downstream where vegetation and land use is no longer forest, the above influence may be diminished.

## 4. Upstream-Downstream Interaction

- Pertinent to examine the relationship between upstream and downstream activities that directly or indirectly affect the overall health of the watersheds and the rivers.
- Cost and benefits should be equitably distributed



## **THE WAY FORWARD**

- **Generate competent and knowledgeable forest managers, supervisors and timber harvesting operators.**
- **Strict enforcement on the application of Reduced Impact Logging (RIL) techniques in forest harvesting;**
- **Continuous identification of suitable areas within PRFs to be gazetted as water catchment forests;**
- **Rehabilitation of degraded water catchment forests;**
- **Preparation of Water Catchment Forest Management Plan at State level;**
- **Implementation of water resource integrated management approach in collaboration with other relevant agencies such as DID, NAHRIM, FRIM & Universities, in the management and conservation of water catchment forests;**





## **THE WAY FORWARD**

- **Conduct more studies related to quantity and quality of water within the water catchment forests to create a good database;**
- **Enhance capacity building of FDPM staff;**
- **Internalization of environmental costs to dispel the assumption that the environment is a free good and help to alleviate the pressure for forest conversion;**
- **Enhance R & D in water catchment management;**
- **Collaboration with international organizations and NGOs for funding of water resources conservation projects;**
- **Payment for Ecosystem Services (PES);**
- **Awareness and publicity programmes**
- **Incorporate good governance in SFM practices**





# CONCLUSIONS

- Forests have close relationship to our water resources;
- Concerted efforts have been undertaken by the Forestry Departments to ensure that all forest management activities within the PRFs do not jeopardize the protective functions of the forests;
- RIL techniques are being strictly implemented in forest harvesting operations in the production forests of the PRFs to ensure minimal impact of forest harvesting on watershed functions and services;
- More areas within the PRFs to be gazetted under the National Forestry Act 1984 and managed specifically as water catchment forests;
- More efforts need to be carried out in the implementation of water resource integrated management approach, creation of database, R & D, sourcing of funding, awareness programmes, and the incorporation of good governance in SFM practices.



# THANK YOU

<http://www.forestry.gov.my>

