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MALAYSIA

Soil Resource Management

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Content

- Introduction
- Status of soil resources in the country
- Main issues and soil threats
- Ongoing activities
- National priorities for sustainable soil management
Introduction

- MALAYSIA (formely Malaya)
  1957 - gained independent
  1963 - Sabah and Sarawak joined Malaysia
- Situated in Southeast Asia
- Two main geographical region separated by the South China Sea:
  **Peninsular Malaysia** in the West, lying between Thailand and Singapore, and the states of **Sabah** and **Sarawak** located in the northern part of the Island of Borneo.
The capital city of Malaysia is **Kuala Lumpur**; meanwhile **Putrajaya** is the administrative center.

Total population as of 2013 is at 29.7 million people with 13.2 million labour forces.

- The contribution of agriculture to GDP was 7.6% in 2012.
  - Palm oil is the biggest contributor at 36.5% of total agriculture GDP.
  - Other agriculture activities (18.2%), fishing (14.4%), livestock (11.7%), forestry & logging (11.0%) and rubber (8.2%).
Due to history and geography, separated into three regions: Peninsular Malaysia, Sarawak and Sabah.

Consist of 13 states and three federal territories.

International borders between Malaysia and Indonesia, Thailand, Singapore and Brunei are defined mostly by geological features such as the rivers, straits, canal and watershed.
Climate

- Malaysia is a humid tropical country which is characterized by an annual monsoons wind from southeast from April to October and northeast winds from November to March.
- The average annual rainfall is 2420 mm/year in Peninsular Malaysia; 2630 mm/year in Sabah and 3850 mm/year in Sarawak.
- The monthly mean temperature is at 25°C to 28°C in the coastal lowlands.
- Relative humidity is 75 to 90%.
Status of soil resources in the country

- The total land area: 329,847 km²
- Coast line: 4,675 km
- Peninsular Malaysia makes up 132,090 km² (39.7%) while East Malaysia (Sarawak and Sabah) covers 198,847 km² (60.3%).
- Agriculture land - 10,985,453 (33.3%)
Peninsular Malaysia
Physical area – 13.21 mil. ha
• Suitable – 53%
• Marginal and unsuitable – 47%
  (Peat, acid sulfate soil, sandy beach ridges, sand tailing and steepland)

Sarawak
Physical area – 12.3 mil. ha
• Suitable – 28%
• Marginal and unsuitable 72 %
  (Steepland, swamp)

Sabah
Physical area – 7.36 mil. ha
• Suitable –30%
• Marginal and unsuitable 70 % (Swamp and steepland)
Soil Information

- Under the **custodian** of Department of Agriculture (DOA), Ministry of Agriculture and Agrobased Industry
  - Due to history and geography, the soil information is under the custodian of DOA for each region
  - Standardization by the ‘Committee for Standardization of Soil Survey and Evaluation of Malaysia’ (COMSSSEM)
  - Through Soil Correlation, Conference, Seminar etc
Current Activities

National Soil Survey: DOA

R & D:
- MARDI (Malaysia Agriculture Research and Development Institute)
- FRIM (Forest Research Institute of Malaysia)
- NAHRIM (National Hydrology Research Institute of Malaysia)
- Universities
- Estates

Soil Correlation, Conference, Seminar etc
Current Status of Soil Map

The DOA is the custodian of spatial soil data

1. **Schematic Reconnaissance Soil Map** - Completed for the whole country, late 1970’s; Map scale: 1:250,000; Vector mode polygon map; Mapping units – Soil Family, Soil Association, Soil Complexes

2. **Semi Detailed Soil Map** - Produced for major agriculture development areas (on going); Intensity: 1 point examination for 20 ha; Map scale: 1:25,000; Vector mode polygon map; Mapping units – Soil series, Soil families, Soil Association and complexes

3. **Detailed Soil Map** - Only for specific agriculture projects – experiment plots, food park etc (carry out on ad hoc basis); Intensity: 1 point examination for 4 ha; Map scale: 1:10,000; Mapping units – Soil series and complexes
Current Soil Classification Structure

- USDA Soil Taxonomy
- FAO-UNESCO Legend
- Local Classification (Family and Series)

Soil Taxonomy is widely used to correlate soils between regions.
Main issues and soil threats

Development on environmental sensitive area

- Highlands agriculture areas → > 1,000 m asl - Cameron Highlands, Lojing (P. M’sia); Kundasang (Sabah) – producing temperate vegetables and flowers
- Highland is associated with steep slope
- Excessive cutting of slope caused severe erosion
- Siltation
- Loss of unique ecosystem
Development on marginal soil/land

Acid sulfate soil and peat soil

Over drained, too acidic, subsidence

Development on Peat Soil
- 2.7 mil. ha
- Some are successfully developed for short term crops, pineapples and oil palm
Main issues
- Less peat swamp forest
- Over drained, subsidence
- Fire (newly developed area)

Development on acid sulfate soil
- Need efficient water management
- Mostly developed for aquaculture, oil palm, coconut, short term crops
Main issues
- Over drained
- Too acid

Pineapple production on peat soil
Main issues and soil threats/cont’d

Ex-mining soil

- Poor sandy and gravel soil

Idle land

Urbanization

- Expansion on township

Loss of prime agriculture area

Properly managed sandy ex tin mining area for production of mango (left) and papaya
Climate change

High rainfall, prolong drought

Big flood, disturbed production pattern

Heavy rainfall
- Flood
- Severe erosion
- Siltation
- Destroy infrastructures
- Upset crop production

(Pic. – Big flood, Dec. 2014. State of Kelantan, East Cost of P. M’sia.)
Ongoing Activities

R & D

Soil Mapping

Agriculture Extension

Seminar, Conference etc

Competition

Campaign

Soil Correlation

International forum

2015 International Year of Soils
Initiatives

1. “CONSERVE OUR SOIL” Campaign
Initiatives

2. DOA, DOF, DVS – *Malaysia Good Agricultural Practices (myGAP)*, *myOrganic*.


4. JPSM – *Forest Monitoring System Using Remote Sensing (FRMS)*;

5. FRIM – Afforestation of ex mining lands, planting of herbal tree species in BRIS soils;
R & D

MUARA SG. REJANG
REHABILITATION OF MANGROVE FOREST

Dominant soil: Linau series
- Marine clay origin & wet
- Limitation: sea water flow was blocked

Species recommendation?
- don’t plant now...
- immediate action: soil remediation

REFORESTATION OF EX-MINE

Dominant soil: DLD
- Very disturbed & non-uniform
- Limitation: very heterogenous

Soil pH <3.5

Courtesy of Dr Wan Rashidah Forest Research Institute of Malaysia (FRIM)
National priorities for sustainable soil management

1) Intensifies agriculture extension
2) R & D
3) Gazeting granary area and food production park -
4) Central management/Cluster development
National priorities for sustainable soil management

4) Good Agricultural Practice (GAP) – Certification for farms practicing GAP (MyGAP or MyOrganic)

5) Best Management Practice (BMP) for Oil Palm – including ‘zero burning’
National priorities for sustainable soil management

6) Rehabilitation of degraded land – including planting under control environment

6) Urban Agriculture

Planting of vetiver grass to protect soil erosion
Rain shelter on disturbed land