

EROSION AND SEDIMENT CONTROL IN OIL PALM PLANTATION

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Presentation outline

- Introduction
- Erosion in oil palm
- Good agricultural and land management practices
- The sustainability of palm oil production
- Conclusion

INTRODUCTION



Rubber = 1,078m Ha
Cocoa = 17,368 Ha
Pepper = 16,374 Ha



High-yield palm oil production system depend on Good Agronomic Practices;

- Zero burning during land clearing and replanting
- Good nutrient management plan
- Implementation of legume cover crop policy**
- Nutrient recycling to build soil organic matter
- Soil moisture conservation practices**
- Erosion control practices**

EROSION IN OIL PALM

The highest rate of erosion and sedimentation mostly occur during land preparation, involving forest clearance or replanting, depending on the slope with the rate increasing with the slope

Accumulation of rain water on the frond tips to form larger drops, have a high kinetic energy when falling from tall palms, causing soil detachment, decreased infiltration and increased runoff resulting in erosion.

The erosion rates in matured oil palm plantations in Malaysia range from 7.7 to 14 t/ha/yr. The suggested acceptable limits of erosion at 9.0 t/ha/yr.

Steep land cultivation causes severe soil erosion resulting in serious soil degradation. Consequently, causing nutrient and water losses through runoff which would in turn decrease soil fertility.

These areas ($>25^\circ$) should not be cultivated with oil palm.

MSPO: Extensive planting on steep terrain, marginal and fragile soils shall be avoided



The background is a dark blue gradient with a starry field of small white dots. Overlaid on this are several faint, white circular patterns. In the top right, there is a large circular scale with numerical markings from 0 to 210 in increments of 10. Below it, there are several concentric circles, some solid and some dashed, with arrows indicating a clockwise direction. In the bottom left, there is another circular pattern with a dashed arrow pointing counter-clockwise. The main text is centered in a bold, yellow, sans-serif font.

GOOD AGRICULTURAL AND LAND MANAGEMENT PRACTICES

CONTROLLING SOIL EROSION

- Terracing area where the gradient exceeds 10° (with 10° back slopes);
- Building stop bunds along terraces every 10m to reduce the speed of the runoff as well as to distribute the water to the palm;
- On slightly slope ($< 10^\circ$) construction silt pits ($>500\text{m/ha}$)
- Introducing fast-growing LCC during the immature phase of planting to cover the soil and reduce the impact of rain, thus minimizing soil erosion;
 - *Mucuna bracteata* , very vigorous and dense cover, deep rooting system and superior total biomass, in Malaysia 1991, from Kerala India

- Allowing the natural soft plant cover to grow when LCC die during the mature phase of plantation;
- Maintenance of riparian reserves along the streams;
- Diverted water to the field, away from roads;
- Retained natural grasses to improve soil properties;
- Mulching young palm or between mature oil palms with EFB
- Pruned fronds are place in inter-rows, can be used as surface flow breakers and to lower down the velocity of surface runoff. The arrangement of the pruned fronds also plays an important role in intercepting soil loss.

Construction of terraces

- For gradient $> 10^\circ$ (17% slope)
- Begin from hill top, Horizontal distance 8m = 136-138 palms/ha
- Closer distance as the gradient steeper.
- Stop as the distance at 5m
- Width of terrace is 4 m for gradient 15 - 20°



- ▶ Improved access to palms for harvest operations including mechanically assisted collection (which requires terraces > 4 m wide);
- ▶ Improved water conservation, particularly during dry season (moisture availability is one of the main factors limiting yield);
- ▶ Minimal or reduced erosion (severe erosion frequently takes place on harvest paths and palm circles in sloping areas);
- ▶ Conservation of organic matter and increased fertilizer use efficiency.

Construction of terraces





Combination of **silt pit** and **legume cover crop** reduced the runoff and total soil loss per hectare by 62% and 39%, respectively.

Planting of leguminous cover crops



Macuna bracteata

Typically established within OP plantations as natural cover crops

Benefits:-

- Prevent erosion
- Enhance soil fertility
- Water / moisture conservation
- Provides nitrogen – N fixation
- Improve soil quality





Ground coverage of *Macuna bracteata* at the 24 MAP
- total dry matter 17 – 28 t/ha



preserving the water quality of rivers by filtering out pollutants transported by runoff





Retained natural
grasses to improve soil
properties



Spread cut fronds to the inter-row for erosion control.



Mulch with EFB and cut fronds in the critical (steep areas, on soils poor in organic matter).





**Pruned fronds;
18 – 24 cut/frnd/palm/yr. Contribute about 14 t dry matter/ha/yr
- contains 136kg N, 10.3kg P, 183kg K and 16.5kg Mg**

EFB Mulching

Normal application : 30 – 60t /ha

Benefits of Mulching

- improve soil structure
 - aeration, WHC
- improve soil pH
- improve nutrient status
- CEC
- root growth and development
- increase microbial activities
- reduce leaching
- improve oil palm growth



Biomass management during replanting

The policy of zero burning and recycling of nutrient from palm residues during replanting is a good agricultural practice for sustainable production of oil palm



Zero burning - Innovative technique of replanting

Young palms planted onto residue rows

Improved accessibility and efficiency of nutrient



Benefits:-

- Sustainable practice
- Environment – free from smoke pollution and trans- boundary haze
- Nutrient recycling – conserving soil fertility
- Reduce 50% chemical fertilizer inputs
- Maintaining biodiversity of soil fauna and microbial communities
- Moisture conservation
- Improved soil quality

The sustainability of palm oil production



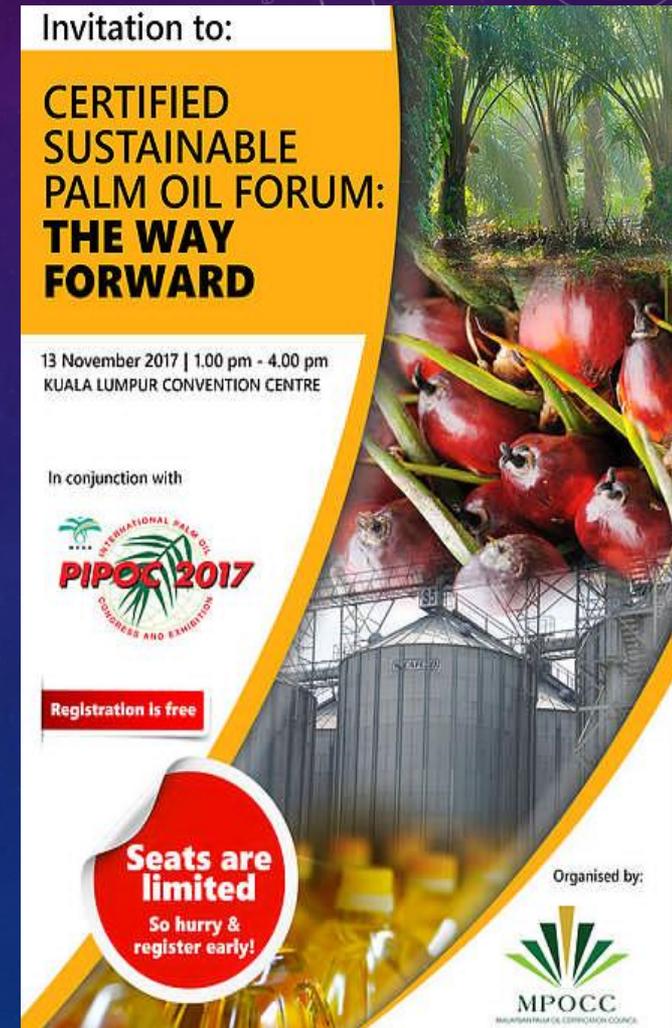
MPOCC is an independent non-profit organisation established in December 2014 to develop and operate the Malaysian Sustainable Palm Oil (MSPO) Certification Scheme. MPOCC is governed by a Board of Trustees and started its operation in October 2015.

Implementation of sustainability certification Malaysian Sustainable Palm Oil (MSPO)

“to assure that oil palm are cultivated on legal agriculture land using good agricultural and management practices”.

The Malaysian government requires all palm oil producer to get MSPO certification by end of December 2019.

Total Certified Area : 241, 377.73 Ha



Invitation to:

CERTIFIED SUSTAINABLE PALM OIL FORUM: THE WAY FORWARD

13 November 2017 | 1.00 pm - 4.00 pm
KUALA LUMPUR CONVENTION CENTRE

In conjunction with

PIPOC 2017
INTERNATIONAL PALM OIL CONGRESS AND EXHIBITION

Registration is free

Seats are limited
So hurry & register early!

Organised by:

MPOCC
MALAYSIAN PALM OIL CERTIFICATION COUNCIL

The poster features a collage of images: a lush green palm oil plantation, a close-up of red palm fruit bunches, and industrial palm oil processing tanks.

MALAYSIAN **SUSTAINABLE PALM OIL**

7 MSPO Principles

1

Principle 1

Management commitment and responsibility

Principle 2

Transparency

2

3

Principle 3

Compliance to legal requirements

Principle 4

Social responsibility, health, safety and employment conditions

4

5

Principle 5

Environment, natural resources, biodiversity and ecosystem services

Principle 6

Best practices

6



7

Principle 7

Development of new plantings

Criterion 1: Site Management: Indicator 2: Where oil palm is grown within permitted levels on sloping land, appropriate soil conservation measures shall be implement to prevent both soil erosion as well as siltation of drains and waterways.

CONCLUSION

Oil palm cultivation creates the least damage to natural resources, unless GAP are neglected.

Planting of cover crops, construction of terraces and silt pits, riparian reserve, correct placement of pruned fronds and mulching with empty fruit bunches are the GAP aimed to minimizing environment degradation, increase water infiltration rate and reduce soil erosion, leaching and runoff.

In all our actions, we must consider the impact upon future generation



M P O B

Thank you very much