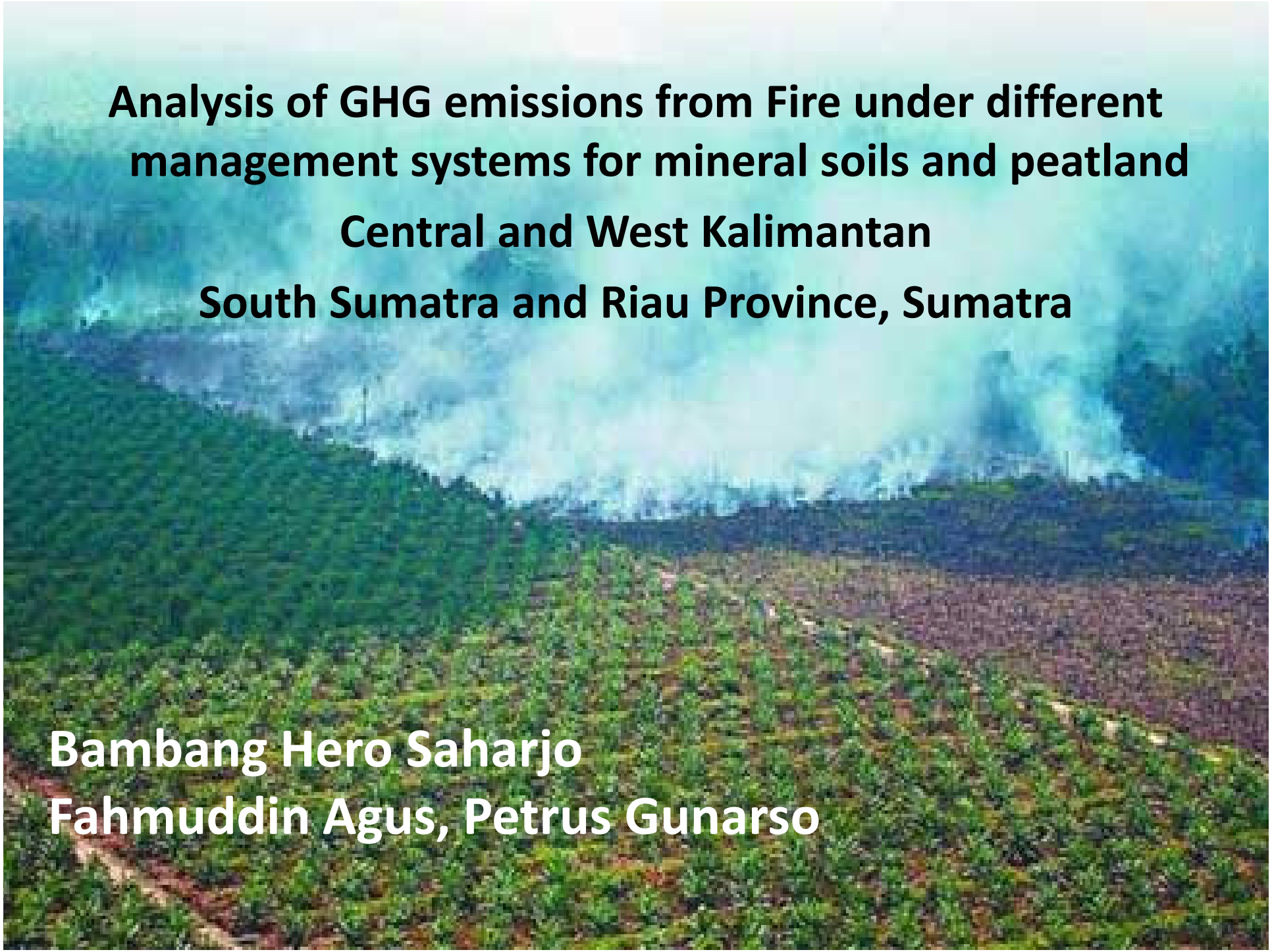


# Analysis of GHG emissions from Fire under different management systems for mineral soils and peatland

## Central and West Kalimantan

## South Sumatra and Riau Province, Sumatra

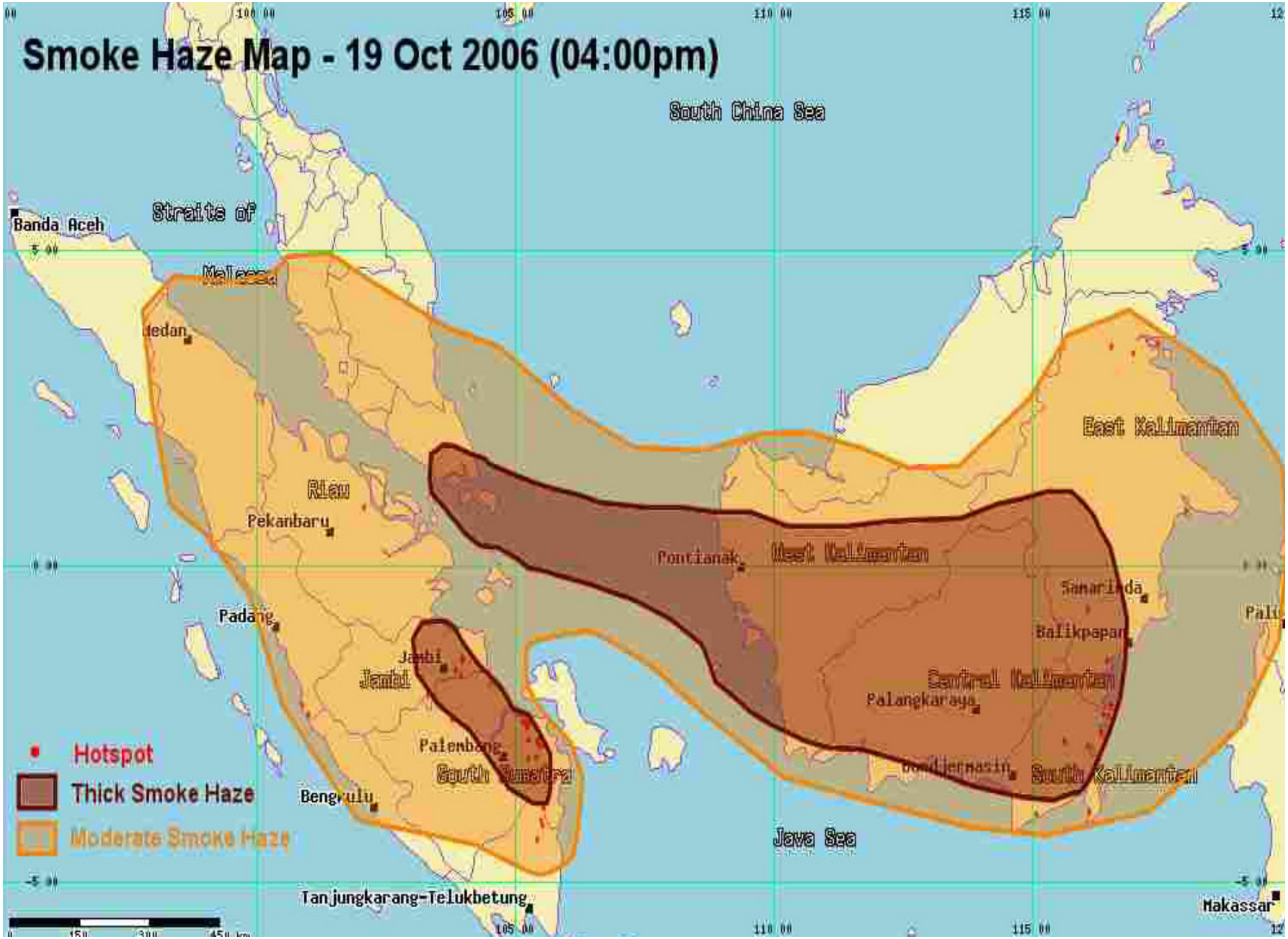
Bambang Hero Saharjo
Fahmuddin Agus, Petrus Gunarso

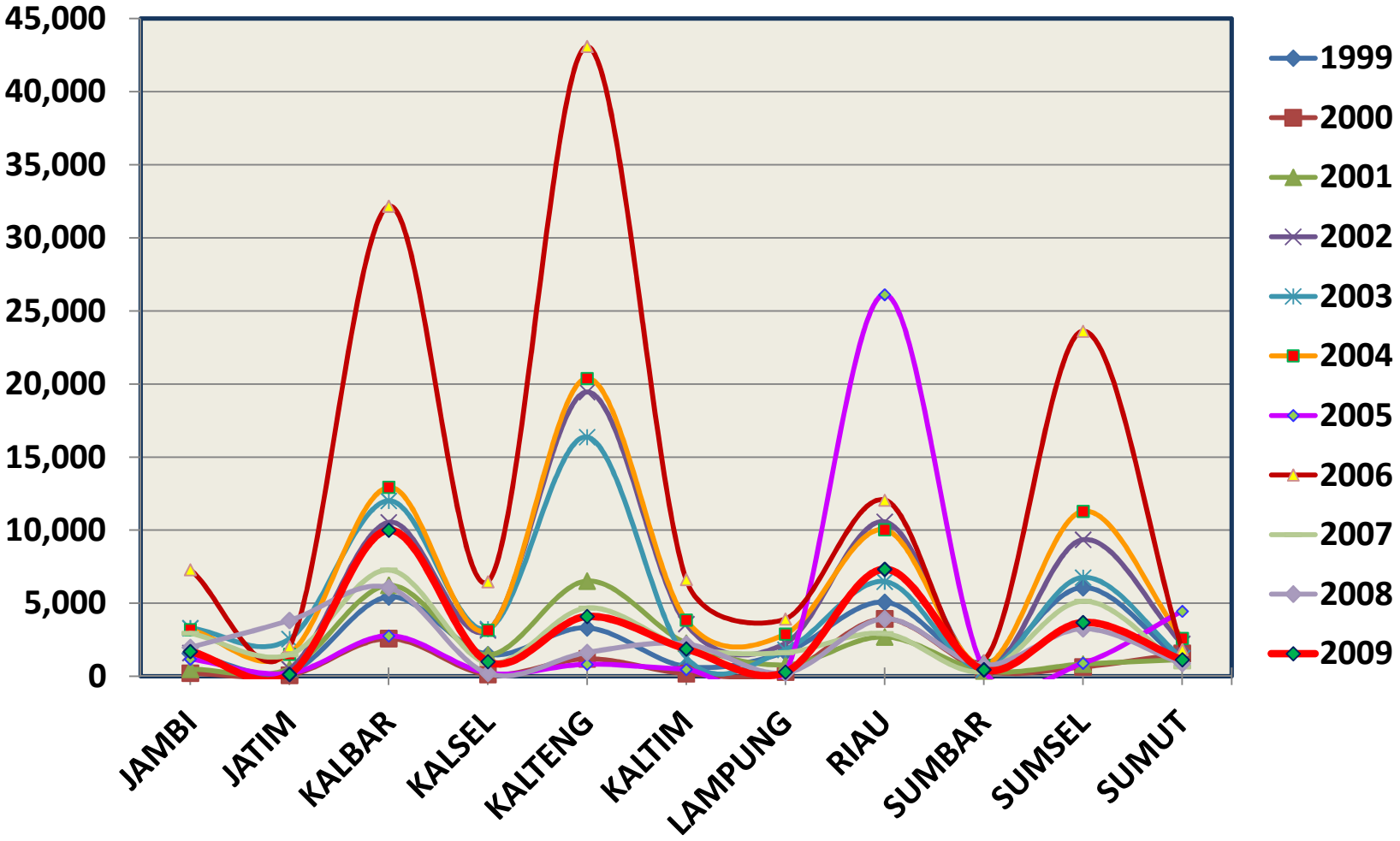
The peat emissions during 2000-2006 have been estimated at 903 Mt CO2 yr-1

- biomass removal (24%)
- peat oxidation (25%)
- uncontrolled fires (46%)

| | |
|---|---|
| Sumatra | 44% |
| Kalimantan | 40% |

Source: BAPPENAS (2009)


Smoke Haze Map - 19 Oct 2006 (04:00pm)
South China Sea
Straits of
Banda Aceh
Medan
Riau
Pekanbaru
Padang
Jambi
Palembang
South Sumatra
Bengkulu
Tanjungkarang-Telukbetung
East Kalimantan
West Kalimantan
Pontianak
Samarinda
Balikpapan
Central Kalimantan
Palangkaraya
South Kalimantan
Java Sea
Makassar
Hotspot
Thick Smoke Haze
Moderate Smoke Haze




Spatial and Temporal Distribution of Hotspots (Bappenas, 2009).

# Methodology

**Hotspots to Area Calculations**

Fire hotspots captured by NASA/MODIS from 2 temporal periods

2000 – 2005 and 2006 – 2010

Summed burned area based on hotspot radius of 0.6 km

Overlain with land cover map with 22 classes (aggregated to 18).

**Depth of Burning Assumptions**

51 cm average depth in 1997 – 2001 (Page 1997)

39 cm average depth 2002 to 2009 (USUP 2009)

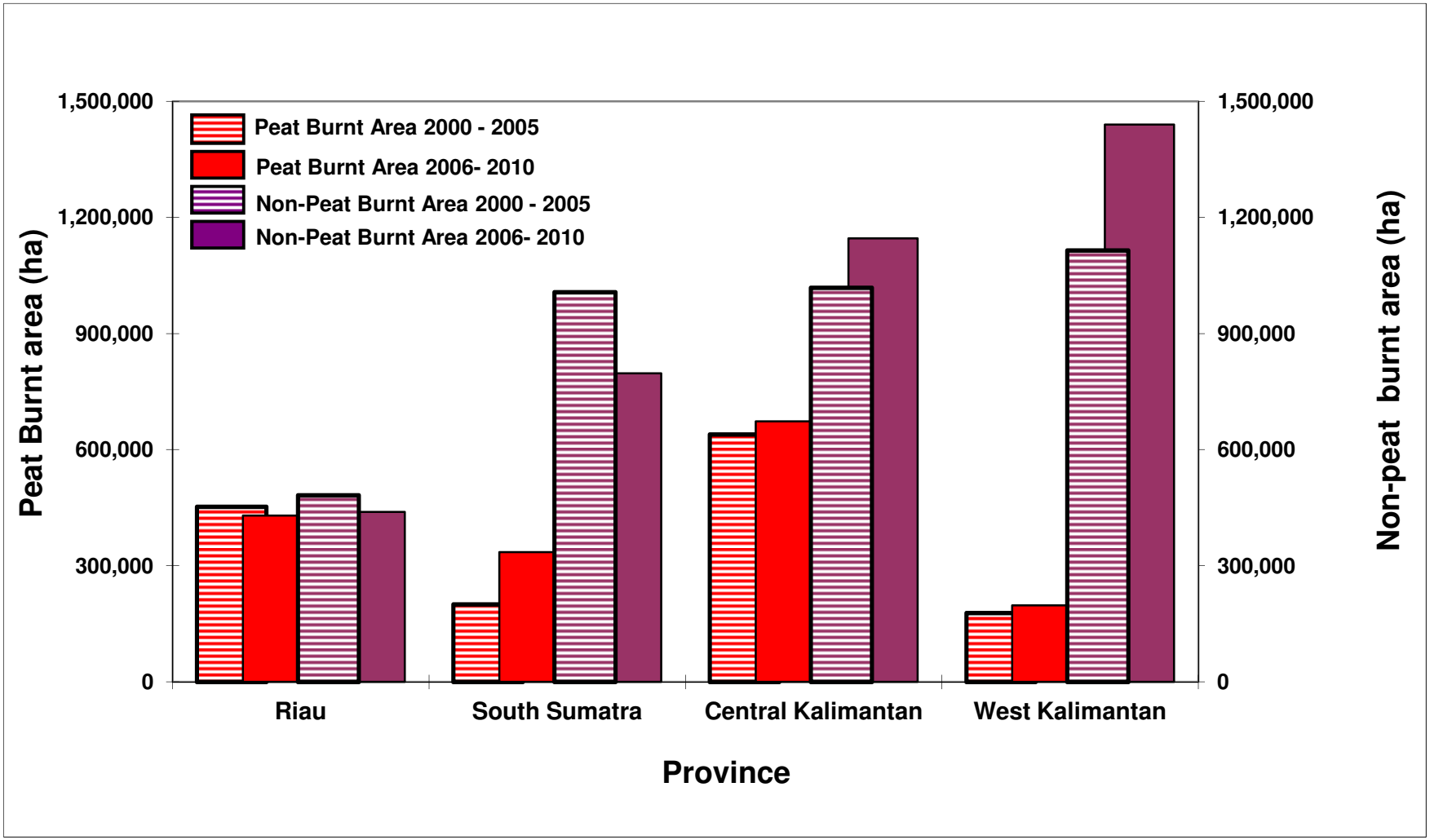
**Biomass burning: M = A x B E**

A the burned areas (ha),

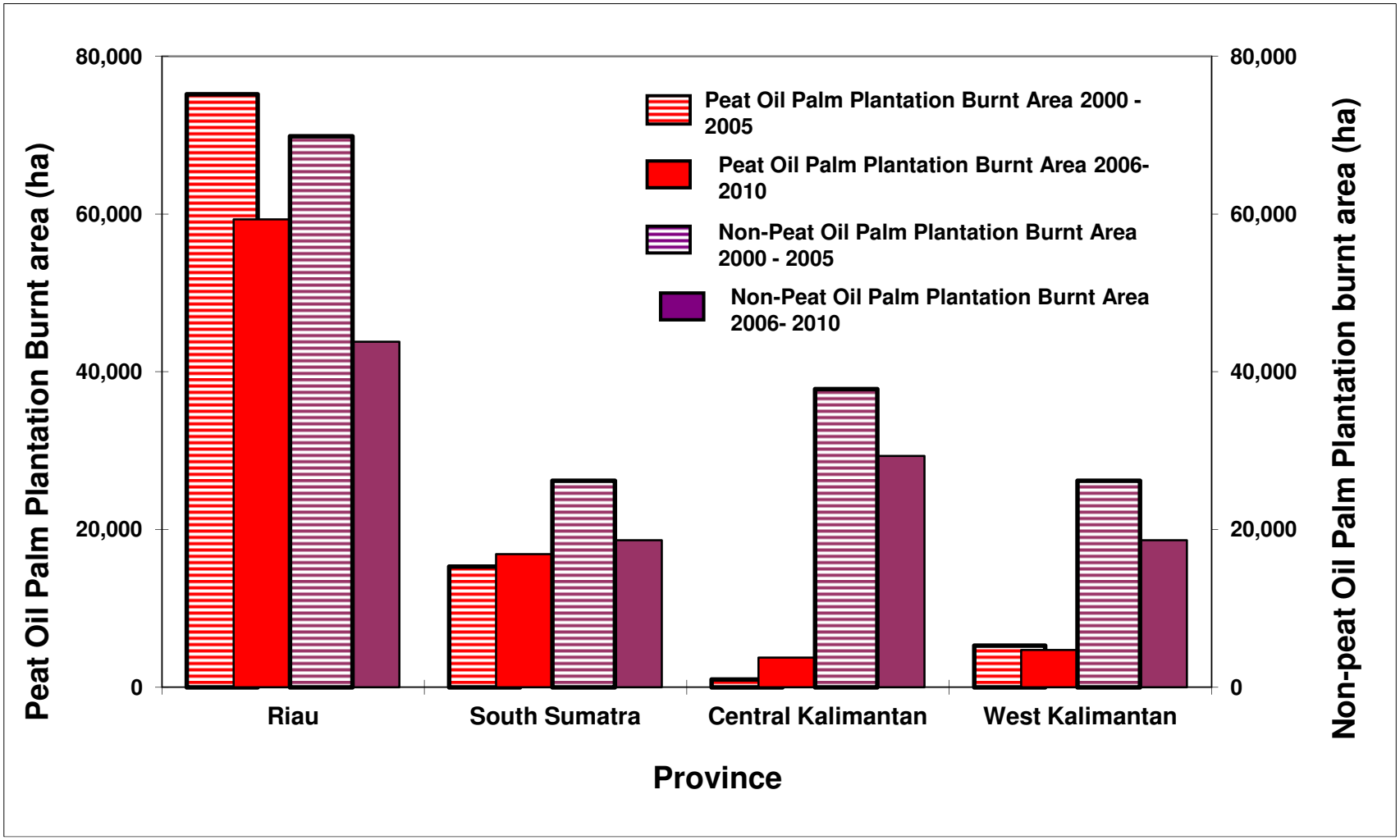
*B* the biomasss loading (t/ha)

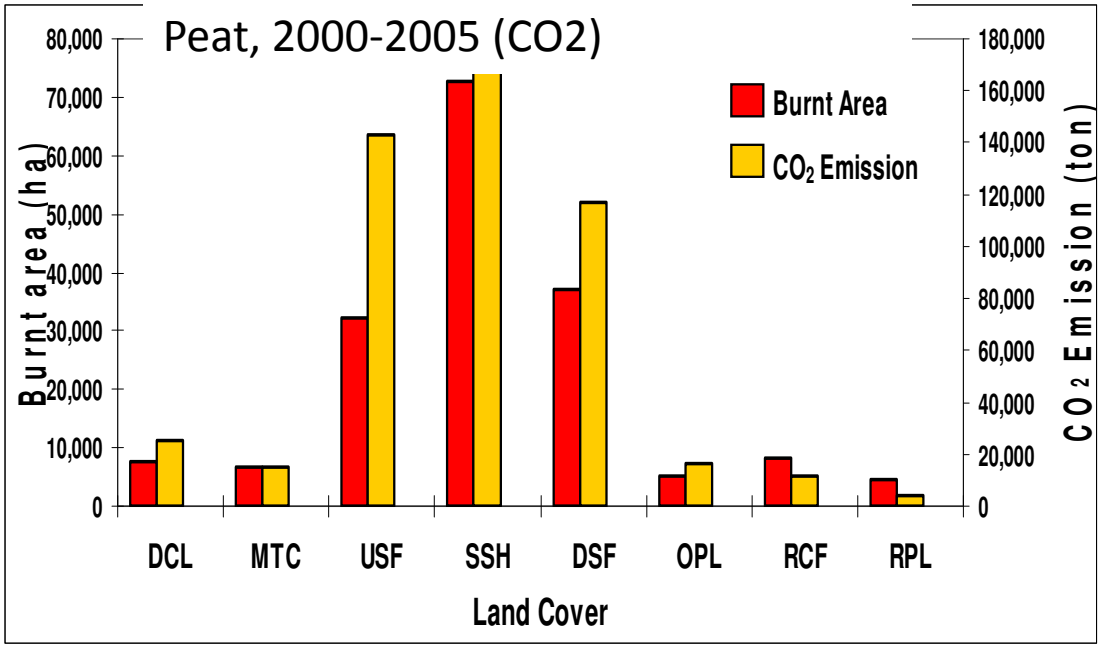
*E* the burning efficiency (%)

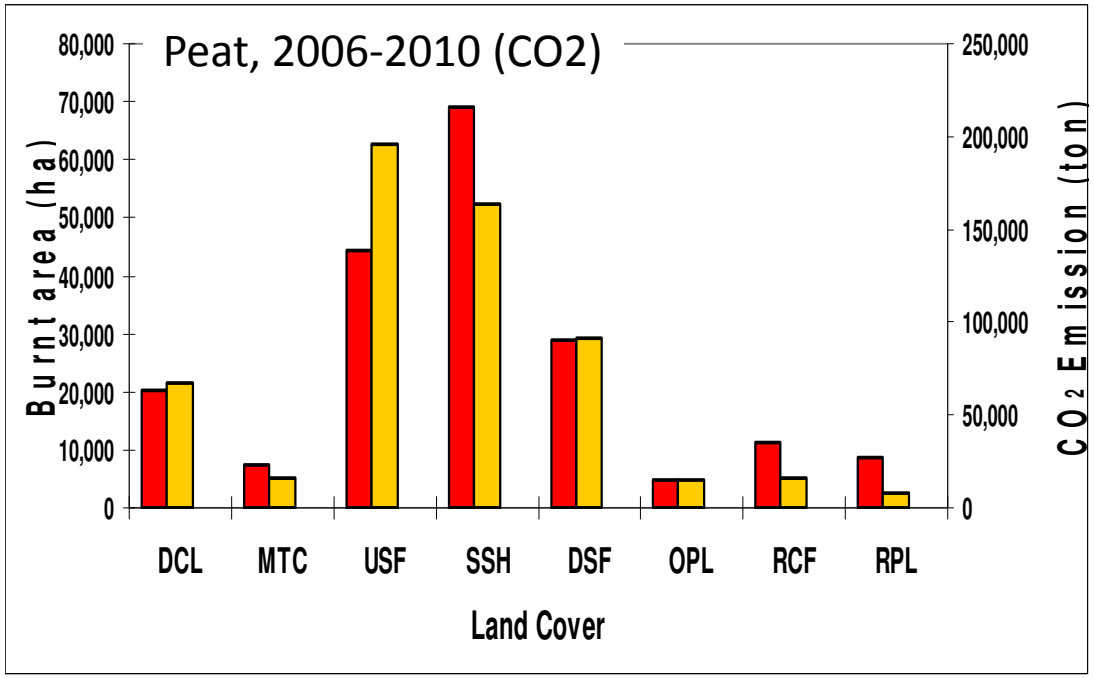
# Total Area Impacted by Fire



# Oil Palm Plantation Impacted by Fire






# **CO2 emissions in** West Kalimantan

DCL Dry Cultivation Land

MTC Mixed Tree Crops

USF Undisturbed Swamp Forest

SSH Swamp Scrubs

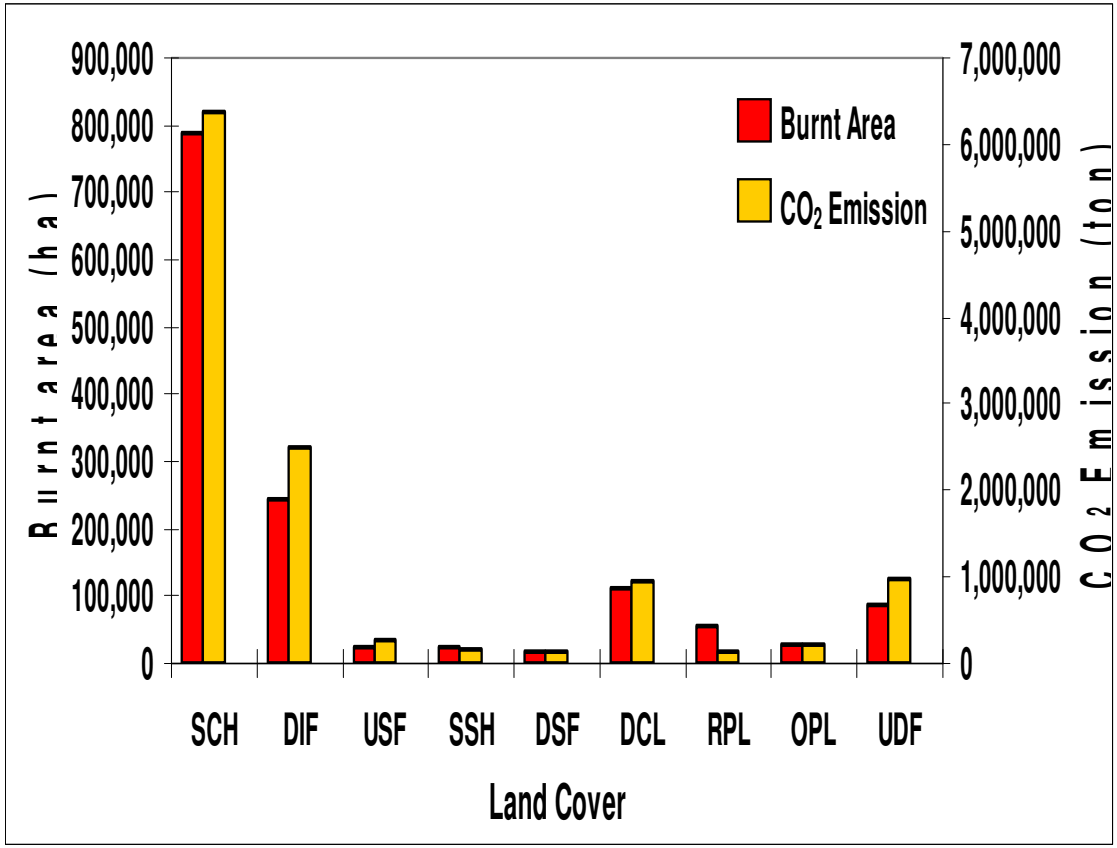
DSF Disturbed Swamp Forest

OPL Oil Palm Plantation

RCF Rice Field

RPL Rubber Plantation

Non, peat 2000-2005 (CO2)




# CO2 emissions in West Kalimantan

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RCF Rice Field

RPL Rubber Plantation

## Fire on peat to establish OP Plantation (X1000 ha)

| **Province** | **2000-2005** | **2006-2010** |
|---|---|---|
| Riau | 70 | 37 |
| South Sumatra | 3 | 34 |
| Central Kalimantan | 61 | 245 |
| West Kalimantan | 7 | 176 |
| **Total** | **191** | **492** |

## Fire on mineral soils to establish OP Plantation (X1000 ha)

| **Province** | **2000-2005** | **2006-2010** |
|---|---|---|
| Riau | 215 | 140 |
| South Sumatra | 45 | 70 |
| Central Kalimantan | 100 | 279 |
| West Kalimantan | 380 | 199 |
| **Total** | **740** | **687** |

# CONCLUSION

## BURNING CONDITION

- Burnt OP (Exist.Pl)/LU Burnt 4 Prov : 4.3 %
- Burnt peat OP/Burnt-peat LU 4 Prov. : 6.7 %
- Non-peat OP/Non-peat burnt LU 4 Prov. : 3.6 %
- LUC burnt for OP/LU Burnt 4 Prov. : 6 %

## GHG EMISSION (CO2)

- Burnt OP/LU Burnt 4 Prov : 3.9 %
- Burnt peat OP/Burnt-peat LU 4 Prov. : 6 %
- Non-peat OP/Non-peat burnt LU 4 Prov. : 3.6 %
- Burnt OP emission : 6.43 t.CO2/ha

# RECOMMENDATION

- Ban the use of Fire for land preparation
- Maintain high water tables during critical periods when fire risk is high especially for peat.
- Improve fire preventing fires through early warning and early detection system
- Preventing fire is more cost effective than fire suppression
- Law enforcement must be realize
- Improve infrastructure
- Capacity building for fire prevention