# MALAYSIA Land-Use Change in the Oil Palm Sector

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MALAYSIA	
POPULATION	28 Million
TOTAL LAND AREA *SUITABLE FOR AGRICULTURE	33 Million hectares 14.7 Million hectares
FORESTED LAND (2008)	19.5 Million hectares (~59%)
TOTAL CULTIVATED LAND	6.6 Million hectares (~20%)
OIL PALMS (2009)	5.3 Million hectares (~14%)
*Steep land and mangrove area excluded : peat included provided drainage not more than 12"	

Oil palm introduced into Malaysia in 1917

	1970	1980	1990	2000	2010
	55,000	907,000	1.7 M ha	2.5 M ha	5.3 M ha
Sourc	e MPOB				

- Digital analysis comparing various geospatial data (including satellite imageries and other spatial maps)
- Data source:

Source MPOB

Region	Year	Source	Remarks
Peninsular Malaysia	<ul> <li>a) 1990</li> <li>b) 2006</li> <li>c) 2009</li> </ul>	Dept. Of Agriculture Dept. Of Agriculture MPOB	Land use map Land use map Oil palm distribution
Sabah	<ul><li>a) 2000</li><li>b) 2005</li><li>c) 2009</li></ul>	MACRES Landsat MPOB	Satellite map Landsat image Oil palm distribution
Sarawak	<ul> <li>a) 2000</li> <li>b) 2005</li> <li>c) 2009</li> </ul>	MACRES Landsat MPOB	Satellite map Landsat image Oil palm distribution

# Land use change analysis - method



**Peninsular** Malaysia LUC and Oil Palm (1990-2006)

Changes (1990-2006)	Area (x 1000 hectares)			
Build up $\rightarrow$ Oil Palm	73			
Forest $\rightarrow$ Oil Palm	364			
Others $\rightarrow$ Oil Palm	199			
Rubber → Oil Palm	588			
Wetland $\rightarrow$ Oil Palm	163			
Total 1,387				
Source MPOB & FRIM				





Negeri Sembilan

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### Oil palm planted on peat Peninsular Malaysia

Year	Oil palm on peat (x1000 ha)	% of total peat land	Total Oil palm ( x1000 ha)	% of total oil palm plantations
1990	112	16%	1,418	0.8%
2006	213	30%	2,546	8.3%
2009	227	32%	2,683	8.4%

Total peat land area = 716, 944 hectares



# Oil palm 2000



# Oil palm 2005



#### **Oil palm 2009** Legend Oil Palm on Peatland Oil Palm on Peatland (21,042.96 ha, 18.0%) Oil Palm Peatland 🐔 Kota 🕻 Marudu Beluran Sandakan Papar Kinabatangan Beaufort Lahad Datu Nabawan Tawau 2 Total Oil Palm (1,452,198.71 ha) Source of Oil Palm 2009 data : Malaysian Palm Oil Board (MPOB)

# The extent of oil palm planted on peat land in Sabah

Year	Oil palm on peat (x1000 ha)	% of total peat land	Total Oil palm ( x1000 ha)	% of total oil palm plantations
2000	11	9%	1,115	1.0%
2006	19	15%	1,152	1.6%
2009	21	17%	1,452	1.4%

Total peat land area = 121, 514 hectares

## OIL PALM AREAS – MALAYSIA (2006/2005)

	Total planted oil palm (ha) (satellite image interpretation)	Statistic reported from MPOB	% difference from the statistics
Peninsular Malaysia (2006)	2,545,893.8	2,334,247	+ 9%
Sabah (2005)	1.151,755.8	1,209,368	-2.5%
Sarawak (2005)	543,515.45	543,398	+ 0.005%



## OIL PALM AREAS - MALAYSIA (2009)

	Oil palm on peatland (ha) (satellite	Total planted oil palm (ha) (satellite image	Statistic reported from MPOB
	Interpretation	Interpretation	
Peninsular Malaysia	226,532.50	2,683,217.00	2,489,814.0
	(4.27%)	(50.7%)	(53.1%)
Sabah	21,042.96	1,452,198.71	1,351,598.0
	(0.4%)	(27.4%)	(28.8%)
Sarawak	434,056.77	1,164,385.75	839,748.0
	(8.2%)	(21.9%)	(17.9%)
Total (Malaysia)	681,632.23 (12%)	5,299,801.46	4,681,160.0

# Oil palm 2000



# Oil palm 2005





### Oil palm planted on peat in Sarawak

Year	Oil palm on peat (x1000 ha)	% of total peat land	Total Oil palm ( x1000 ha)	% of total oil palm plantations
2000	40	2.5%	473	8%
2006	193	12%	544	36%
2009	434	27%	1,164	37%

#### Total peat land area = 1.3 M hectares



## OIL PALM and LUC - MALAYSIA (2009)

	Total (2009)	Forest Conversion (1990/2000 - 2005)	Peat Soils (Historical to 2009)
Peninsular Malaysia	2,683,217	364,457 *	226,532
Sabah	1,452,198	63,960 ***	21,042
Sarawak	1,164,385	46,406 **	434,057
Total	5,299,800	NA	681,632

\* Covers period 1990 - 2006

\*\* Covers period 2000 – 2006; extensive clearing on mineral soils prior to 2000

\*\*\* Covers period 2000 - 2006 ; extensive clearing on mineral soils prior to 2000 and after 2006



# SUMMARY of LU Changes

- For Peninsular Malaysia it shows that about 23% (587,792 ha)of the newly planted oil palm in 2006 originally came from rubber land use, whereas the forest land use category only contributed about 14% (364,457 ha).
- In the case of Sabah it shows that the main land use categories converted to oil palm are from the "Others" category (8.5% or 97,909 ha) where as the forest land use category only contributed about 5.5% (63,960 ha).
- In Sarawak it shows that the total oil palm area increased from 473,133.96 hectares in 2000 to about 1.16 million hectares in 2009. In this region the main land use category converted to oil palm is from the "wetland" category (34% or 186,875 ha) where as the forest land use category only contributed about 8% (46,405.7 ha).

Note: Others (Horticulture, Shifting cultivation, Grassland, Bare land, Coconut, Paddy,)

Note: Wetland (Swamp, Mangrove), Nypa and Gelam)



Fig. 1 – Expected trends in world population and edible use of vegetable oil. Population from UNPD (2006). Demand

Major issues of the future

1. Water ---mineral soils (DEM is essential for slope determinations)

2. Food security---peat (short term crops)

3. Biodiversity---both

(SEE FIGURE below on Infiltration comparing tree rows and between tree rows, carried at the Dunlop research station in Melaka) It is for this reason that oil palm should be grown in areas. preferably. where the slopes do not exceed 8 degrees

## Infiltration Rate i (cm.h<sup>-1</sup>) vs Time t (min) in H- & F-plots



H represents between rows and F represents the tree rows where the harvested fronds are placed. (Work carried out by Maene, L.M., Thong, K.C. and Mokhtaruddin, A.M., 1979 Amount of Leaf Litter Produced

Dry leaf litter (t/ha/yrForest10 (proctor et al, 1983)Rubber7.7 (shorrocks, 1965)Cocoa6.5 (B.L. Kho 1986)

Run-off Losses

FOREST < RUBBER < OIL PALM < MIXED HORTICULTURE

Catchment studies show that forest > rubber > oil palm In term of increased infiltration with less run off Hence slope frequency distribution is important to put Oil Palm On slopes of eight degrees. and below Reforestation to take place on slopes greater than eight degrees to rehabilitate Biodiversity.



#### A moratorium on further development of oil palm on peat in SARAWAK should be introduced.

Estimated loss 33 billion (API -625)

