ASEAN Peatland Forests Project (APFP)

Peatlands and climate change in SE Asia

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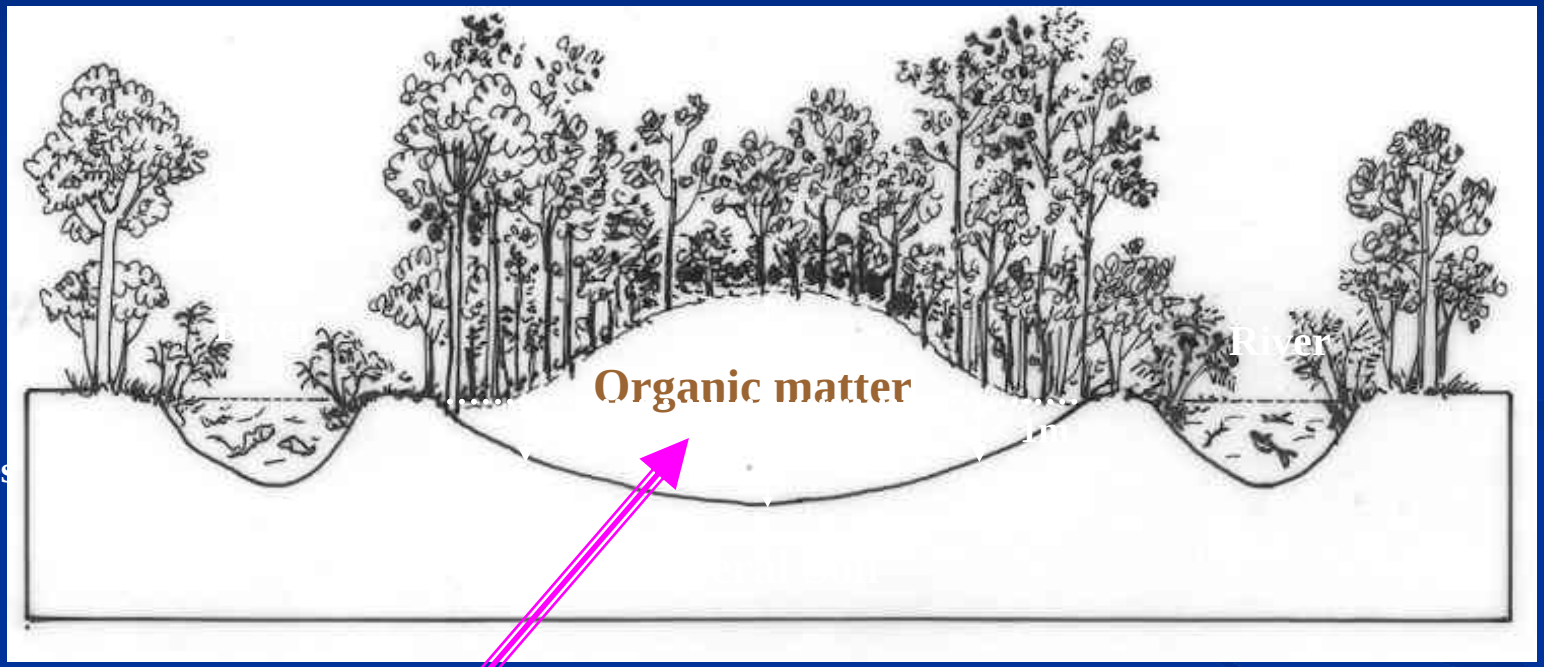
APFP Regional Project Executing Agency

UNFCCC Side event on Status of investments and knowledge in wetland emissions reduction
Cancun, Mexico, 2 December 2010

Peat Swamp Forest is the most important carbon store in Se Asia

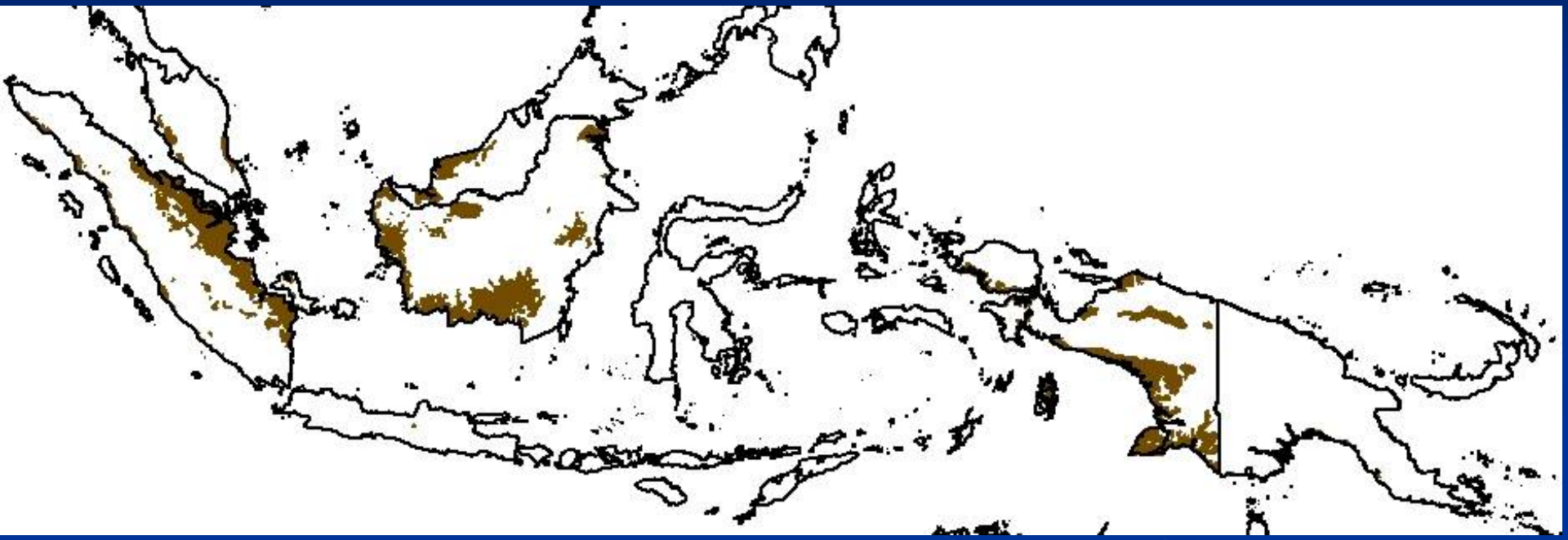
Peat accumulates in thick layers over thousands of years



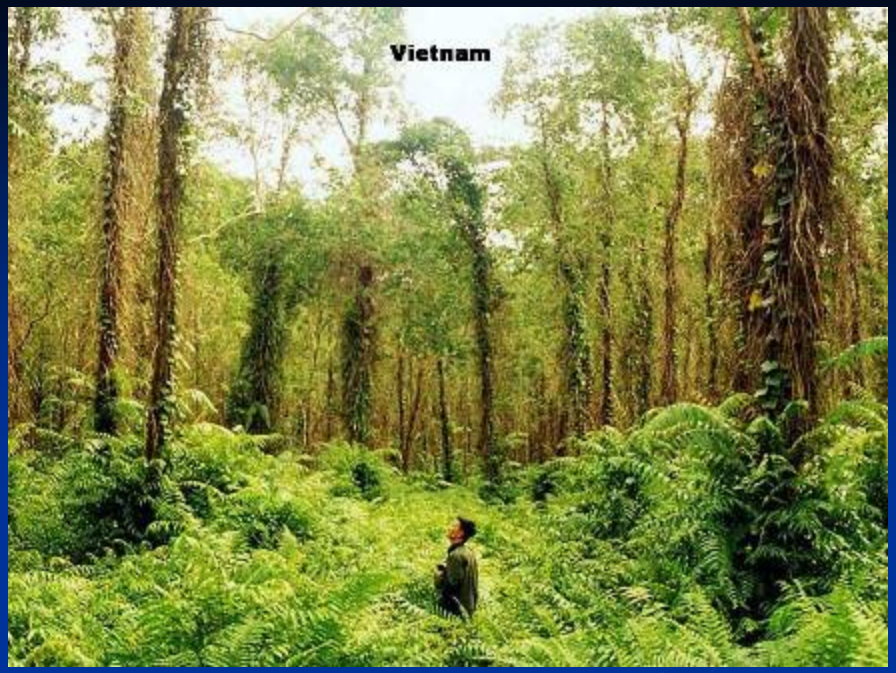
Peat layer up to 20 m thick

Source Nyoman Suriadiputra, Wetlands International Indonesia

Peatlands cover 25 million ha in Se Asia

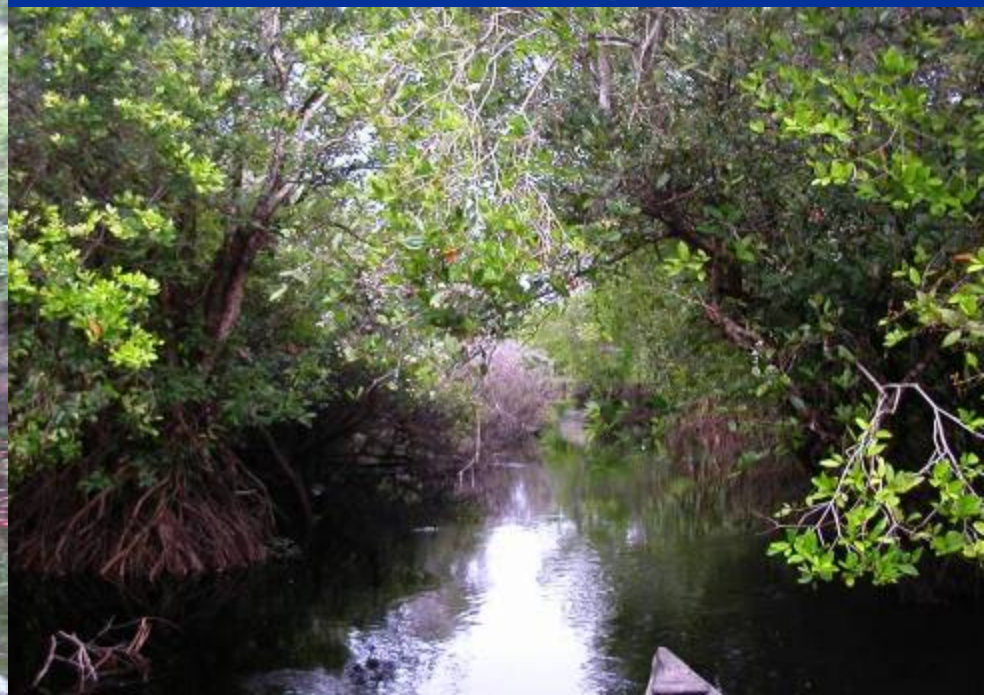



Malaysia

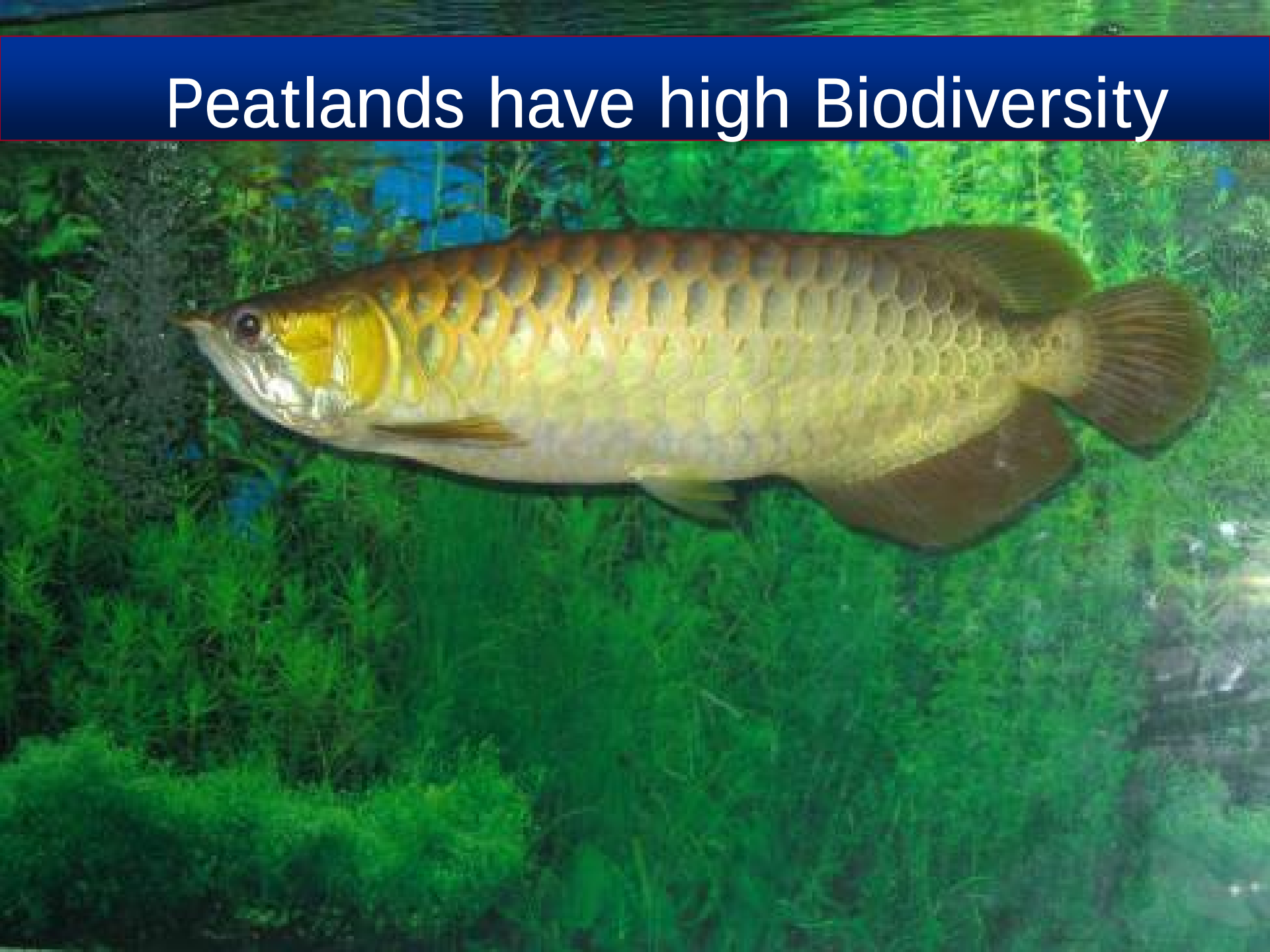

Vietnam


Thailand

Peatlands provide water and prevent floods



Peatlands have high Biodiversity



Peatlands Feed communities

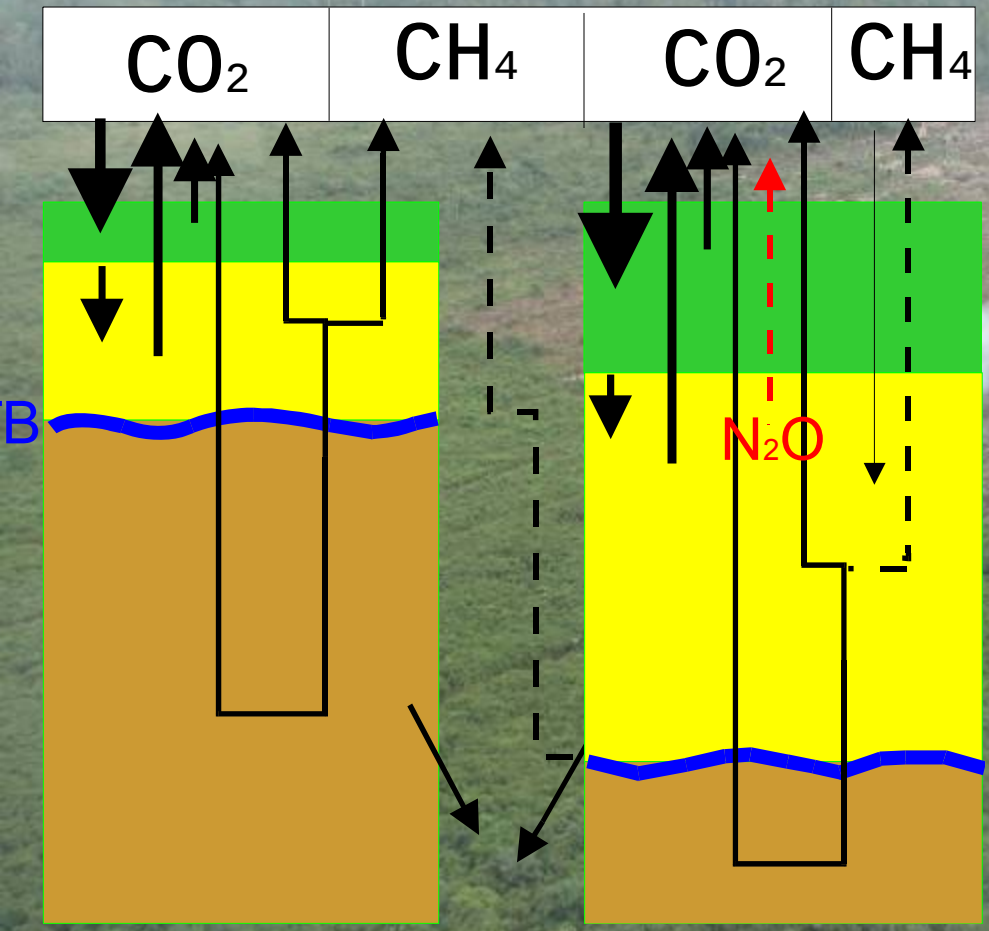
Fishing, Pahang, Malaysia

Source: UNDP-GEF PSF Project

Peatlands support communities

Jelutong - Chewing Gum tree, Indonesia

Peatlands regulate climate

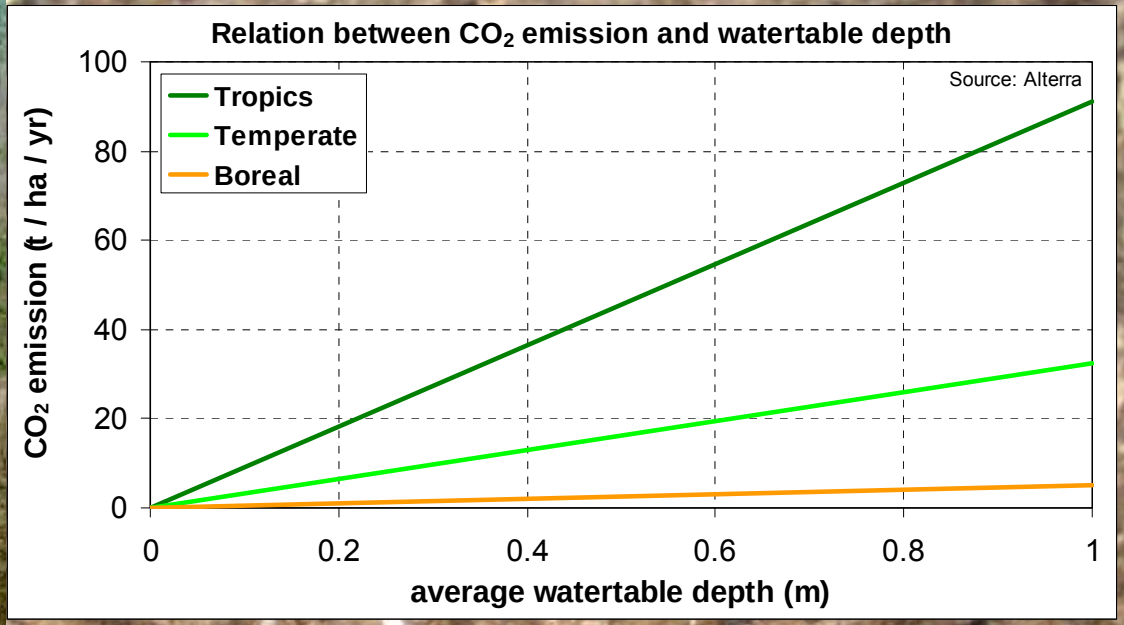


While covering only 3% of the World's land area, peatlands contain 550 Billion tonnes of carbon In SE Asia peatlands store over 50 billion tonnes of carbon

This is equivalent to twice the carbon stock in the entire forest biomass.

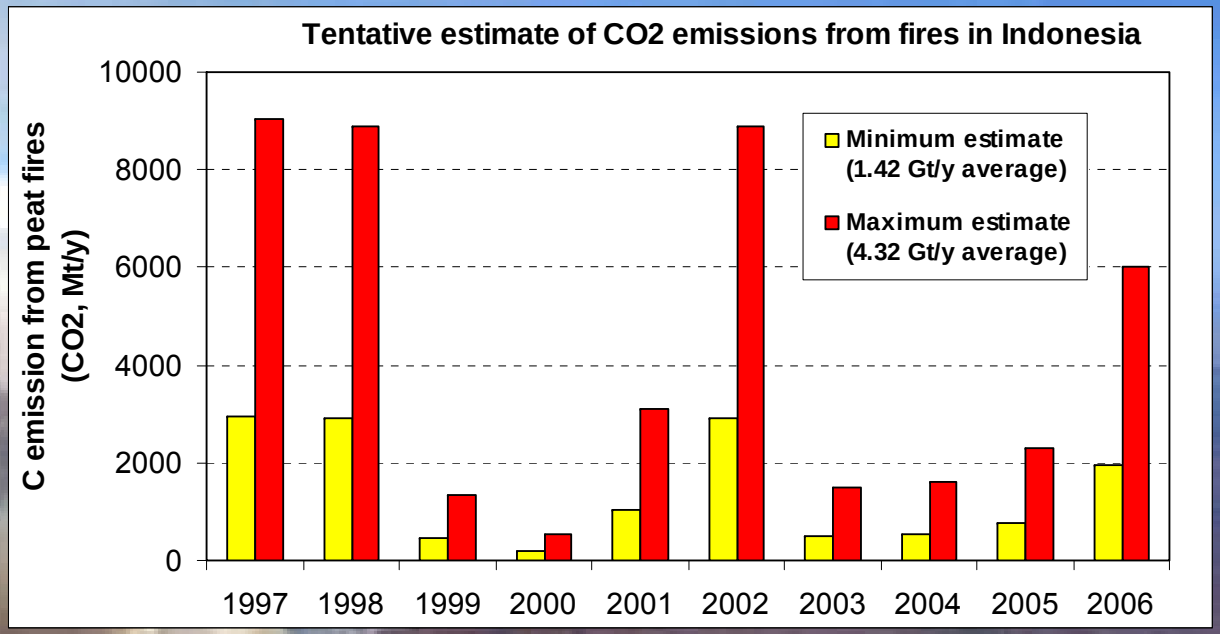
Peatland drainage and fires are one of the main sources of carbon released to the atmosphere from the land use sector.

Drained peat releases carbon



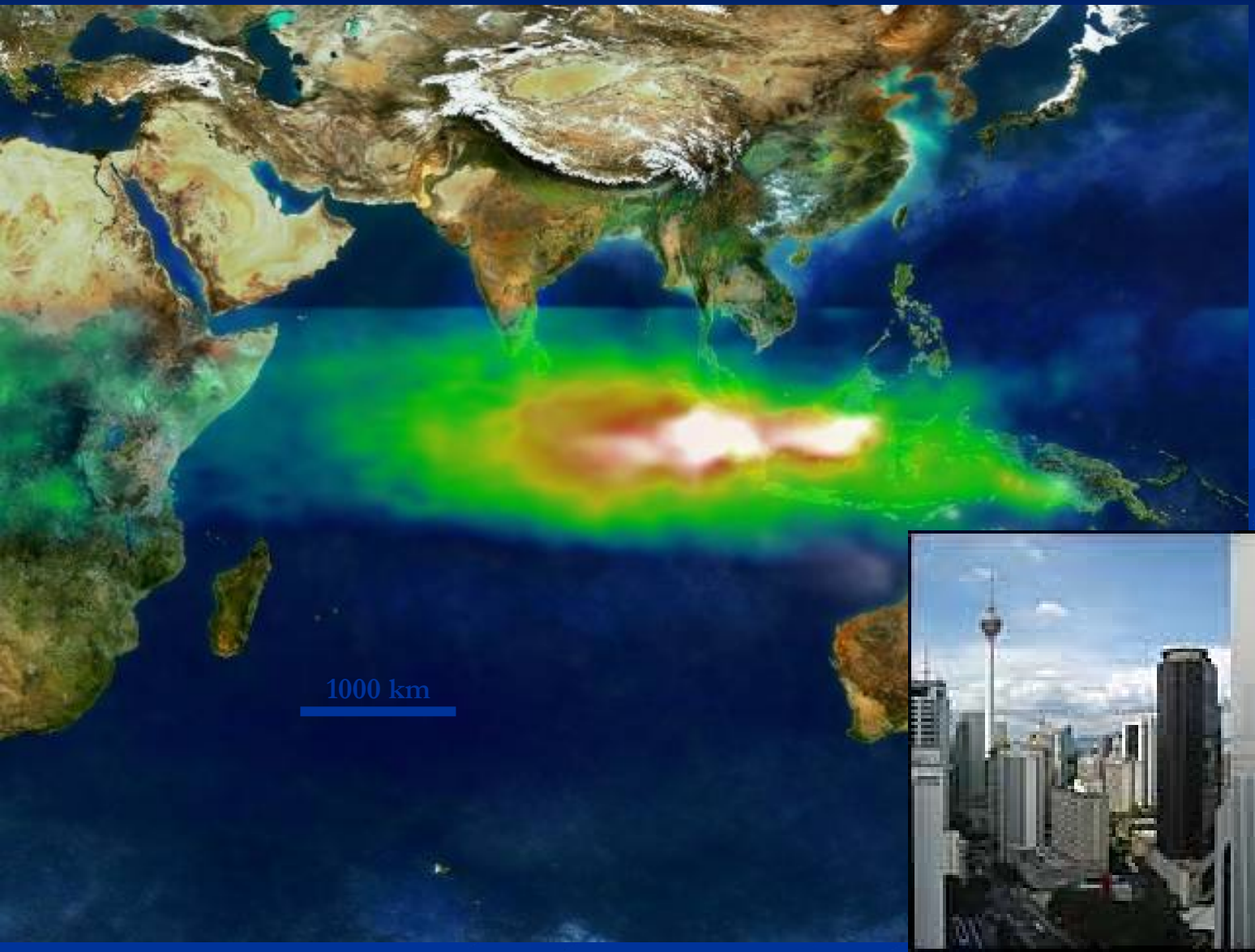
- **Drainage to 1 meter = emission of 90 ton CO_2/ha/yr in tropics - 30 ton CO_2/ha/yr in temperate region**
- SE Asia: Agriculture & agro-forestry on 12 million ha contributes around **600 MtCO_2/yr** (drainage only)

Burning peat releases more carbon

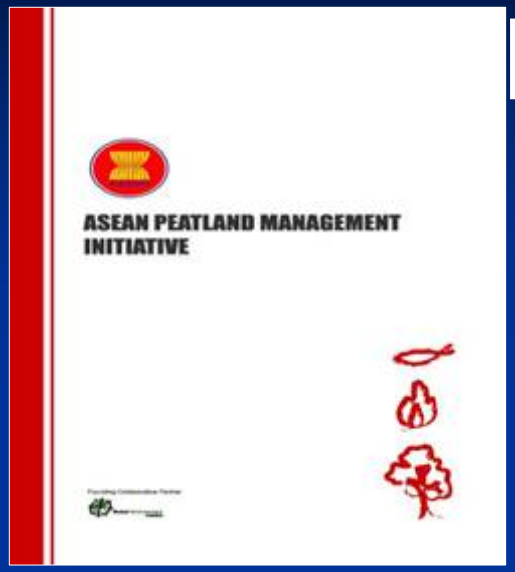


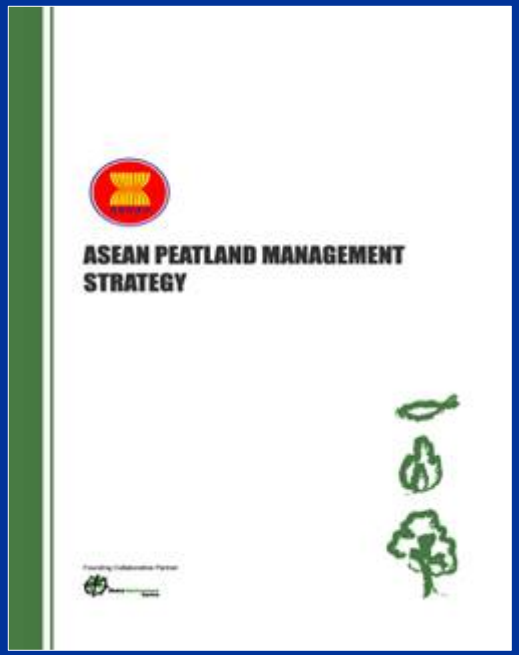
- **Tentative average annual emissions estimate:**
- **500 to 1400 Mt CO_2/y**

Smoke Haze is the most serious regional environment problem in ASEAN



Institutional Frameworks provided by ASEAN Countries





- ASEAN Agreement on Transboundary Haze
- ASEAN Peatland Management Initiative (APMI) & ASEAN Peatland Management Strategy (APMS)
- National Action Plan on Peatland (NAP)
- APMS identifies key actions related to maintaining carbon storage and minimizing GHG emissions.

Pedoman Pelaksanaan Kebijakan ASEAN tentang Penyiapan Lahan Tanpa Bakar

Pedoman Pelaksanaan Praktek Pembakaran Terkendali

Didukung Oleh :

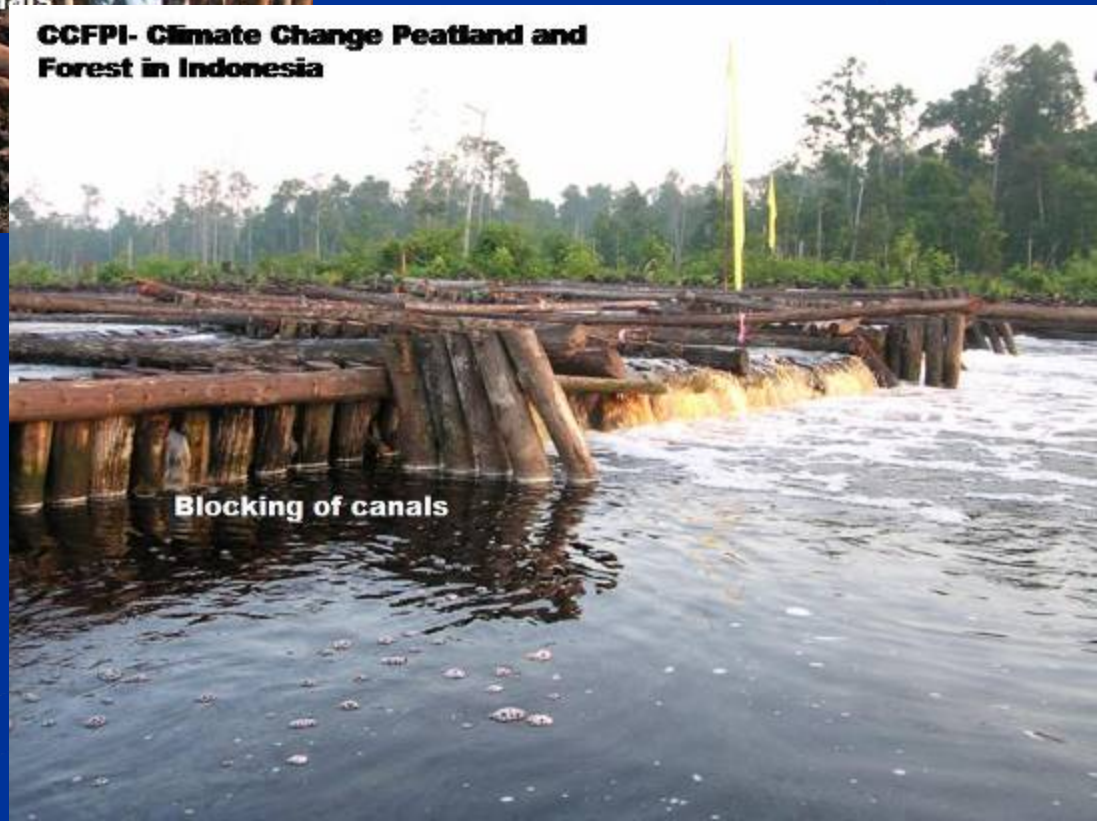
Dilaksanakan Oleh :

Penyusunan Pedoman ini dibiayai oleh :

ASEAN Haze Action Online
www.haze-online.or.id

Root Cause: Linkage between Drainage and Fires

- Rehabilitation of Degraded peatlands through blocking abandoned drainage



Alternative Livelihoods

Community based Sustainable peatland management

- Non-timber forest products
- Agriculture – appropriate species
- Fisheries
- Animal Husbandry
- Appropriate financing mechanisms (eg Biorights)






Thailand – Peat Reforestation

Initial experience on peatland and carbon finance

- 2002-2007 WI-GEC Integrated management of peatland for biodiversity and climate change (UNEP-GEF)
- 2002-2007 WI-GEC-WHC CCFPI project 2002-2007 – pioneered approaches for community based peatland rehabilitation linked to climate change (Canada).
- 2007-2009 Kalimantan Peatland Conservation programme (Netherlands)
- 2009-2013 Kalimantan Forest and Climate Initiative (Australia)
- 2009-2010 – various pilot project for voluntary carbon market in Kalimantan, Sumatra, Malaysia under initial development
- 2010- **Norwegian International Climate and Forest Initiative -** Proposed moratorium on peatland development.

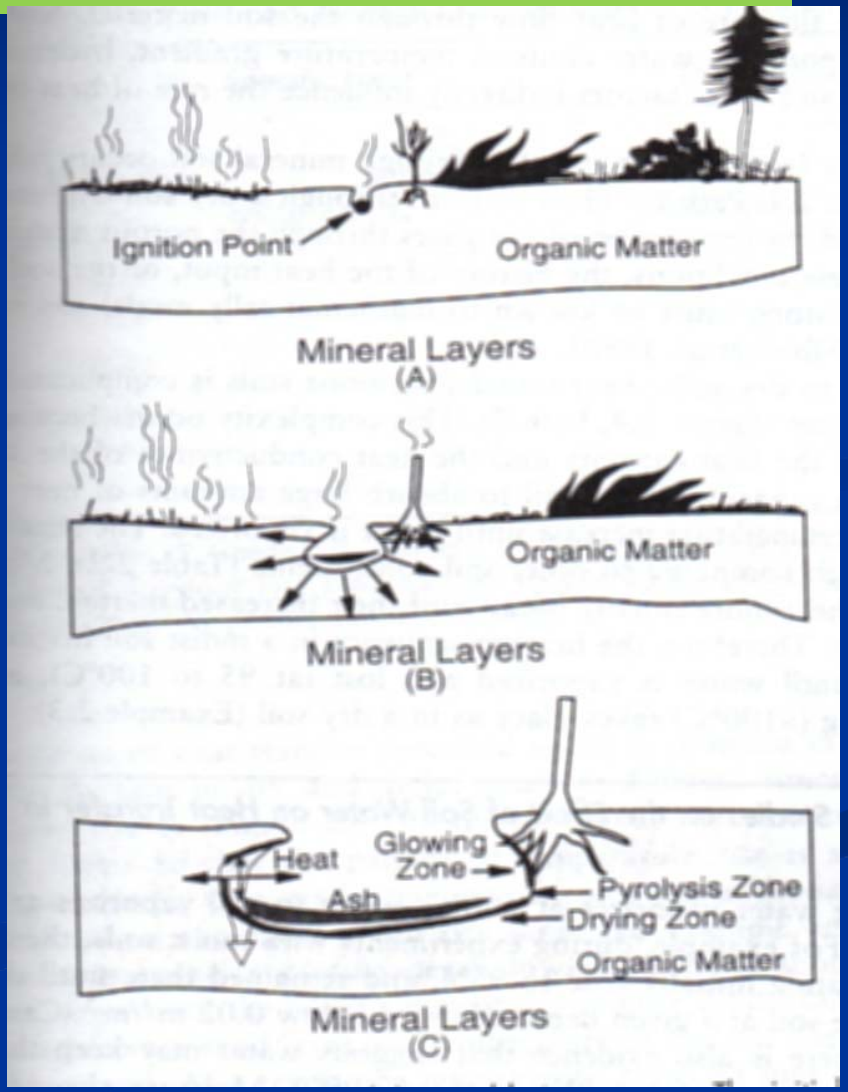
ASEAN Peatland Forest Project

- Implemented 2009-2013
- Support implementation of ASEAN Peatland Management Strategy 2006-2020
- Development of pilot projects in 4 ASEAN countries – Indonesia, Malaysia, Philippines and Viet Nam
- Identification and promotion of BMP for peatland
- Reduction in peatland fire and degradation
- Development of innovative Finance options

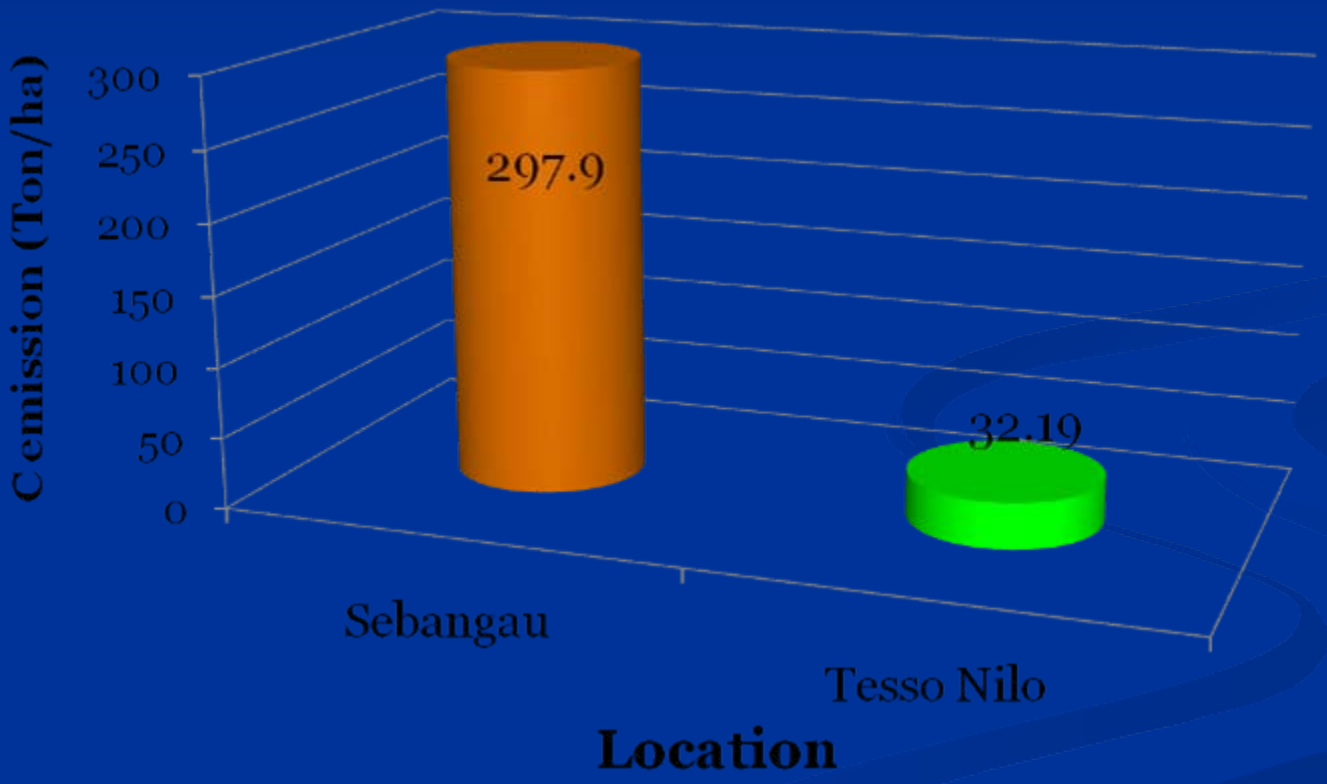
Workshop on Options for carbon financing to support peatland management

- Pekanbaru 4-6 October 2010
- More than 100 participants, government, research, private sector, NGOs 14 countries
- Organised by ASEAN Secretariat, GEC, Govt of Indonesia, Government of Riau province
- Supported by IFAD/GEF

PEAT FIRE


Ignition Point
Organic Matter
Mineral Layers
(A)
Organic Matter
Mineral Layers
(B)
Heat
Glowing Zone
Ash
Pyrolysis Zone
Drying Zone
Organic Matter
Mineral Layers
(C)

Results

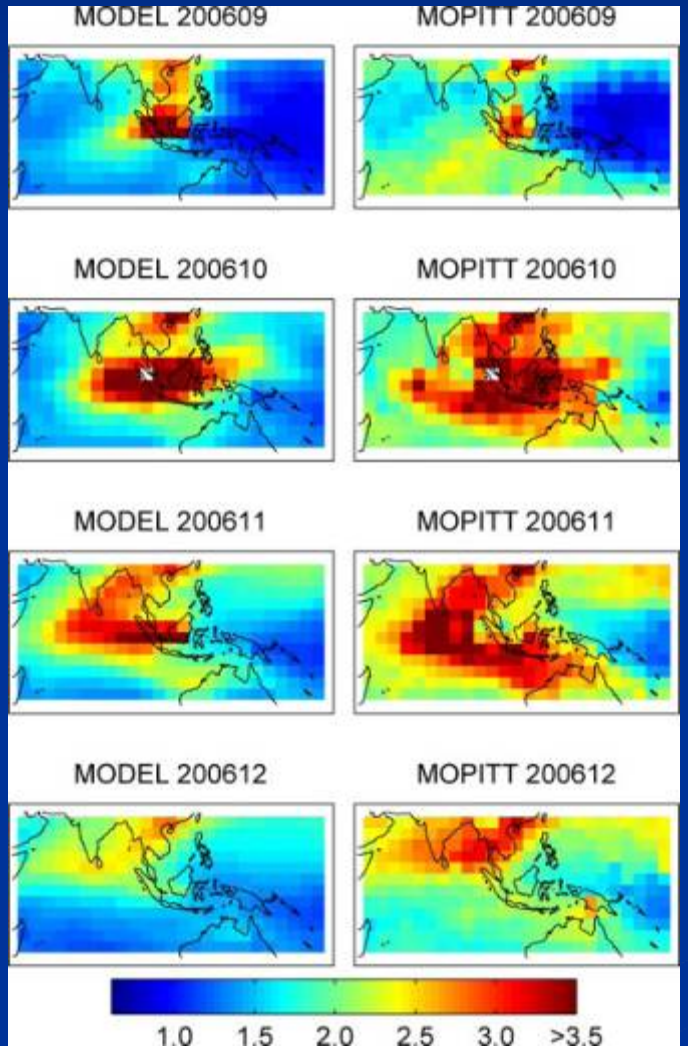


Comparison of C emission after fire in Peatland (Sebangau) and non peat (Tesso Nilo)

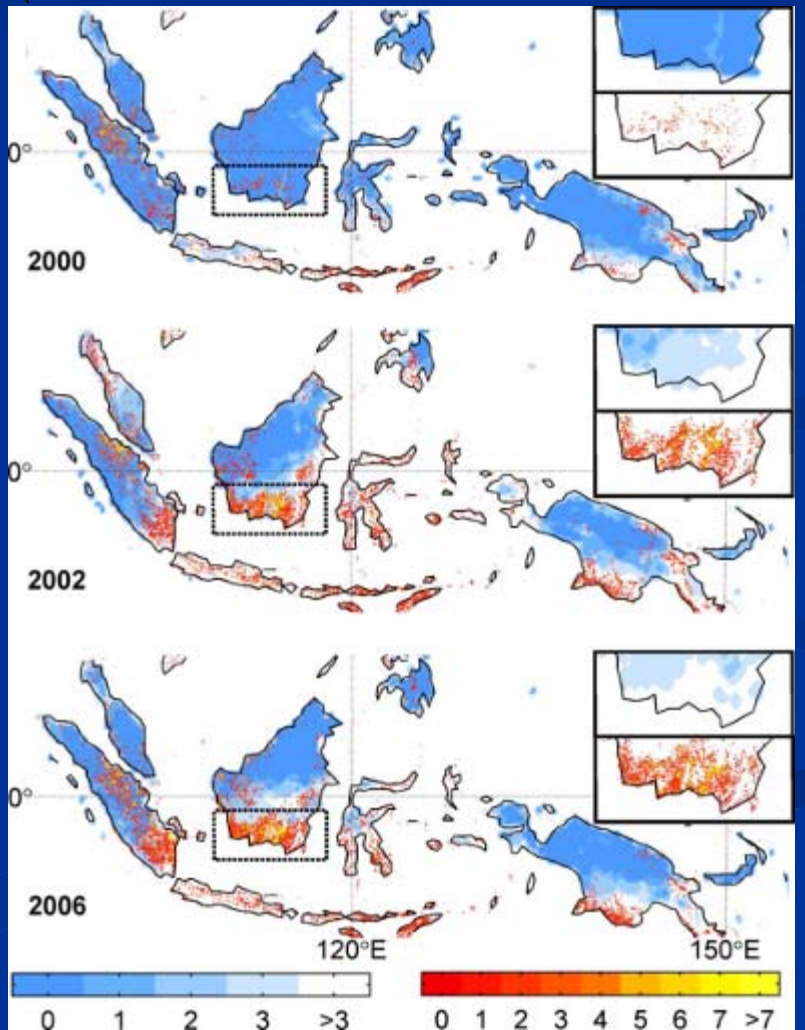
High loss of peat layer due to fire (potential emission 2500tCO2/ha if 1m of peat is lost)

Van der Werf et al 2008

- CO emission from MOPPIT satellite



- Hotspot distribution (MODIS/NOAA satellite

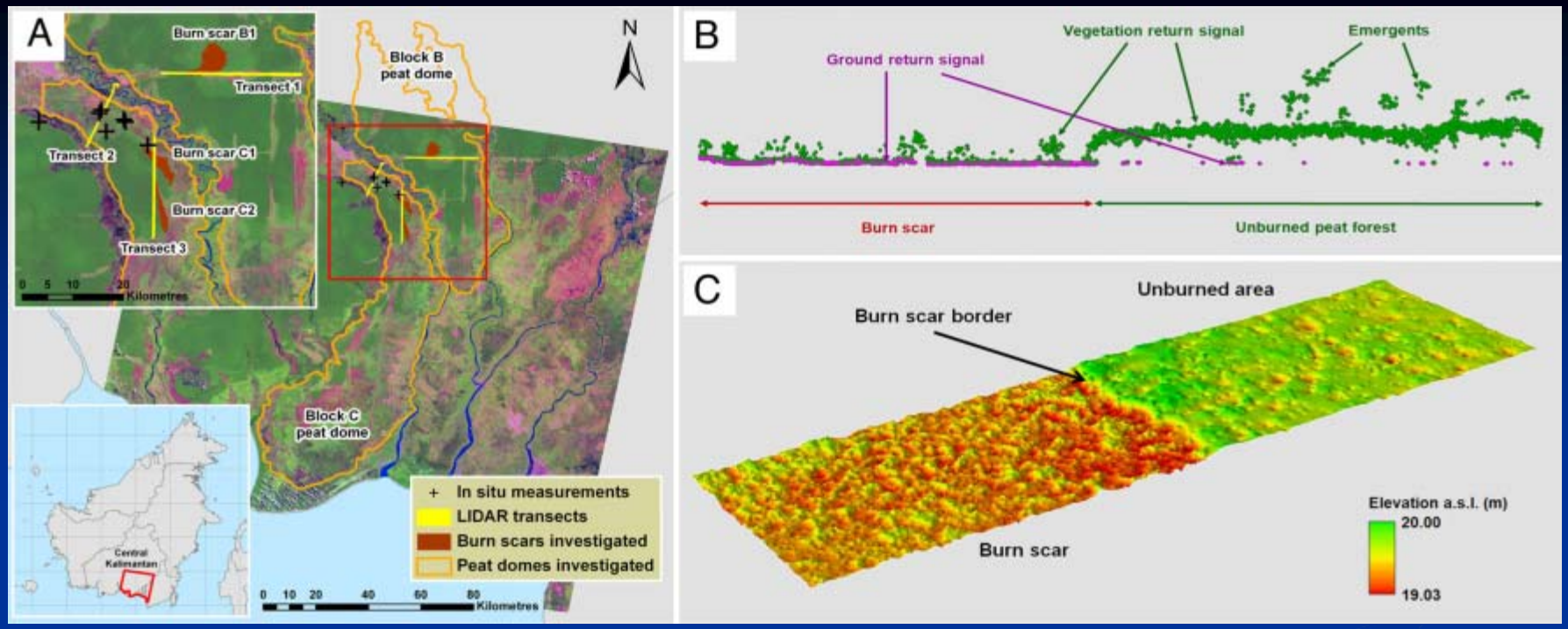


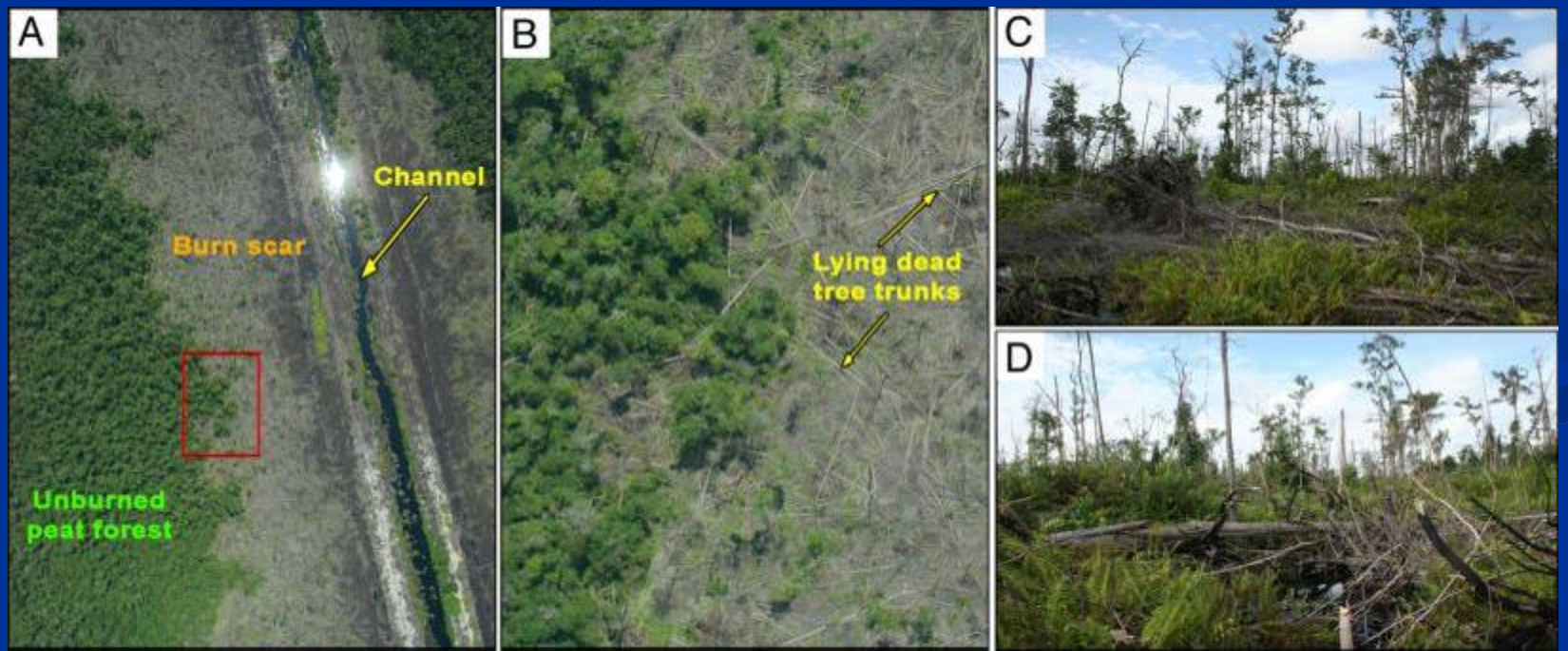
Ballhorn et al 2009

Table 1. Different peat fire carbon emissions in Indonesia from the 2006 El Niño fire season

	Specific burn scars in the study area				
	Block B peat dome	Block C peat dome			
	B1	C1	C2	Study area	Indonesia
Peatland area	283,800 ha*	361,400 ha*		1,651,805 ha†	21,892,399 ha†
Mean peat thickness	4.90 ± 1.15 m*	3.65 ± 0.92 m*		4.65 ± 1.05 m‡	4.5 ± 0.85 m*
Peat volume	13.86 ± 3.26 $10^9 m^3$*	13.17 ± 3.32 $10^9 m^3$*		76.81 ± 17.34 $10^9 m^3$§	985.16 ± 186.09 $10^9 m^3$§
Carbon storage	0.80 ± 0.19 Gt*	0.76 ± 0.19 Gt*		4.45 ± 1.01 Gt¶	57.14 ± 10.79 Gt¶
Fire damaged peatland	2,632 ha‖	1,209 ha‖	864 ha‖	256,783 ha**	1,331,367 ha††
Percent peatland damaged	0.9%	0.3%	0.2%	15.5%	6.1%
Peat volume loss	8.69 ± 4.74 $10^6 m^3$‡‡	3.99 ± 2.18 $10^6 m^3$‡‡	2.85 ± 1.55 $10^6 m^3$‡‡	847.38 ± 462.21 $10^6 m^3$‡‡	4.39 ± 2.40 $10^9 m^3$‡‡
Peat carbon loss	0.50 ± 0.27 Mt¶	0.23 ± 0.13 Mt¶	0.17 ± 0.09 Mt¶	49.15 ± 26.81 Mt¶	0.25 ± 0.14 Gt¶

*See ref. 11.
†See refs. 18–20.
‡Average peat thickness of the three peat domes in Central Kalimantan (Block B, Block C, and Sebangau) modeled by Jaenicke et al. (11).
§Derived by multiplying peat land area and mean peat thickness.
¶Based on a peat bulk density of 0.1 g cm^{-3} and a peat carbon content of 58% (0.58) (26).
‖Derived from visually digitizing the burn scars based on the Landsat ETM + 7 image (118–62, August 5, 2007, gap filled) (see *Materials and Methods*).
**Derived from the object oriented classification of the Landsat ETM + 7 image (118–62, 05 August 2007, gap filled) (see *Materials and Methods*).
††Derived from MODIS hotspot data of the year 2006 converted to fire affected areas minus a correction factor of 30% (see *Materials and Methods*).
‡‡Derived from a burned peat depth of 0.33 ± 0.18 m based on this LIDAR study.


A
Burn scar B1
Transect 1
Transect 2
Burn scar C1
Burn scar C2
Transect 3
0 5 10 20 Kilometres
Block B peat dome
N
Block C peat dome
Central Kalimantan
+ In situ measurements
LIDAR transects
Burn scars investigated
Peat domes investigated
0 10 20 40 60 80 Kilometres
B
Ground return signal
Vegetation return signal
Emergents
Burn scar
Unburned peat forest
C
Unburned area
Burn scar border
Burn scar
Elevation a.s.l. (m)
20.00
19.03


A
Channel
Burn scar
Unburned peat forest
B
Lying dead tree trunks
C
D

Couwenberg et al 2010

Table 2 Carbon emissions from peat fires and related parameters

Burnt peat depth (cm)	Year	Bulk density ($g\,cm^{-3}$)	Carbon content	Emission ($kg\,C\,m^{-2}$)	Fire type	Reference
37 (25–60)	1988, 1994				C	DID & LAWOO (1996)
51 (20–150)	1997	0.100*	0.57*	29.1 (11.4- 85.5)	W	Page *et al.* (2000, 2002)
55 (25–85)	1997	0.160 (0.100–0.220)	0.54 (0.53–0.56)	47.5 (13.3–104)	W	Limin *et al.* (2004)
21 (3.5–44.5)	2002	0.160 (0.100–0.220)	0.54 (0.53–0.56)	18.6 (6.3–37.1)	W	Limin *et al.* (2004)
27 (15–30)†	2002				W	Usup *et al.* (2004)
12 (0–32)	2001, 2002	0.155 (0.060–0.220)	0.50 (0.46–0.54)	9.0 (0–27.4)	E	Saharjo & Munoz (2005); Saharjo & Nurhayati (2005); Saharjo (2007)
Mean						
34		0.144	0.54	26.1		

Data are mean values (range in parentheses).
*Data from Neuzil (1997).
†Own calculations based on weight loss data.
C, clearance fire; W, wildfire; E, experimental fire.

Comparison of assessments

- If we assume a total area of 1.9 million ha of peat soil burnt during the 1997-8 El Nino related fires in South-east Asia (Heil et al., 2007), with each m2 emitting 26 kgC (Couwenberg 2010, Table 2), peat carbon emissions from the 1997-8 fires would have amounted to 494 Tg C.
- This value corresponds well with the 486 Tg peat carbon emissions (67% of total emissions of 726 Tg) of van der Werf et al. (2008), who used CO measurements from the MOPITT satellite to optimize bottom-up estimates based on burnt area.
- Above values are only slightly higher than the lower estimate of 380–460 Tg peat carbon of Page et al. (2002)
- For an average year 2000-2006 – 90Tg C for fire emissions (note part of emissions are in CH4)
- This compares to Annual emissions from peat oxidation from drainage 130-170Tg C (Hooijer 2010, Couwenberg 2010)

Conclusions

- Peatlands in SE Asia store more than 50 billion tonnes of carbon – more than double the estimated biomass of the forests in the region.
- Peatland Forests store up to 10 times more carbon per ha that other tropical forest types.
- Degradation and fire in peatlands in ASEAN release up to 1.5 billion tonnes of $C0_{2e}$ per year or approximately 15-20% of global emissions from land use change.
- This makes peatlands in SE Asia a priority area for actions to reduce global climate change.
- Fire prevention and good management of peatlands will not only reduce emissions but will also create other benefits for biodiversity conservation, water resource management and community livelihood.
- Carbon financing is a new and important mechanism to generate resources to support sustainable peatland management and provide incentives to reduce peatland degradation.

Conclusions

- There has been significant progress with the first approved VCS methodology on REDD being specifically for peatlands and a number of peatland REDD projects being finalized.
- Some uncertainties remain in international negotiations with a need for clearer inclusion of peat through the negotiation process.
- Basic methodologies and approaches for assessing carbon stocks and emissions and determining emission reductions to generate carbon finance are available - but refinements are needed
- Constraints include lack of clear carbon finance regulations and mechanisms at national level, unclear mandates and jurisdiction among agencies, uncertainty over benefit sharing and poor capacity among different stakeholders.

Recommendations

- Peatlands should be emphasized in international negotiations on climate change
- ASEAN Countries should work to enhance implementation of the ASEAN Peatland Management Strategy
- Each ASEAN should establishment of pilot sites for peatland carbon finance and set up of appropriate legal and institutional arrangements.
- Capacity of stakeholders for peatland carbon finance should be built.

Recommendations

- A regional network and directory of peatland pilot sites for testing and training on peatland carbon finance should be established
- Methodologies for assessing peatland carbon stocks and tracking the impact of peatland carbon projects should be developed further,
- Further research should be undertaken to enhance understanding and undertake longer term monitoring of peatland carbon stocks and emissions.
- Establish a funding mechanism to support peatland management and develop peatland carbon projects and provide incentives to the private sector to develop peatland carbon projects such as tax deductions or grants
- Ensure that benefits from peatland carbon projects reach local communities and other key stakeholders.

Thank you