



# Challenges of mitigating commercial agriculture over tropical peatlands in Indonesia

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# Outline

- Tropical peatlands in Southeast Asia
- Commercial agriculture expansion over tropical peatlands in Indonesia
  - What we know so far
  - Changing actors in rapidly degrading landscape
- Peatland governance for low carbon development

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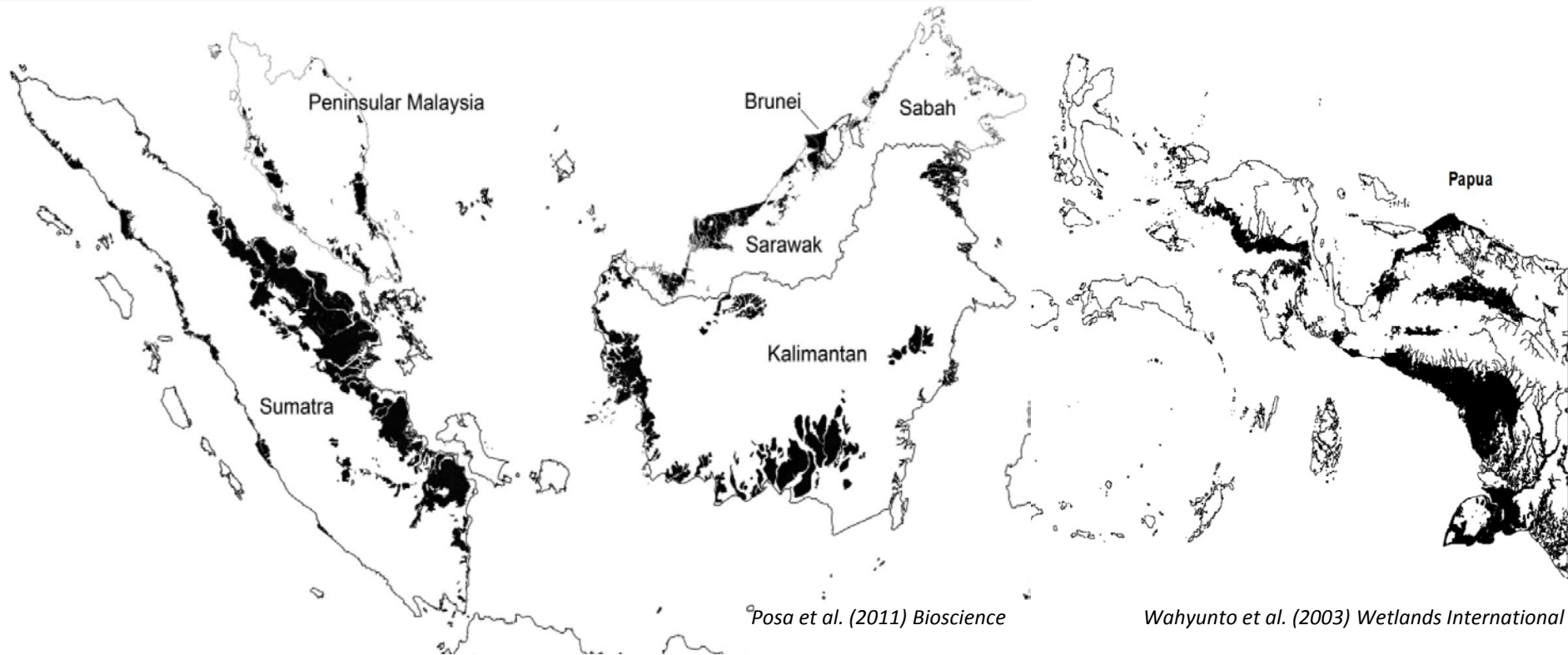
# What are peatlands?

***“Peatlands are wetlands with a thick water-logged organic soil layer (peat) made up of dead and decaying plant material. Peatlands include moors, bogs, mires, peat swamp forests and permafrost tundra.”***

**Wetlands International**

# Southeast Asia's peatlands

247,778 km<sup>2</sup> of tropical peatlands



An aerial photograph of a lush, dense tropical forest. A dark, winding river flows through the center of the forest, reflecting the surrounding greenery. The forest is composed of various types of trees, including tall palm trees and broad-leafed species. The overall scene is vibrant and green, with a mix of different shades of foliage.

**Carbon storage**

**Water regulation**

# Livelihoods



Photo: CIFOR



Photo: ABC News.au

# Biodiversity



© mongabay.com



Photo: Outrop.org







# Threats

Photo: Greenpeace



# Logging

Photo: forclime.org



# Conversion

Photo: Greenpeace



# Fires

*Yule (2010) Biod Cons; Posa et al. (2011) Bioscience*

*“last frontiers for production...”*

*Posa et al. (2011) Bioscience*



# Production for...



**Paper**

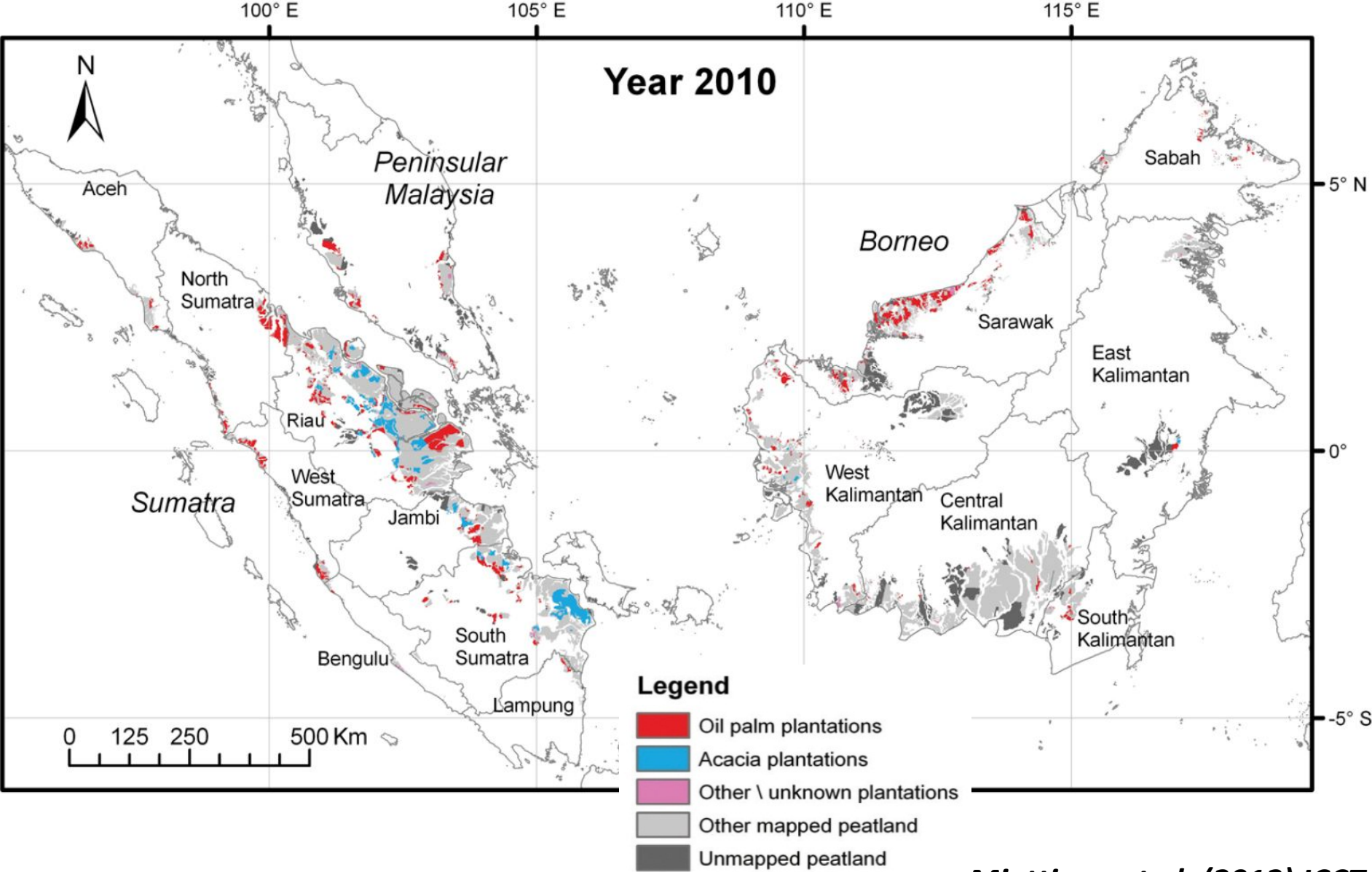
**Wood**

**Palm oil**

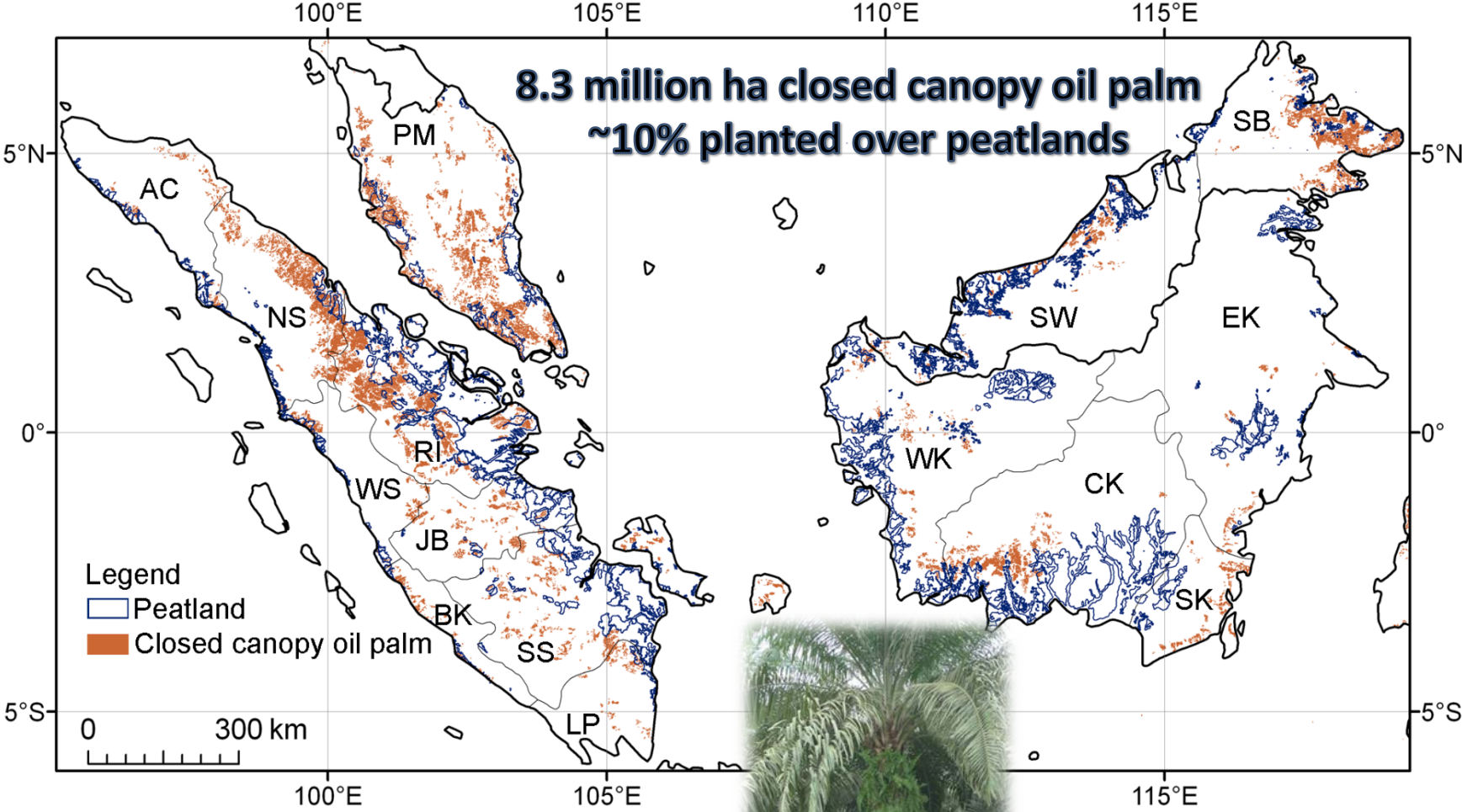
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# Industrial plantations over peatlands



# Extent of planted oil palm area over peat



Mature, 8 years  
Area > 2 km<sup>2</sup>

# Extent of closed canopy oil palm over peatlands

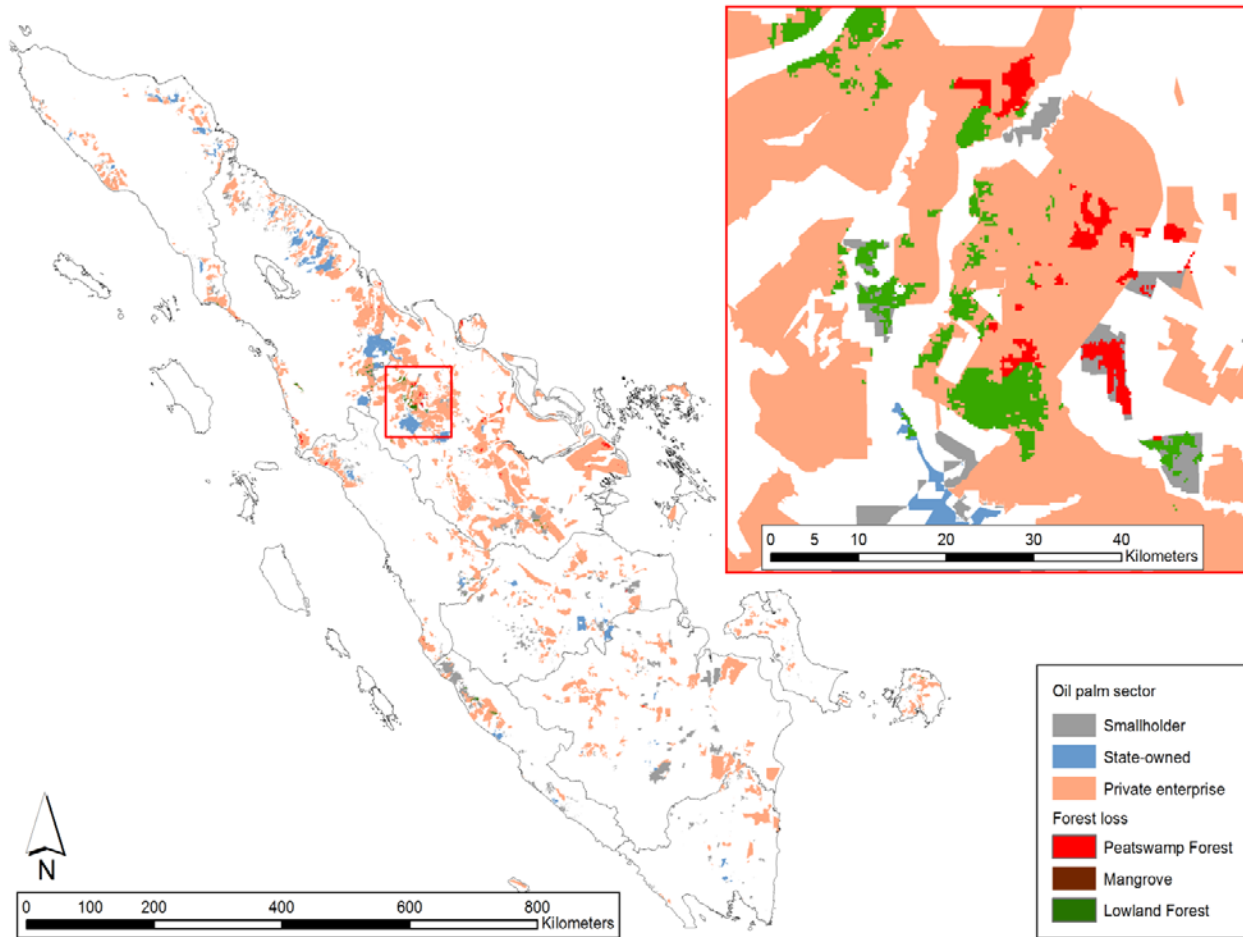
Area of oil palm planted on peatlands (ha)



Indonesia

Koh et al. (2011) PNAS

# Large-estates or smallholders as agents of peatswamp deforestation?



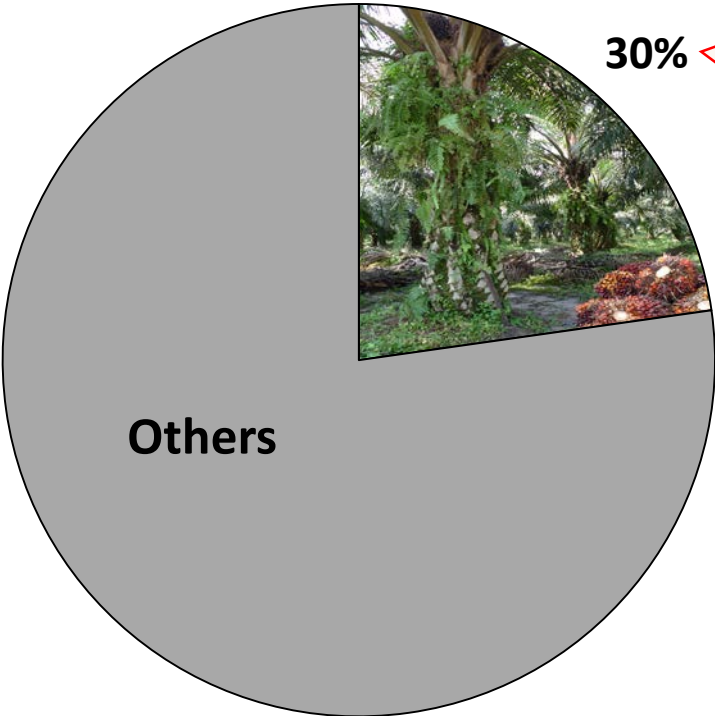
Smallholder plantations > 25 ha

Removed overlaps among sectors and with timber plantation concessions

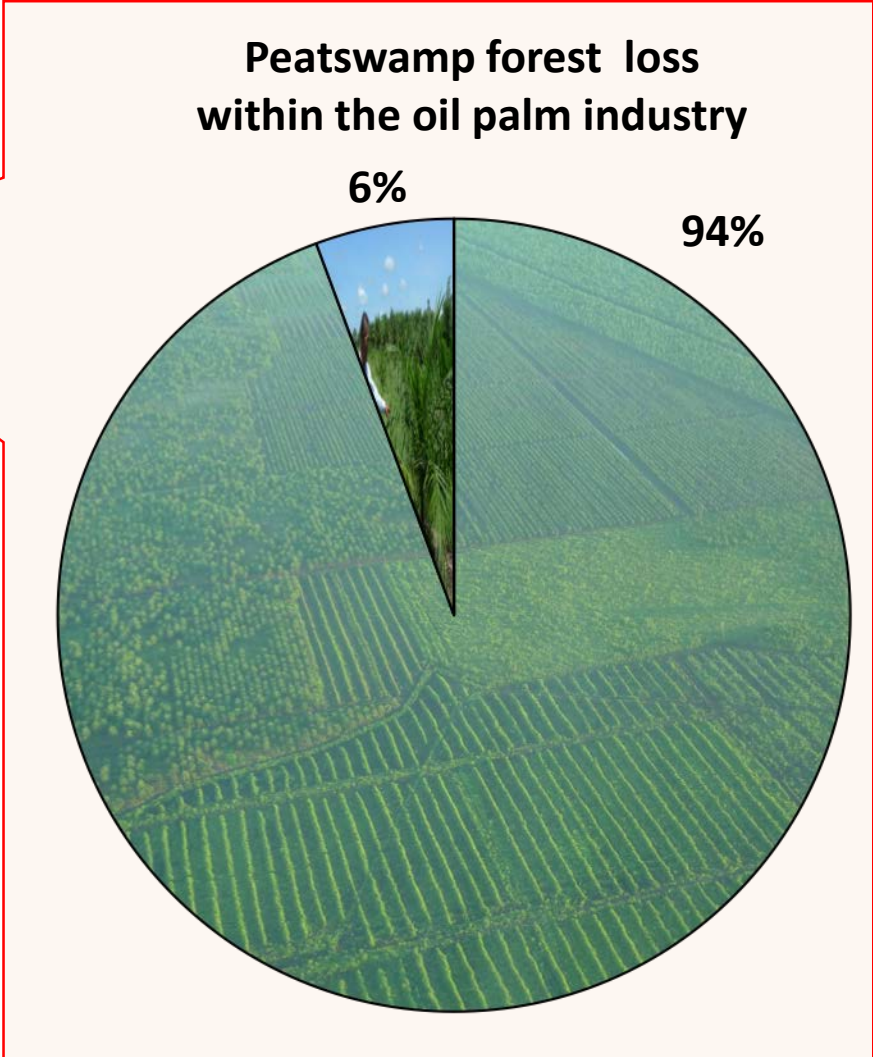


# Peatswamp forest loss from 2000-2010 in Sumatra: ~1.3 million ha

Peatswamp forest loss from the oil palm industry



Peatswamp forest loss within the oil palm industry



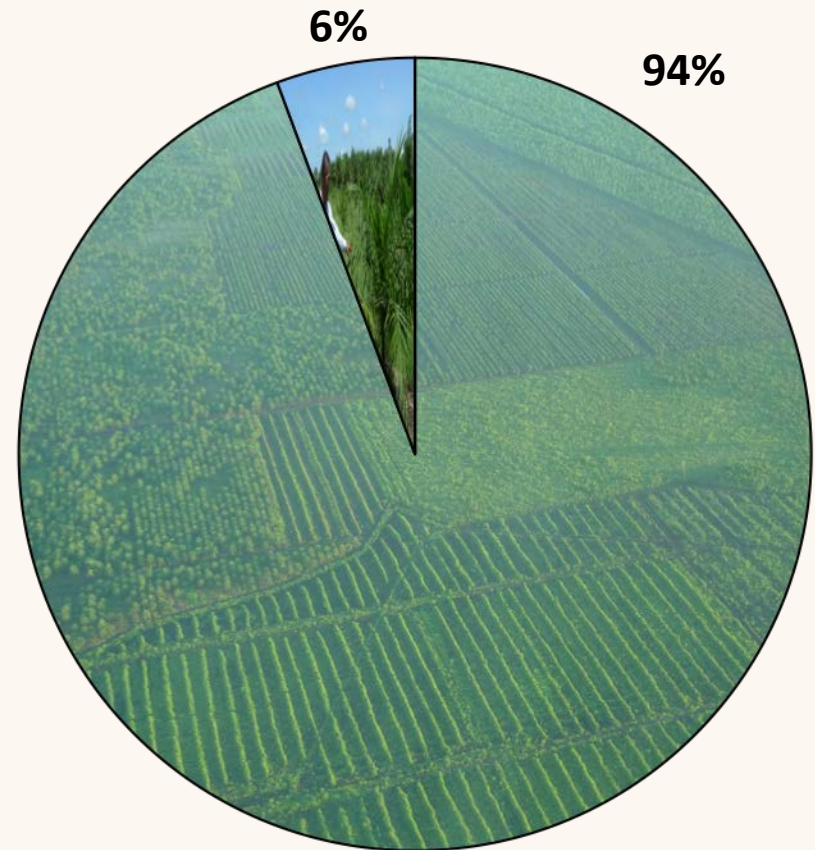
# Peatswamp forest loss from 2000-2010 in Sumatra: ~1.3 million ha

Peatswamp forest loss from the oil palm industry

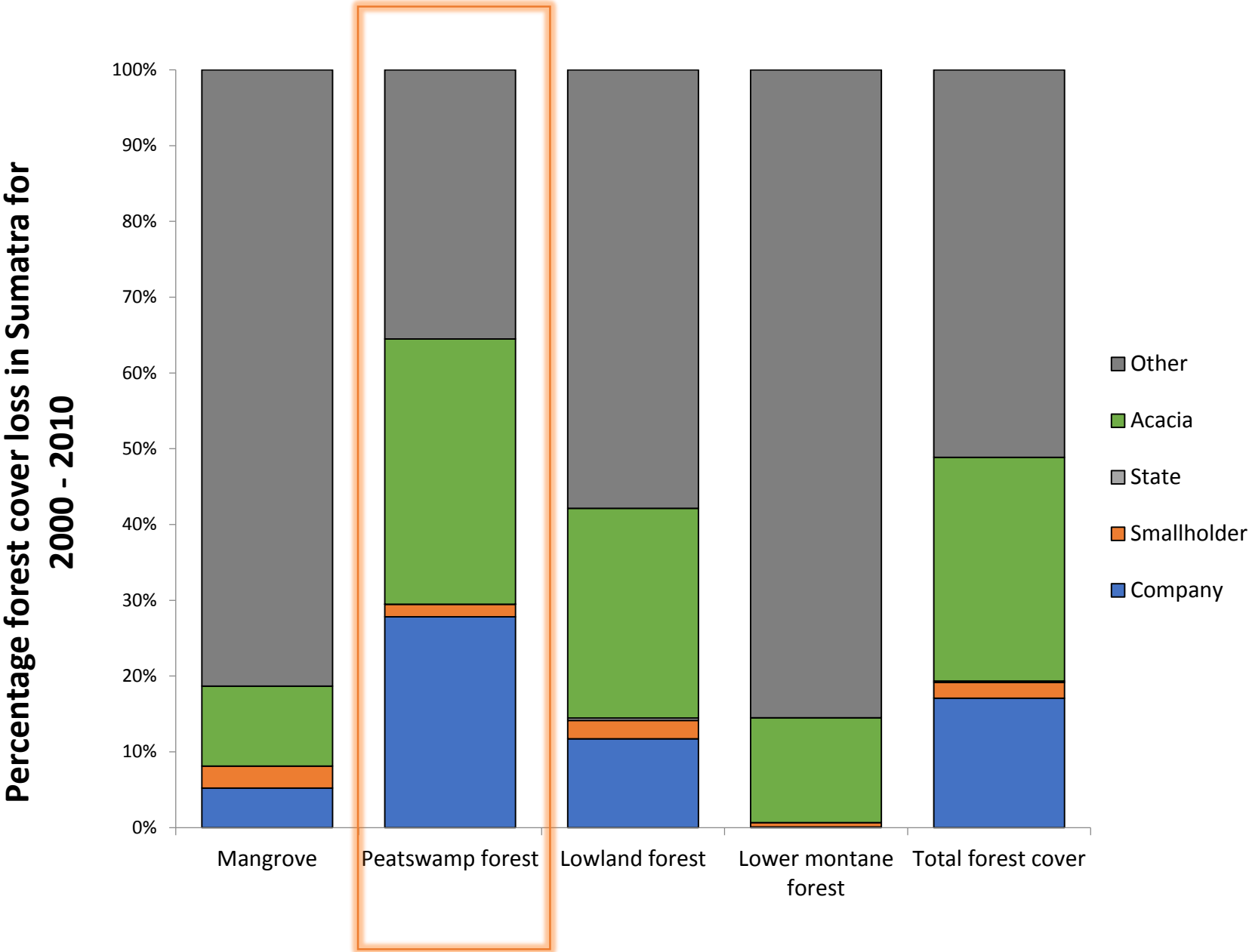


**70 – 77% of emissions from the oil palm industry came from PSF loss within private enterprises**

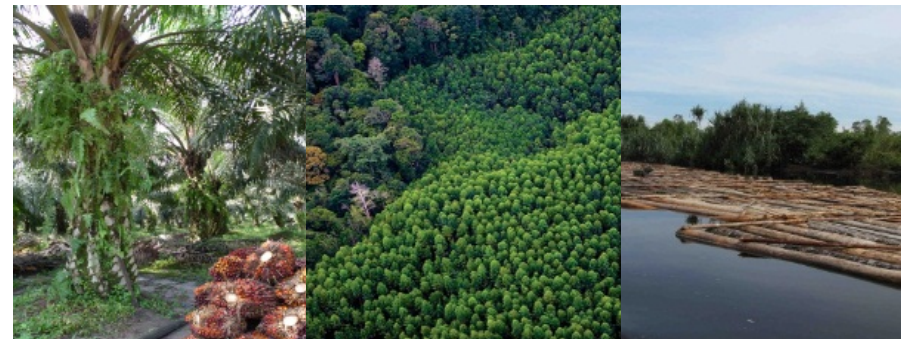
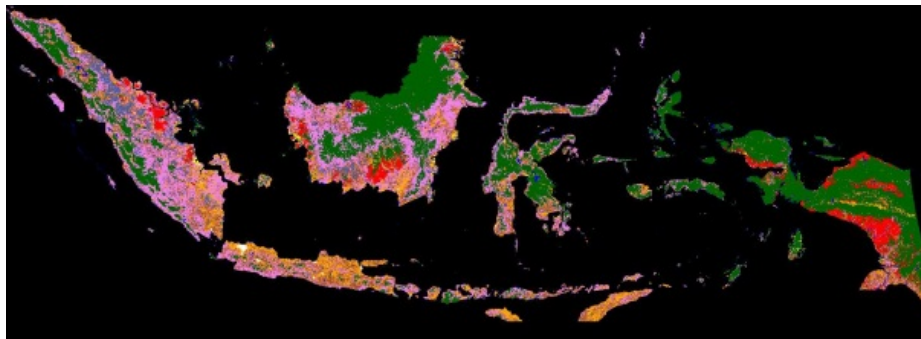
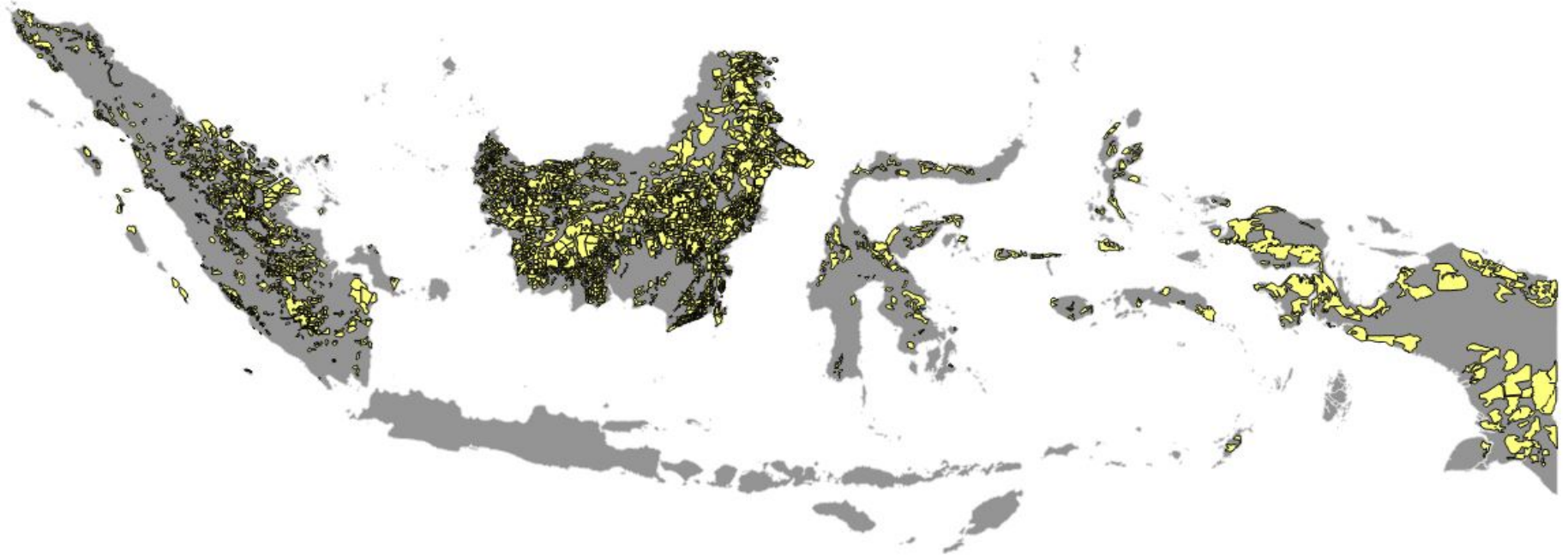
Peatswamp forest loss within the oil palm industry



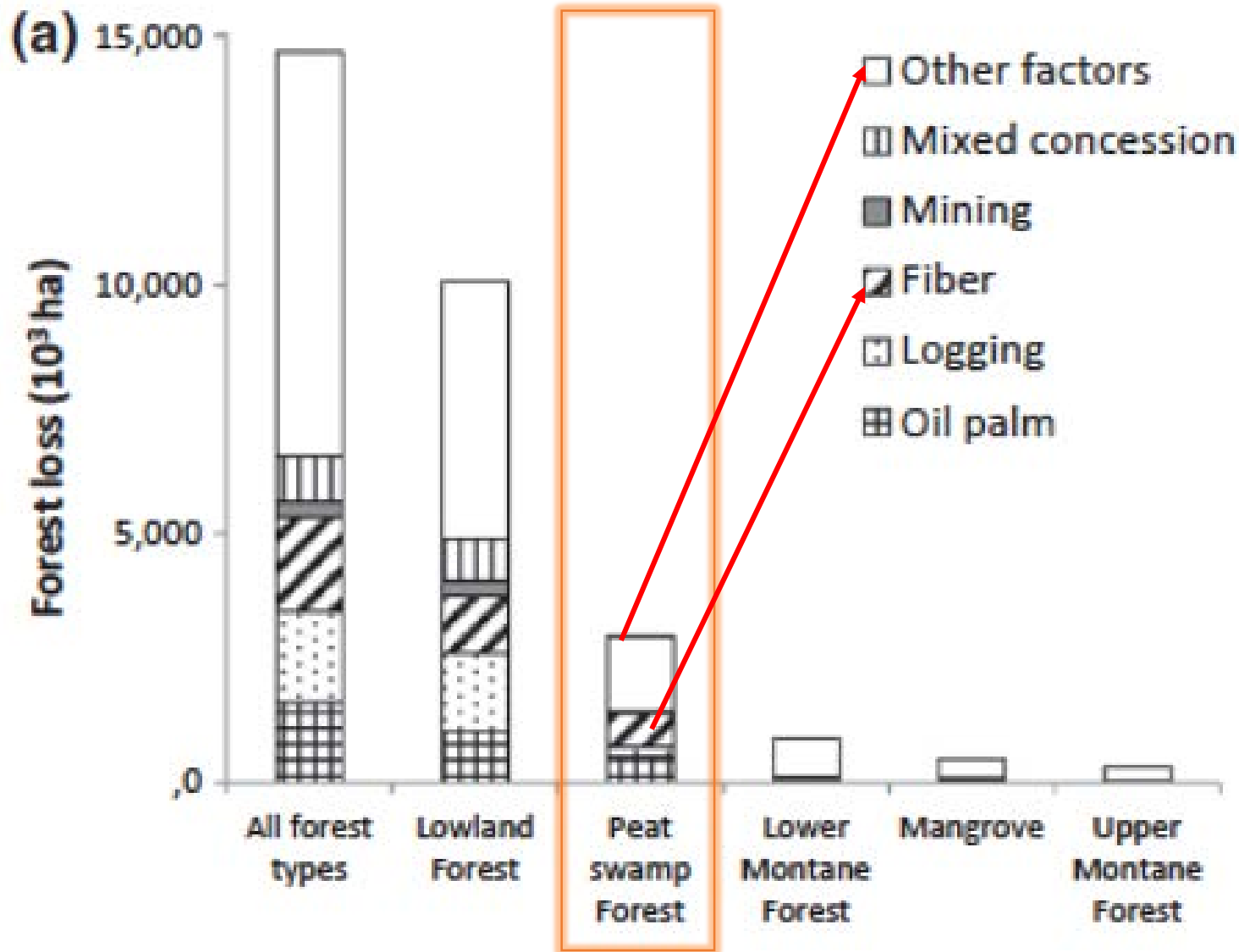
# Are we missing the impacts from the pulp and paper industry?



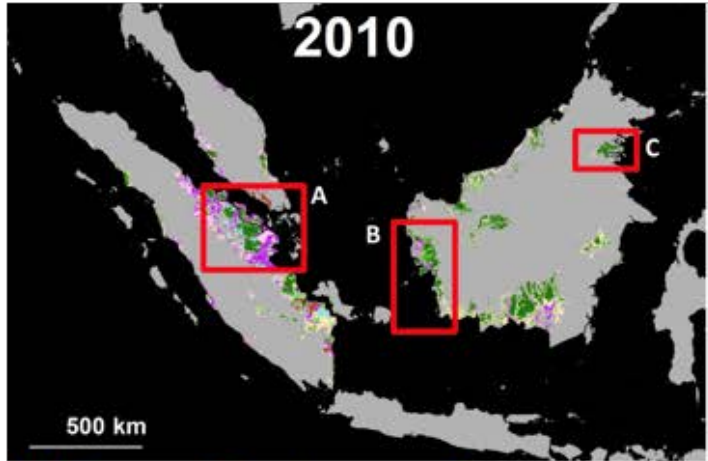
# Peatswamp forest loss in different concessions



# Peatswamp forest loss in different concessions

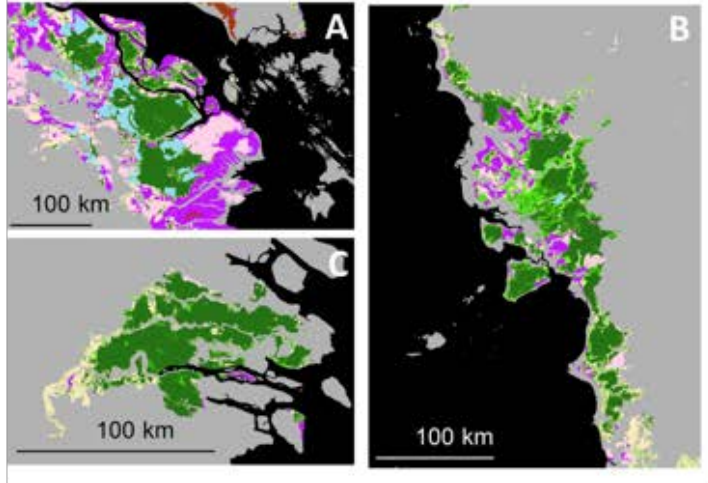


# Smallholders playing a more active role?



“Smallholders accounted for 43% of all agricultural conversion of peatland observed by 2010, followed by industrial oil palm plantations at 39%, industrial *Acacia* plantations at 11%, and other industrial plantations at 6%.”

*Wijedasa et al. (2018)*



*Image: WRI*



*Image: Uni of Minnesota*



# Who is the smallholder?



Contents lists available at ScienceDirect

Land Use Policy

journal homepage: [www.elsevier.com/locate/landusepol](http://www.elsevier.com/locate/landusepol)



Unpacking Indonesia's independent oil palm smallholders: An actor-disaggregated approach to identifying environmental and social performance challenges

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## Smallholder Typology

- Size of landholding
- Origin of farmer
- Residence of farmer
- Land status
- Soil type
- Ethnicity



Small local farmer

Medium local farmer

Large resident farmer

Small migrant farmer

Medium migrant farmer

Small and medium peat farmer

Large investor farmer

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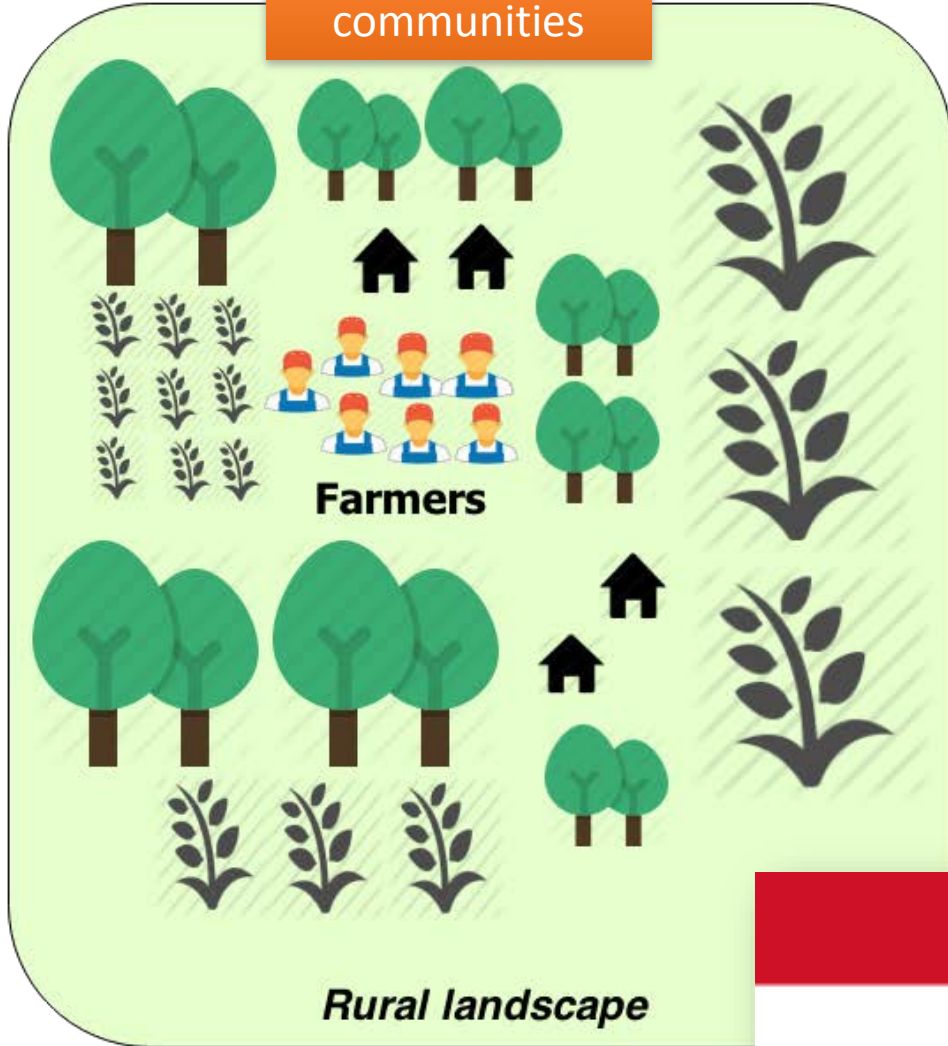


# Sustainable development of peat?



- Is any development sustainable at all?
- Still lack in our understanding of peat ecosystem
- Manage these systems in knowledge gap

Involving local communities

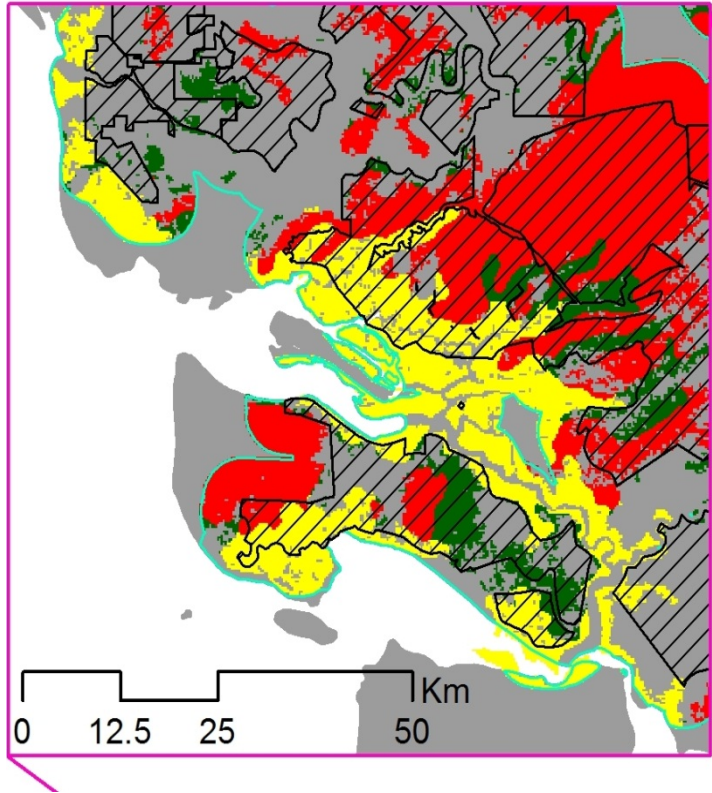


Changing corporate activities



International/National/Sub-national Governance Systems

# Diverting development away from PSF



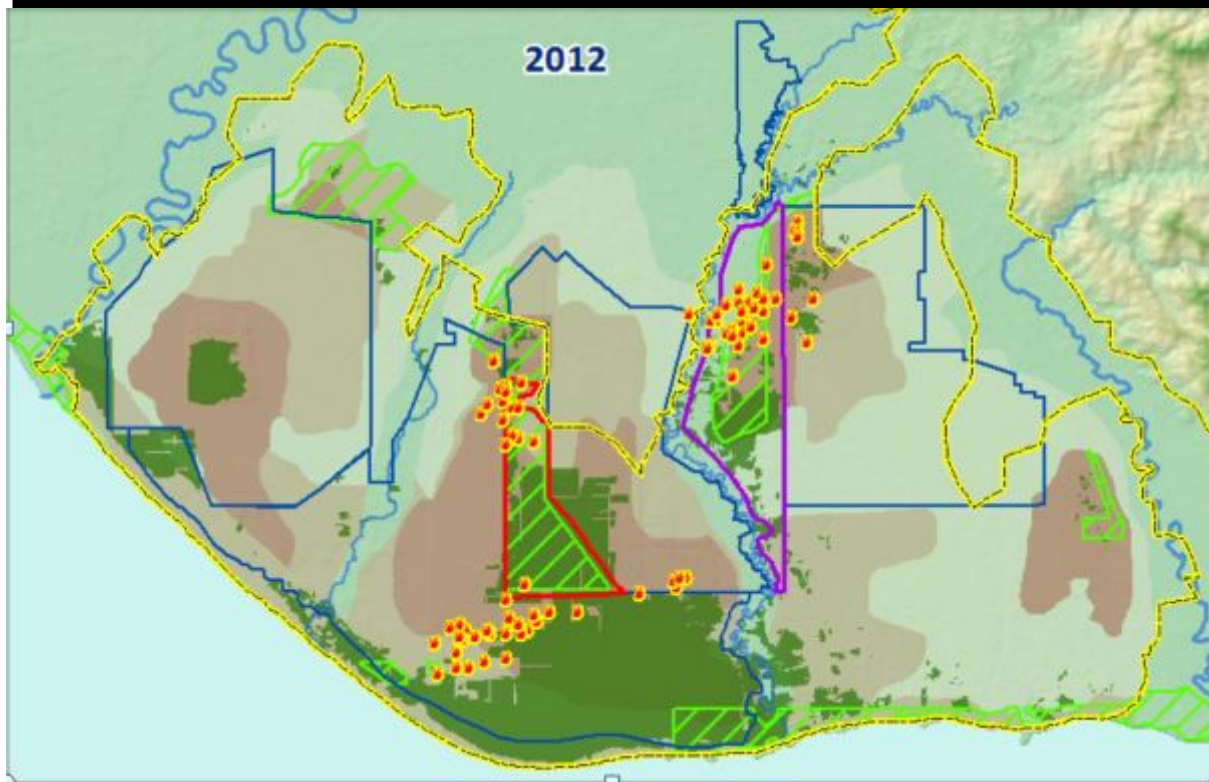
## Peatland development within concessions

- High Conservation Value status under ISPO/RSPO
- REDD+ to offset opportunity costs for not developing PSF
- Land swaps (under Peatland Restoration Agency)
- Moratorium over peatlands

*Effective enforcement of policies*

# Government action

## Tripa Peatswamp forests in Aceh



**Deep peat (>3 m)**

**No enforcement  
of this legislation**

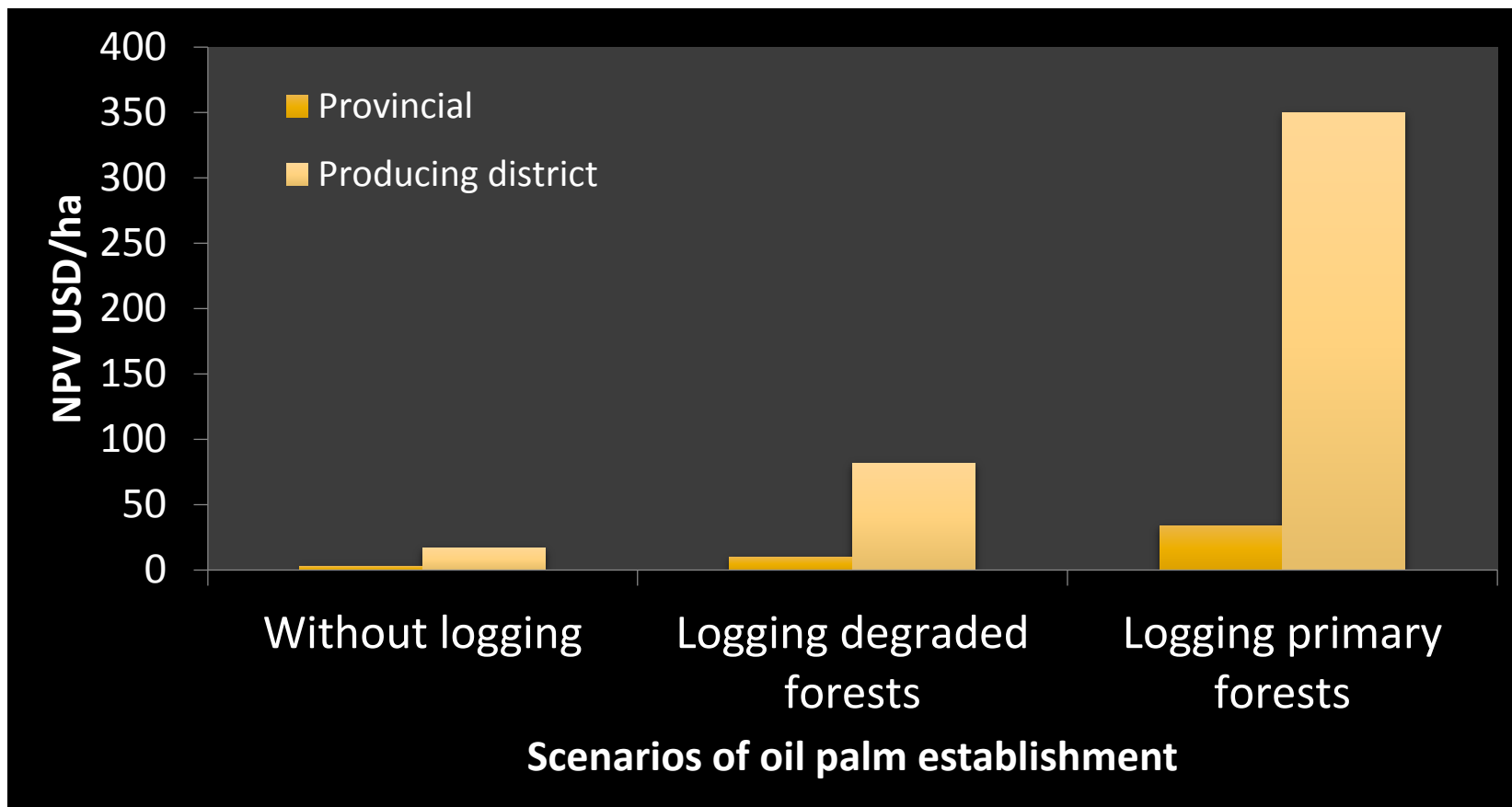
1989: 61,000 ha

2012: 10,700 ha

Credit: Graham Usher, PanEco

# Political economy of PSF development

## Economic drivers for allocating forested peatlands for development



# Changing corporate practices

## RSPO MANUAL ON BEST MANAGEMENT PRACTICES (BMPs)

FOR MANAGEMENT AND REHABILITATION  
OF NATURAL VEGETATION ASSOCIATED  
WITH OIL PALM CULTIVATION ON PEAT

SUPPORTED BY



**RSPO**

Roundtable on Sustainable Palm Oil

# Involving local communities



## Community-based peat restoration in Indonesia

Local communities in Central Kalimantan, Indonesia have traditionally depended, for their livelihoods, on fish and non-timber forest products from the extensive peat swamp forests. They have been severely impacted by the clearance and degradation of peatlands, for example, the failed 1-million ha Mega-Rice Scheme abandoned in 1999 after 500,000 ha burnt in the 1997-98 El Niño events. The Climate Change, Forest and Peatland in Indonesia (CCFPI) Project assisted the local communities to block the abandoned drainage channels and to rehabilitate the peatlands. This has led to reductions in fires and ORO emissions and improvements in fish harvests. The restoration techniques developed - drawing on indigenous knowledge - have now been adopted for large-scale rehabilitation of peatlands in Indonesia and elsewhere.



*Replanting burnt peat swamp forest*



*Building dams for peatland rehabilitation*

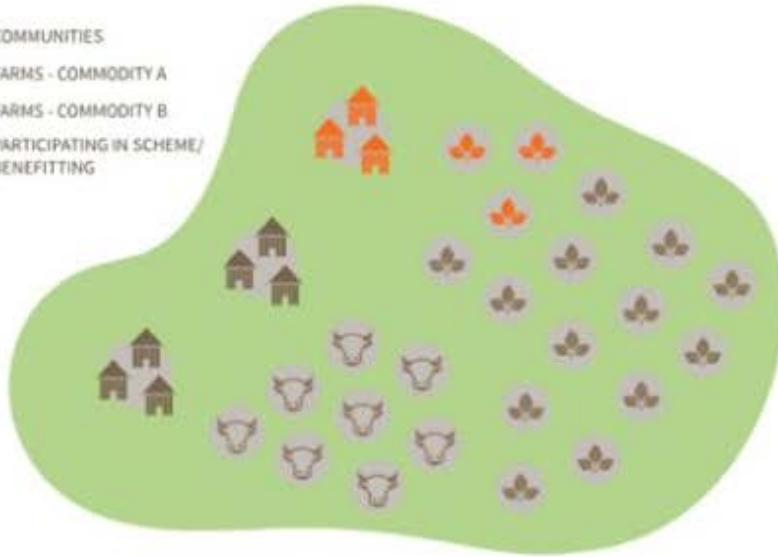
## Peatland development outside of concessions

- Recognizing land rights of local communities
- Encouraging more community-company partnerships for smallholder agriculture
- Restoring degraded peatlands in Indonesia

# JA - One boundary to rule them all

## Project Model

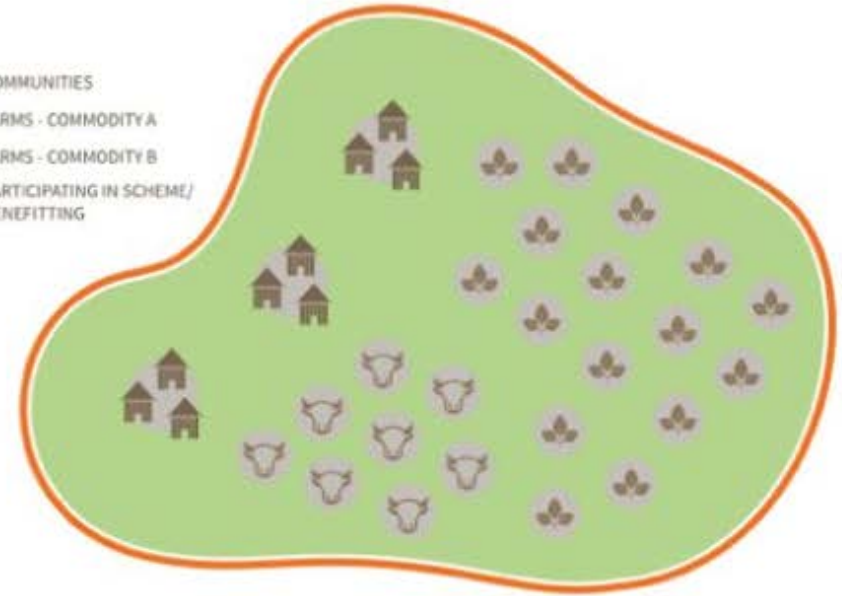
- COMMUNITIES
- FARMS - COMMODITY A
- FARMS - COMMODITY B
- PARTICIPATING IN SCHEME/  
BENEFITTING



Under the Project approach, only a few communities (including indigenous and traditional communities) or farms are participating and benefiting in the scheme and emissions reductions are small in scale.

## Jurisdictional Model

- COMMUNITIES
- FARMS - COMMODITY A
- FARMS - COMMODITY B
- PARTICIPATING IN SCHEME/  
BENEFITTING



Under the jurisdictional model, entire jurisdictions would be rewarded for reducing emissions from deforestation, with benefits sharing mechanisms that could potentially reach a broader group of stakeholders. Incentives and investments flowing from climate finance could promote a range of benefits, from health to infrastructure, to address communities' needs and aspirations and promote systemic change.



# Tools for implementing JA

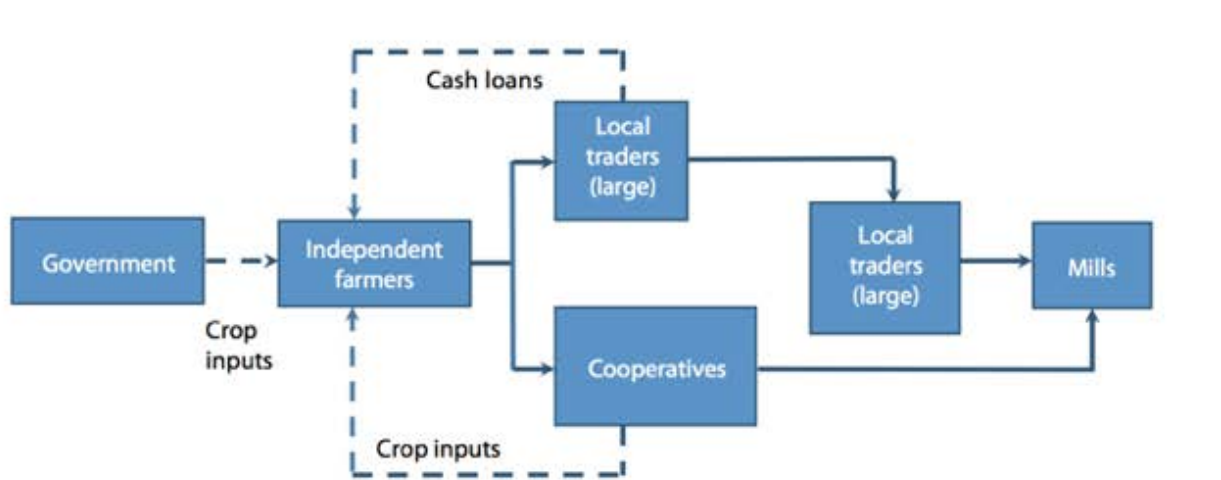


Figure 5. Marketing channels and input sources for independent smallholders.

*Sahara et al. (2017) CIFOR*

- Green financing channels for smallholders

## New Palm Oil Alliance 'SUSTAIN' Initiates Blockchain Solution to Drive Sustainable Practices Across the Supply Chain

Media OutReach

September 12, 2018



- Traceability within supply chains

# Future for Indonesia's peatlands?



1970s: Logging of peatswamp forests - increased desiccation  
1980-2000s: Draining of peatswamp forests, industrial plantation development  
2000s-present: Mixed agency of companies and smallholders  
2020, 2030, 2040, 2050 – future scenarios for peatlands in Indonesia?



# Implications for fires & carbon emissions

- Fires are intricately linked to peatland degradation through the years
- Peatlands moving from a carbon sink to carbon source
- Will Indonesia's peatland restoration reverse this trend?



Environmental Research Letters

ACCEPTED MANUSCRIPT • OPEN ACCESS

Evaluating the social and environmental factors behind the 2015 extreme fire event in Sumatra, Indonesia

Jocelyne Shimin Sze<sup>1</sup>, Jefferson Jefferson<sup>2</sup> and Janice Ser Huay Lee<sup>3</sup>

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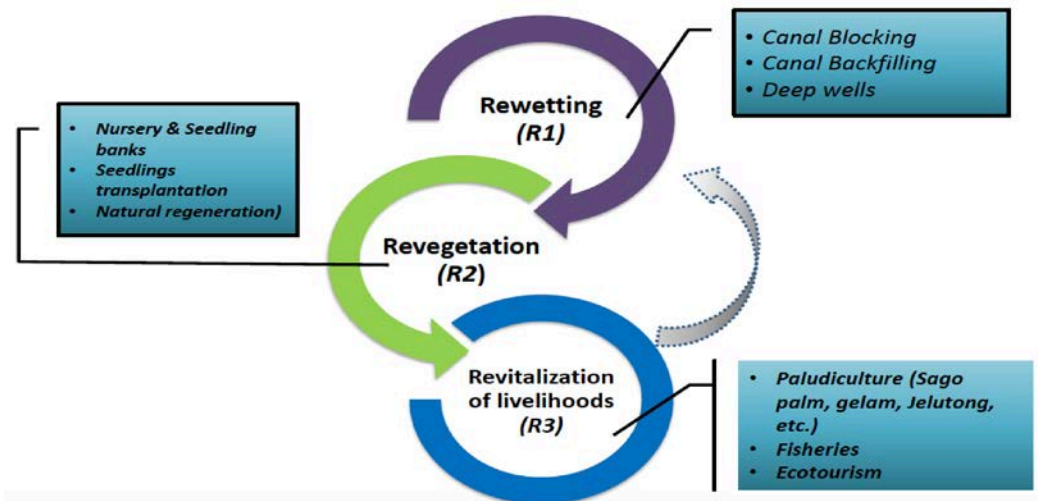
Accepted Manuscript PDF



Badan  
Restorasi  
Gambut

Restoration Measures & Techniques

## Restoration Measures & Techniques: 3R Approach



Thank you!



## Gross CO<sub>2</sub> emissions (Mt) from total forest loss

Gross carbon dioxide emissions (Mt)	Sumatra	Oil palm sector			
		Total	Private enterprise	Smallholder	State-owned
Mean	3,526-4,502	756-1,043	685-956 (90.6-91.7)	67-83 (8.9-8.0)	4.19-4.21 (0.6-0.4)
Low	2,747-3,090	599-700	543-638 (90.7-91.1)	52-58 (8.7-8.3)	3.49-3.50 (0.6-0.5)
High	4,387-6,231	919-1,462	830-1,342 (90.3-91.8)	84-115 (9.1-7.9)	4.89-4.93 (0.5-0.3)

**70 – 77% of emissions from the oil palm industry came from PSF loss within private enterprises**