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**Drainage impacts in tropical peatlands in SE Asia:
processes, scale of the problem and possible solutions.**

Why improved water management of peatlands is a key factor in climate change mitigation and adaptation, by reducing and avoiding carbon emissions from peatland decomposition and fires, as well as reducing biodiversity loss and prolonging land productivity.


By: Deltares peat team

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2/15 Drainage impacts on peatlands



A natural SE Asian peatland: covered with tropical rainforest

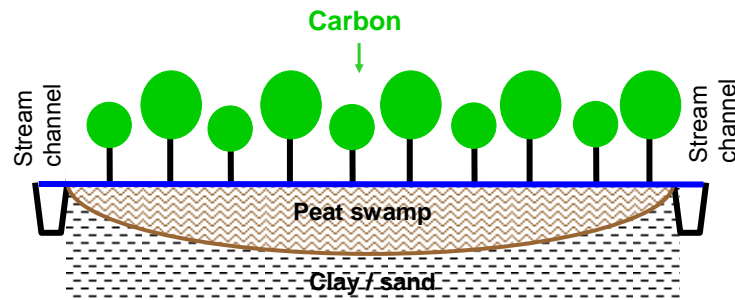


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3/15 Drainage impacts on peatlands

How do peatlands develop?

Peatlands develop where dead vegetation (carbon) accumulates over thousands of years, in water-saturated conditions

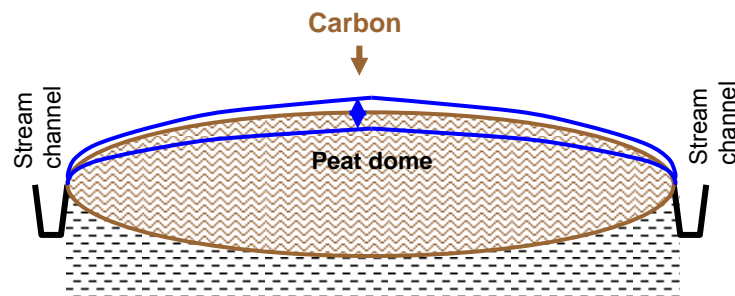


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4/15 Drainage impacts on peatlands

How do peatlands develop?

Peat accumulation continues as long as water tables are near the soil surface: it is a carbon sink, taking up CO₂ from the atmosphere



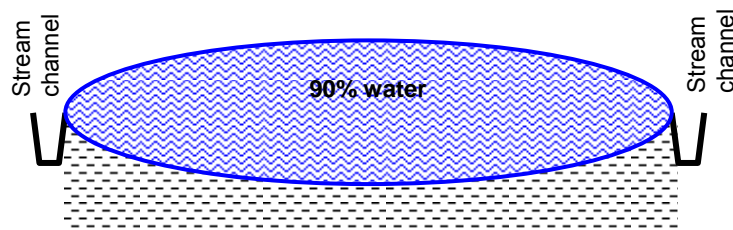
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5/15 Drainage impacts on peatlands

Why are peatlands different from other lowland areas?

Peat soils consist mostly of water (90%), held together by vegetation remains
i.e. mostly carbon (10%)

Peatlands are in some ways more like lakes than land: they are wetlands

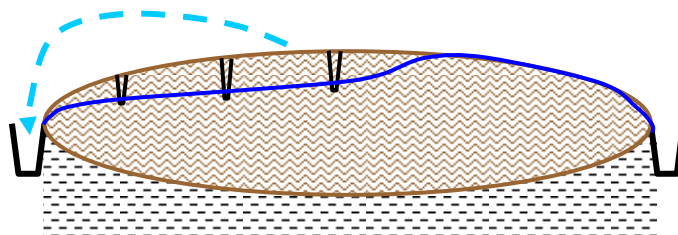


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6/15 Drainage impacts on peatlands

Why does peatland drainage have such major impacts?

Drainage lowers water table and dries the peat

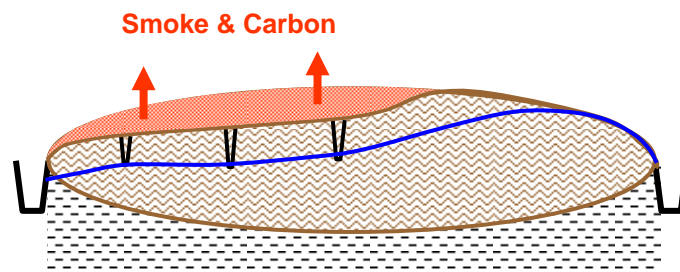


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7/15 Drainage impacts on peatlands

Why does peatland drainage have such major impacts?

Dry peat will burn easily, but also decomposes ('rotting') without fires: it becomes a carbon source, releasing CO₂ to the atmosphere



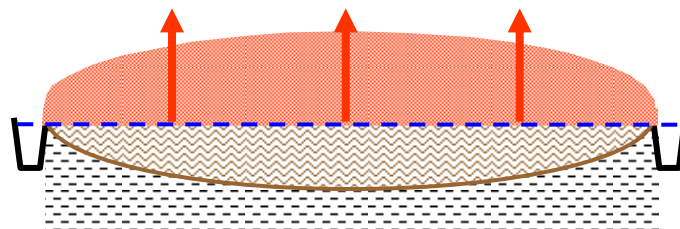
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8/15 Drainage impacts on peatlands

What is the long-term impact?

Peat loss can be quick (fires) or slow (decomposition)

As long as it is drained, all peat above drainage base (River or Sea) will be lost



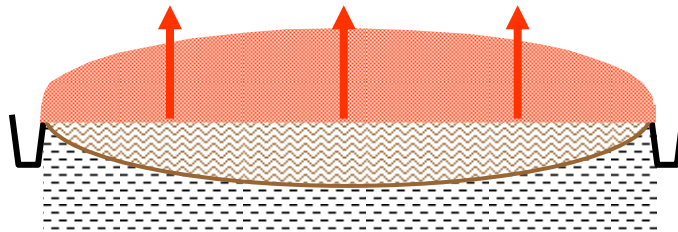
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9/15 Drainage impacts on peatlands

What are the impacts of peatland drainage?

General environmental impacts:

- ▶ Smoke emissions: local health problems and regional haze
- ▶ CO₂ emissions (and other greenhouse gases)
- ▶ Remaining conservation forest progressively drained and lost



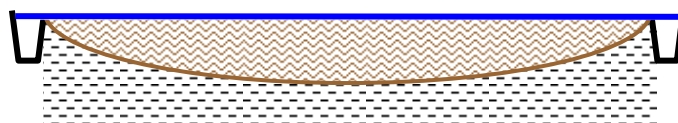
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10/15 Drainage impacts on peatlands

What are the impacts of peatland drainage?

Impacts directly relevant to peatland agricultural productivity:

- ▶ Peat subsidence increases flooding of the peatland
- ▶ In some cases, downstream flooding may also increase
- ▶ Increased flood frequency means decreased agricultural productivity
- ▶ Further production loss if peat is underlain by infertile 'acid sulphate' or sand soils



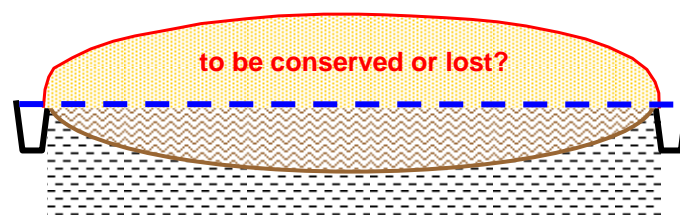
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11/15 Drainage impacts on peatlands

How can these impacts be stopped or reduced?

Peat loss only stops when the peat is 'rewetted'

For rewetting, water levels must be brought up: water management needed

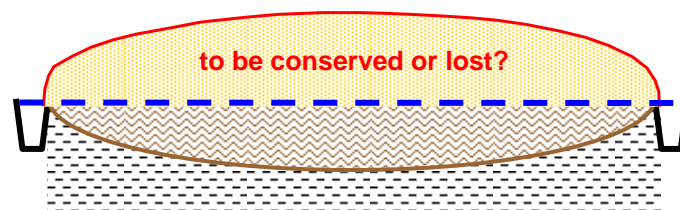


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12/15 Drainage impacts on peatlands

Why would SE Asia's Governments, international organizations, NGOs and private sector (palm oil plantations, pulp wood plantations) be interested in reducing these impacts? Why would they invest in improved land and water management in peatlands?

- ▶ Reduced agricultural production loss in medium to long term (~20-50y)
- ▶ Reduced environmental impacts; better chance of certification, exports
- ▶ Carbon credits, e.g. REDD in near future?



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13/15 Improving water management in SE Asian peatlands

Rehabilitation projects in drained and degraded peatlands: aiming to bring water tables up to a level that peatswamp forest may be restored and carbon emissions stopped.



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14/15 Improving water management in SE Asian peatlands

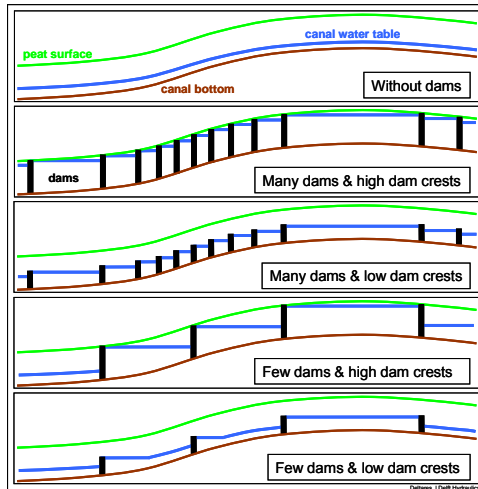
Water management improvement project in plantations: aiming to bring up water tables to a level that subsidence, and carbon emissions are reduced.



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15/15 Improving water management in SE Asian peatlands

Guidelines and planning projects for peatland water management



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Thank you

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