

From the desert to the swamp: the role of reeds in the world of peatlands

Hans Joosten
Greifswald University



Caspar David Friedrich: 'Meadows near Greifswald' (~1821)



Hans Joosten

Me: 'Reedbeds near Greifswald' (~ yesterday)



Michael Succow

The Baltic, where reeds (and peats!) meet the sea

All the lands were sea
Gilimma bound reeds upon the face of the waters
He formed soil and poured it out beside the reeds
He filled in a dike by the side of the sea
He made a swamp, he formed a marsh
and he brought it into existence
Reeds he formed, trees he created

Sumerian creation myth
Enki and Ninhursanga c. 2500 BC



703 BC

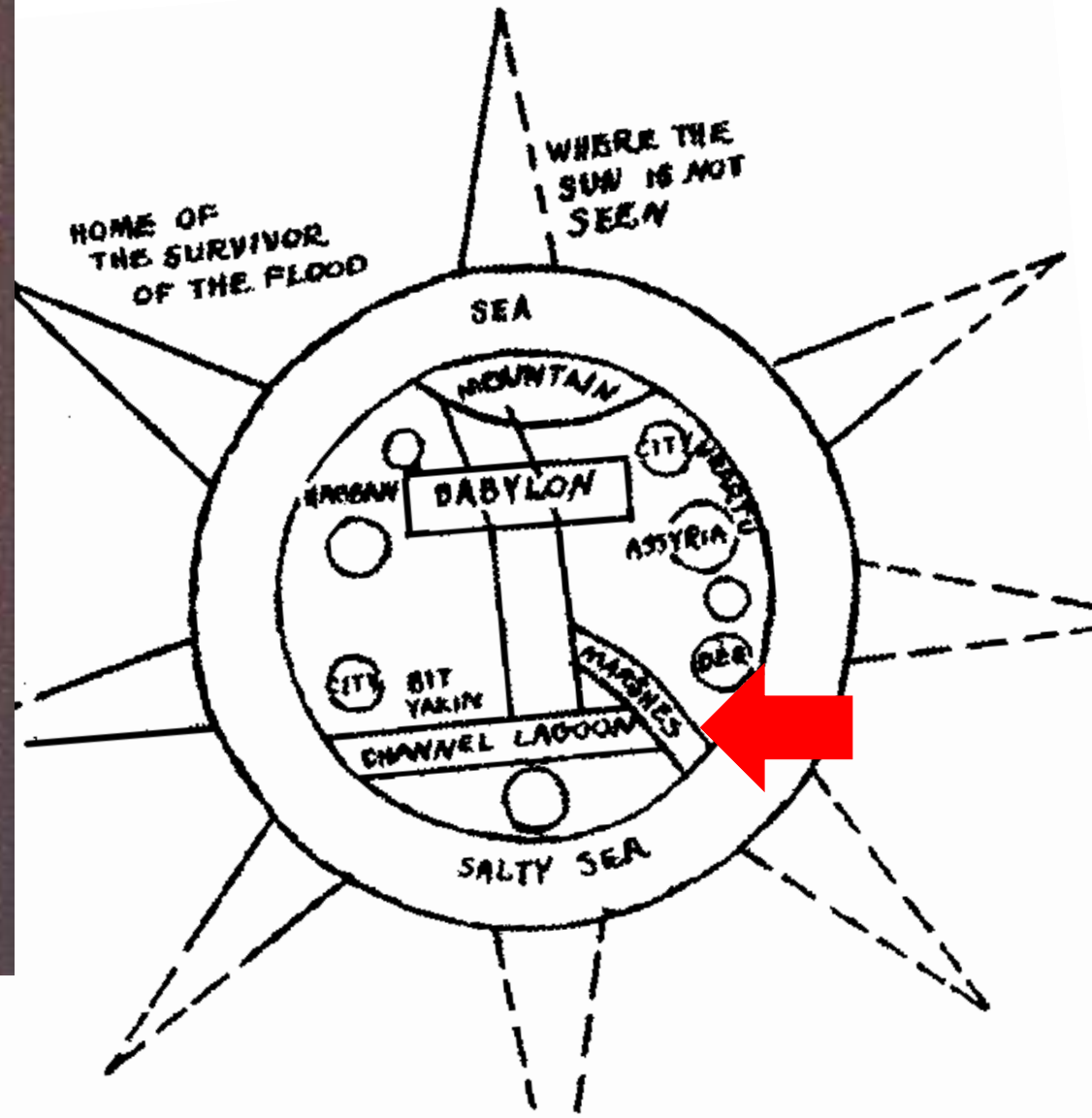
'He fled like a bird to the swampland. I sent my warriors into the midst of the swamps ... and they searched for five days'.



<http://archangels-bloggy.blogspot.de/2011/06/ancient-history-of-babylon-and-noahs.html>

A region that established municipal reedbeds and harvested bulrushes for construction 1,000 yr BC...

Sumerian map, early 5th century BC



...and made the first map with reed marshes



<http://www.internationalrivers.org/resources/hope-and-renewal-in-the-iraqi-marshlands-1808>

A region with the Ma'dan, the Marsh Arabs....



<http://www.arch.mcgill.ca/prof/sijpkes/abc-structures-2005/Lectures-2005/term-work/50-questions/marsh-arabs-construction.jpeg>

... who live(d) in, with, through reeds...



http://en.wikipedia.org/wiki/File:Iraqi_mudhif_interior.jpg

... and constructed impressive dwellings of reed ...



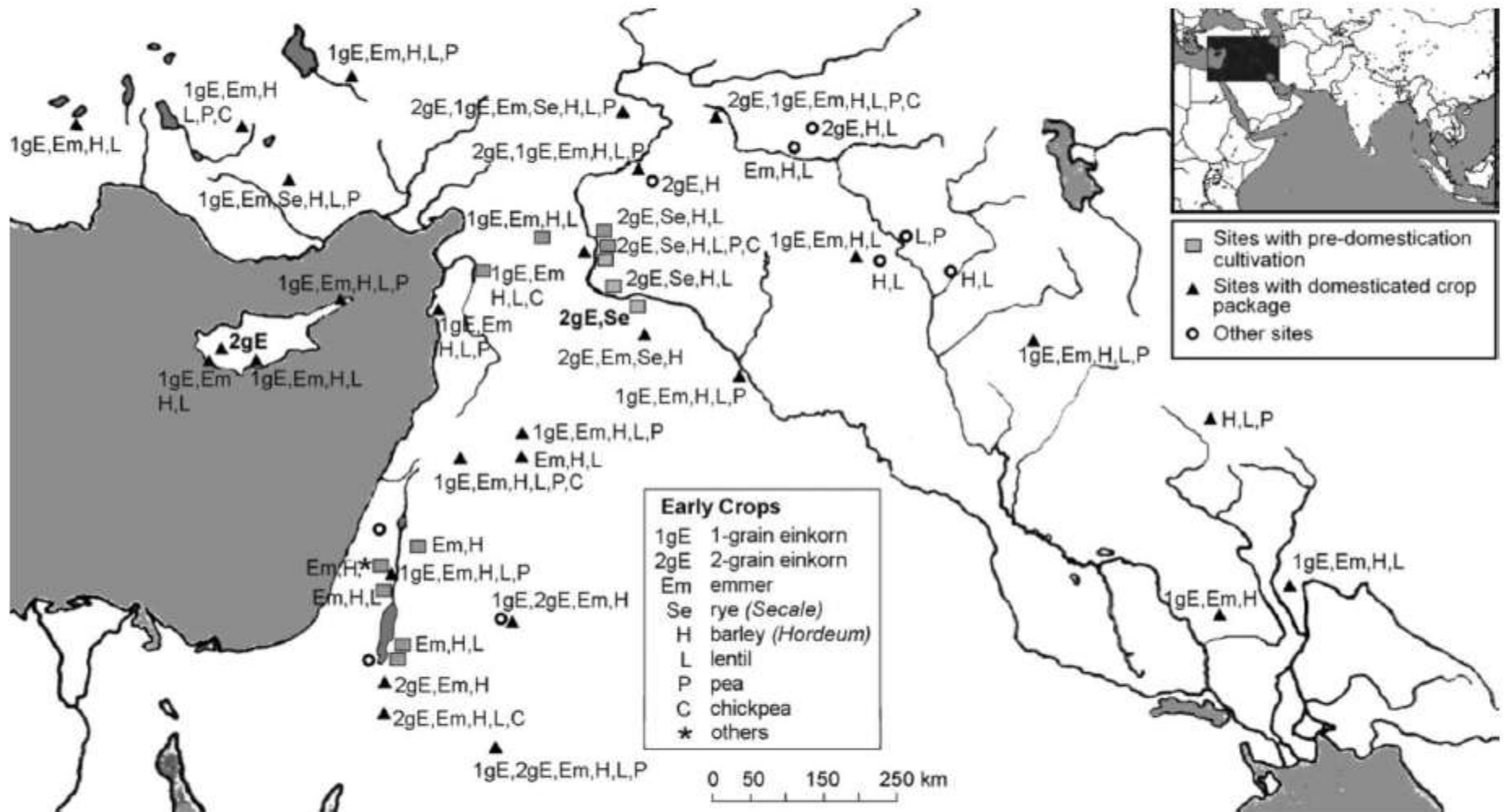
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... a use of reeds that persist in many areas...



<http://www.newsecuritybeat.org/wp-content/uploads/2012/07/harvest1.jpg>

...Middle East: the region where 'our' agriculture originated...



...the cradle of 'our' arable farming...



René Dommain

...that strongly differs from further East...



Hans Joosten

...farming with the idea that productive land must be dry...



Hans Joosten

...and soils must be continuously moved...



Greta Gaudig

...illusions that we also apply to wet, organic soils...



Bostang Radjagukguk

... African desert plants on SE-Asian peatland: *Aloe vera*...



Hans Joosten

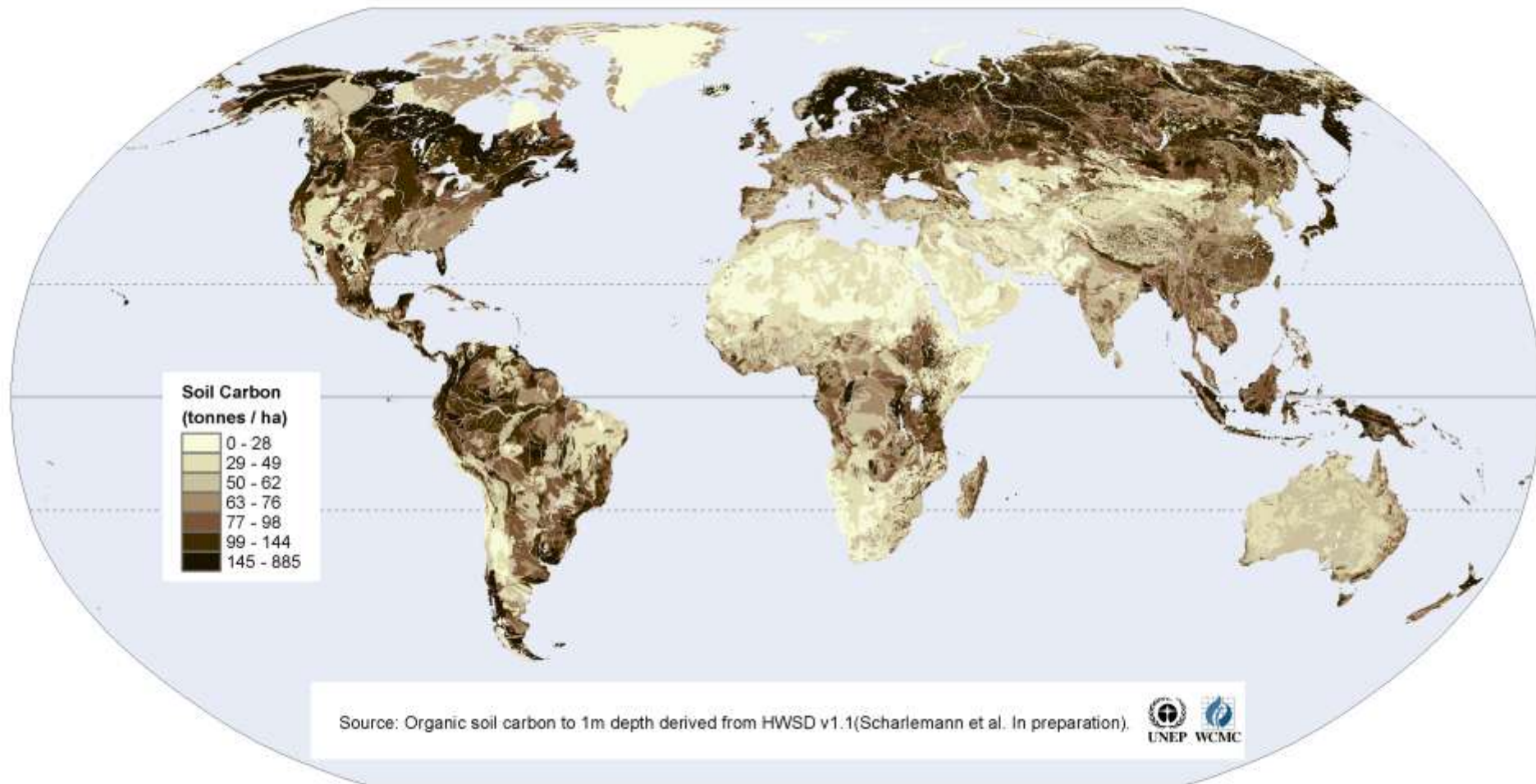
... S-American arid Maize on German peatland...



Sabine Wichmann

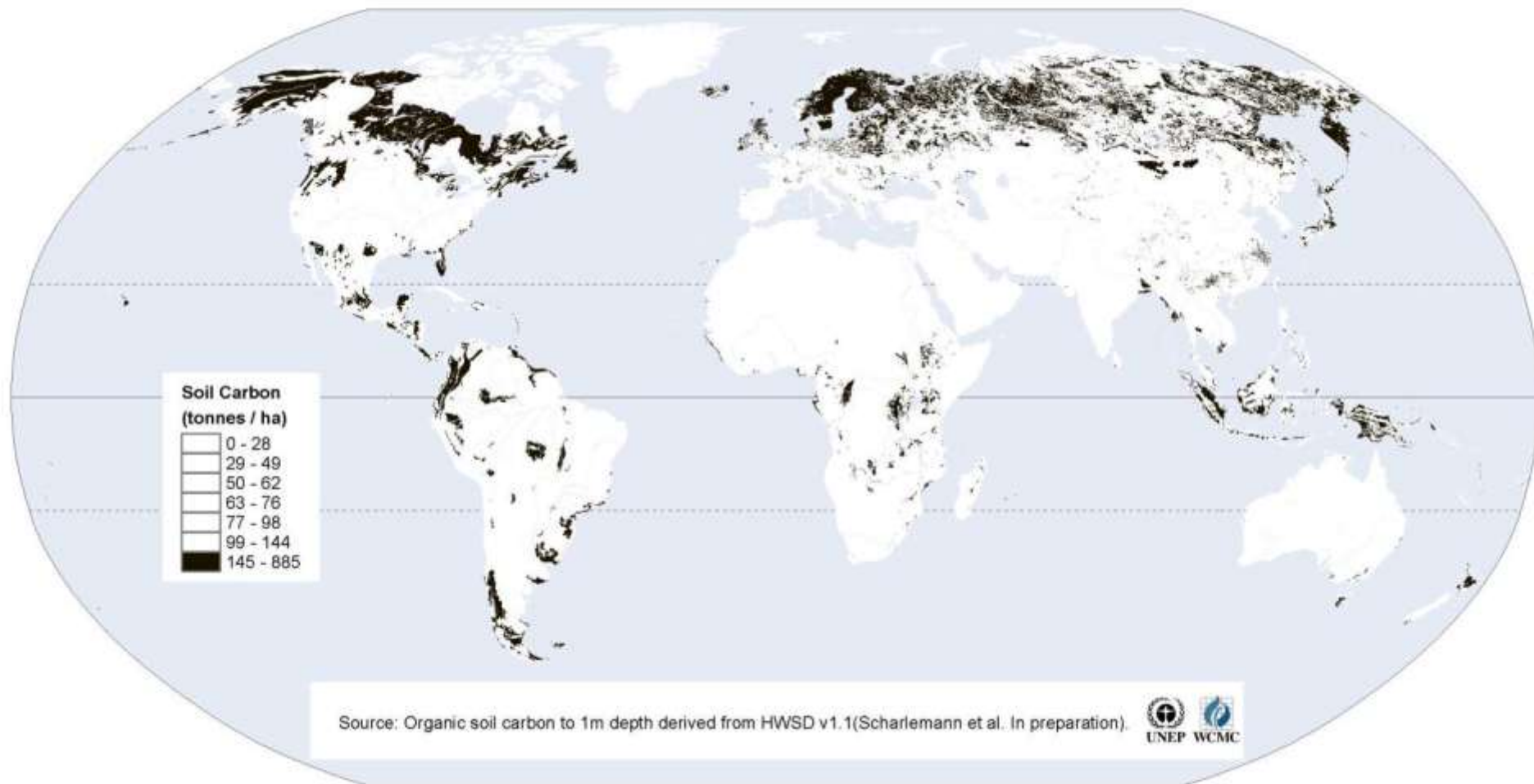
...land use with problems that we start to see only now...

The neglected carbon pool: SOC



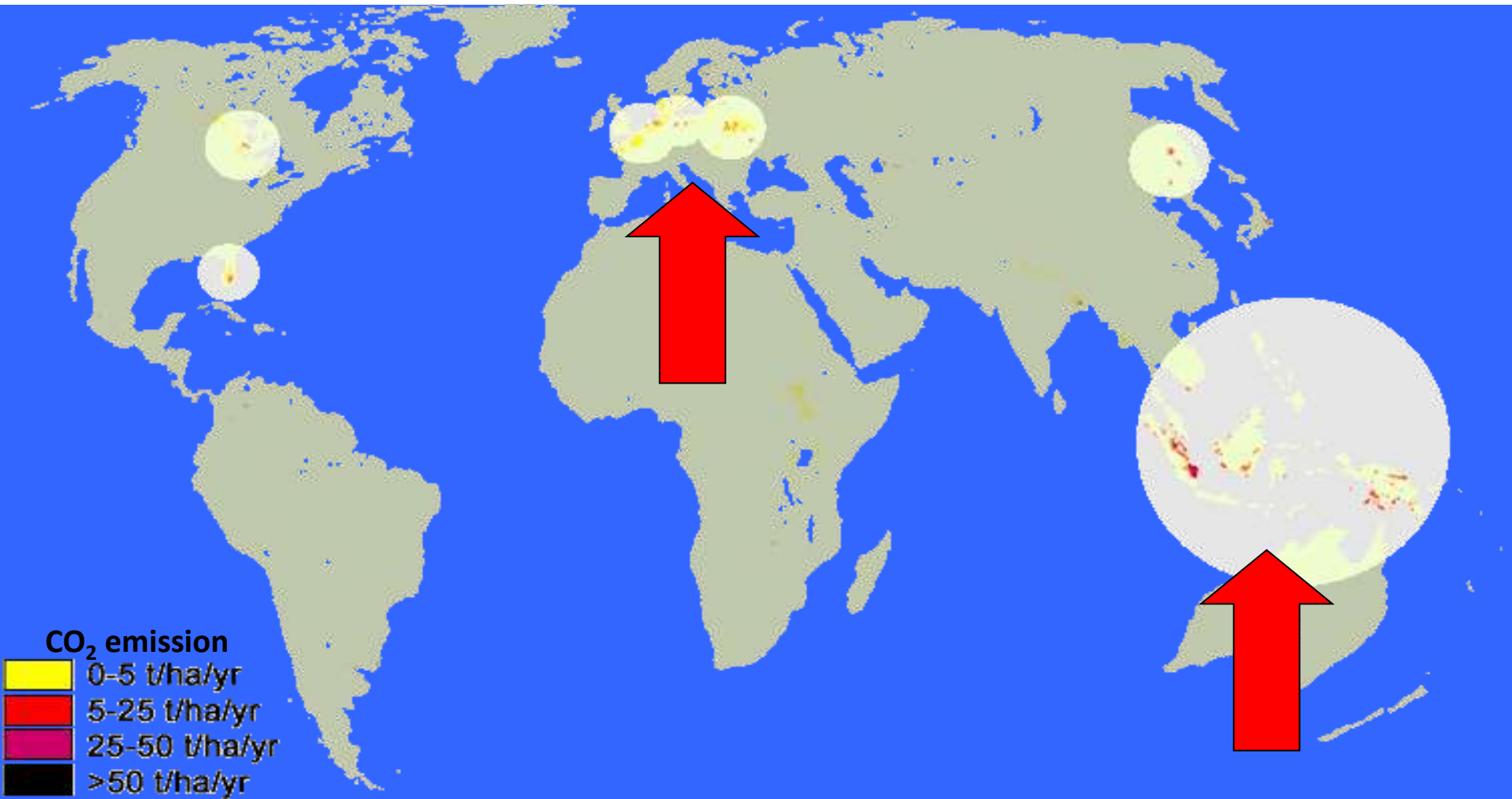
Soil Organic Carbon holds 6x more carbon than
the entire global forest biomass

The SOC hotspot

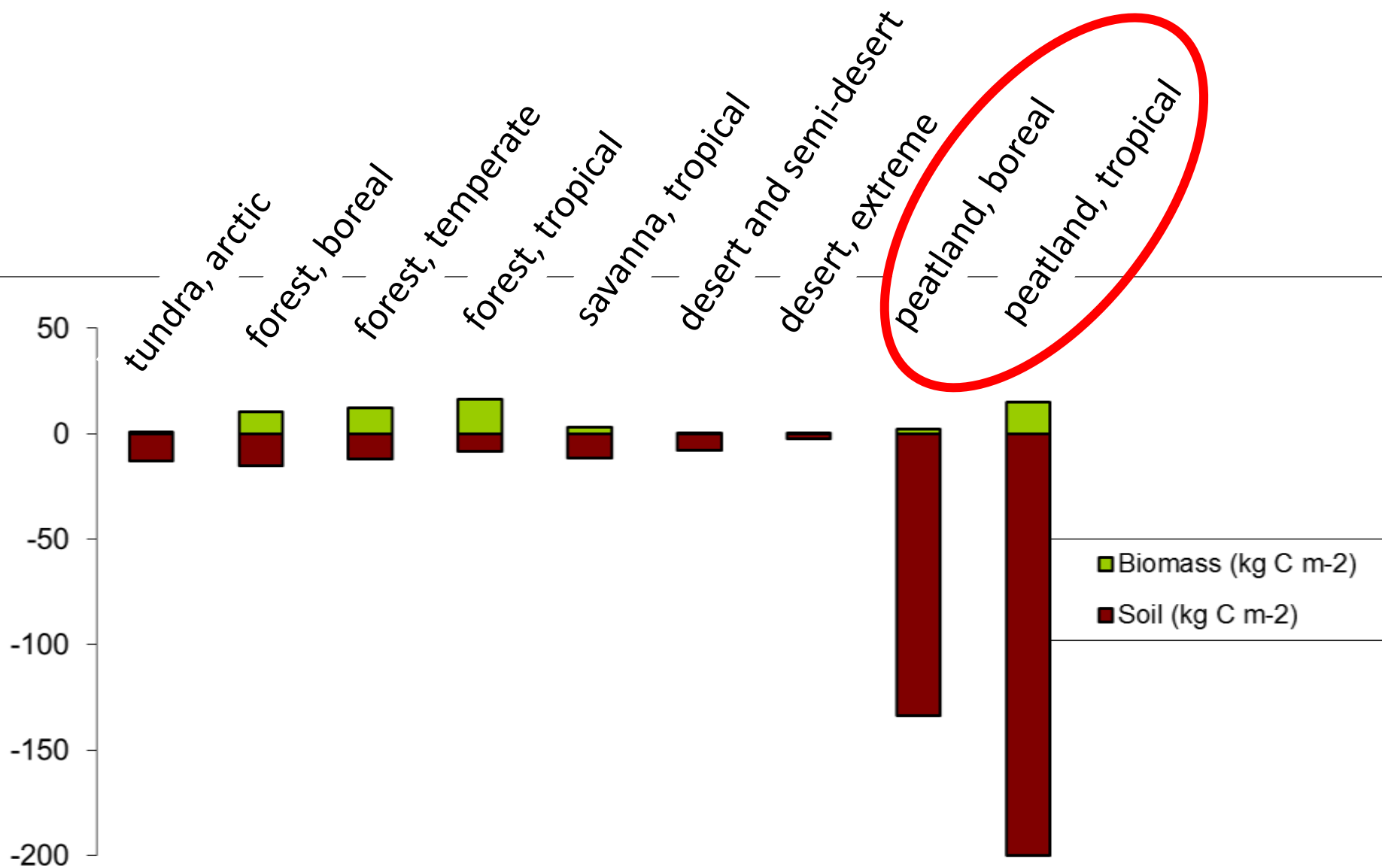


Peatlands (organic soils) on 3% of the land contain 30% of all Soil Organic Carbon


The land use emission hotspot



Drained peatlands on 0.3% of the land emit 6% of all anthropogenic CO₂



Compared to other lands, peatlands contain disproportionately much carbon (largely in their soil)



Wohlgemuth, J.,
1962, Egon und das
achte Weltwunder.
Neues Leben, Berlin.



Michael Succow

When drained, peatlands become vigorous sources of carbon dioxide (and nitrous oxide)



Hans Joosten

Globally, emissions from drained peatland have increased with +25% since 1990, especially in the tropics

Main drivers: drained agriculture...



...drained forestry



...peat extraction...



... for horticulture...



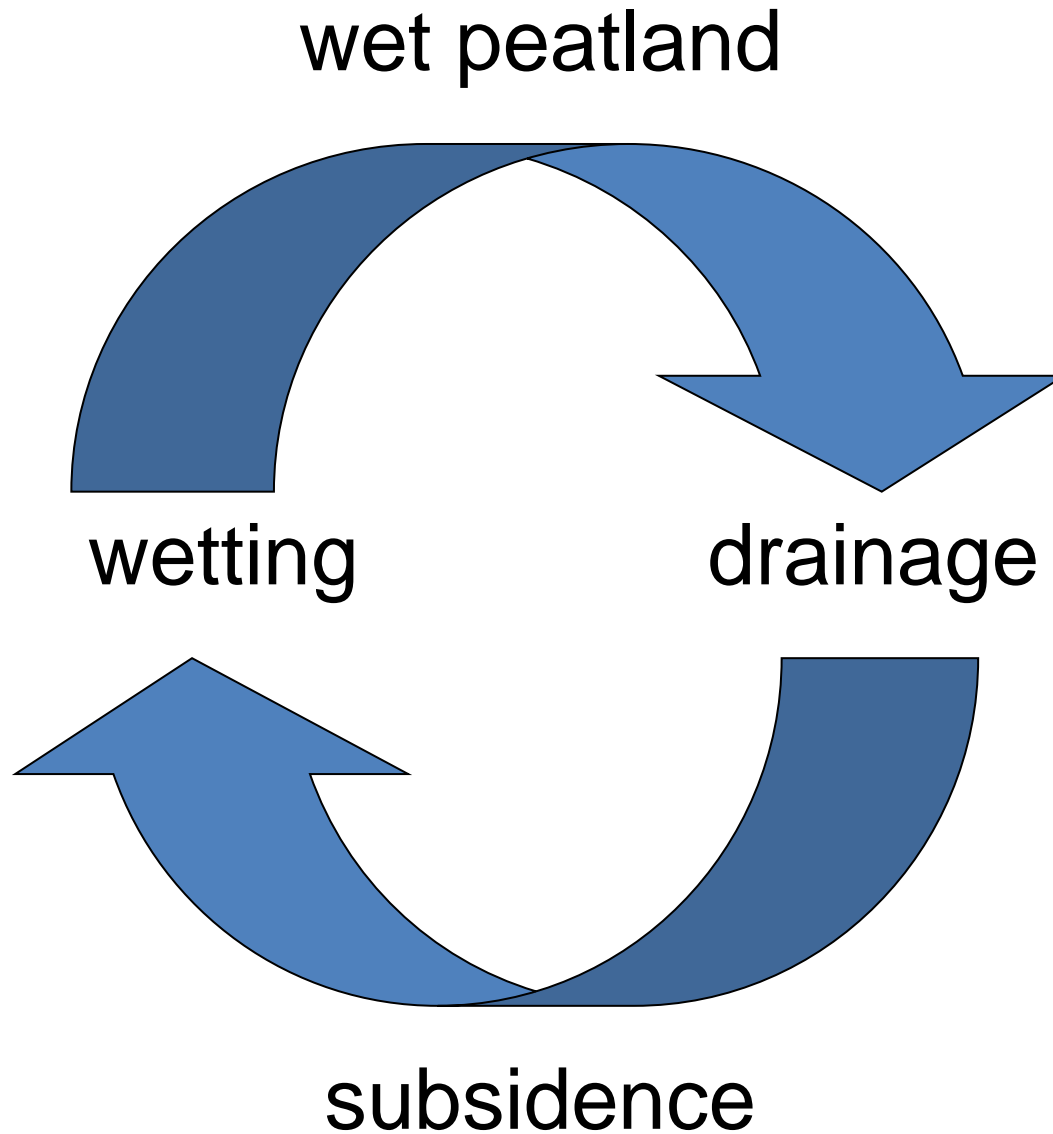
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...and energy generation....

Peatland drainage causes problems



... the “*devil’s cycle*” of mainstream peatland utilisation...





Bavaria: 3 m loss since 1836

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UK: 4 m loss since 1870

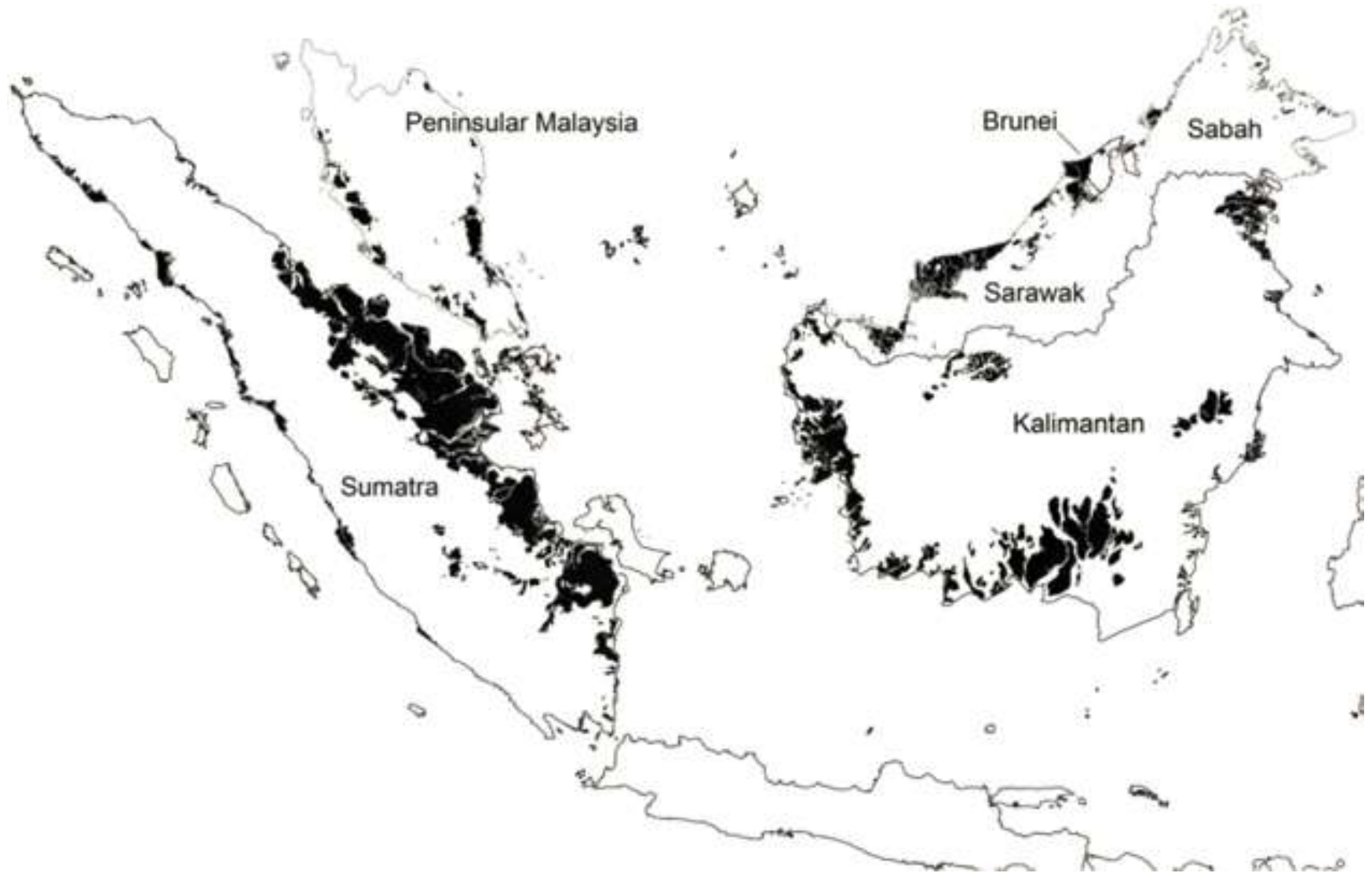
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...*Nether*-lands: bogged down: 1000 yr of peatland drainage,
now half the country deep under sea level...



...*Nether*-lands: bogged down: 1000 yr of peatland drainage,
now half the country deep under sea level...





Many tropical peatlands are coastal and will - with continuous drainage and >2000 mm of rainfall - become undrainable ...



Marcel Silvius

In Sarawak, 30 years of oil palm plantation on coastal peatland will lead to the loss of >10% of the entire land area



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In Germany, ten thousands of hectares of agricultural peatland have already been given up as they could no longer be drained



Hans Joosten

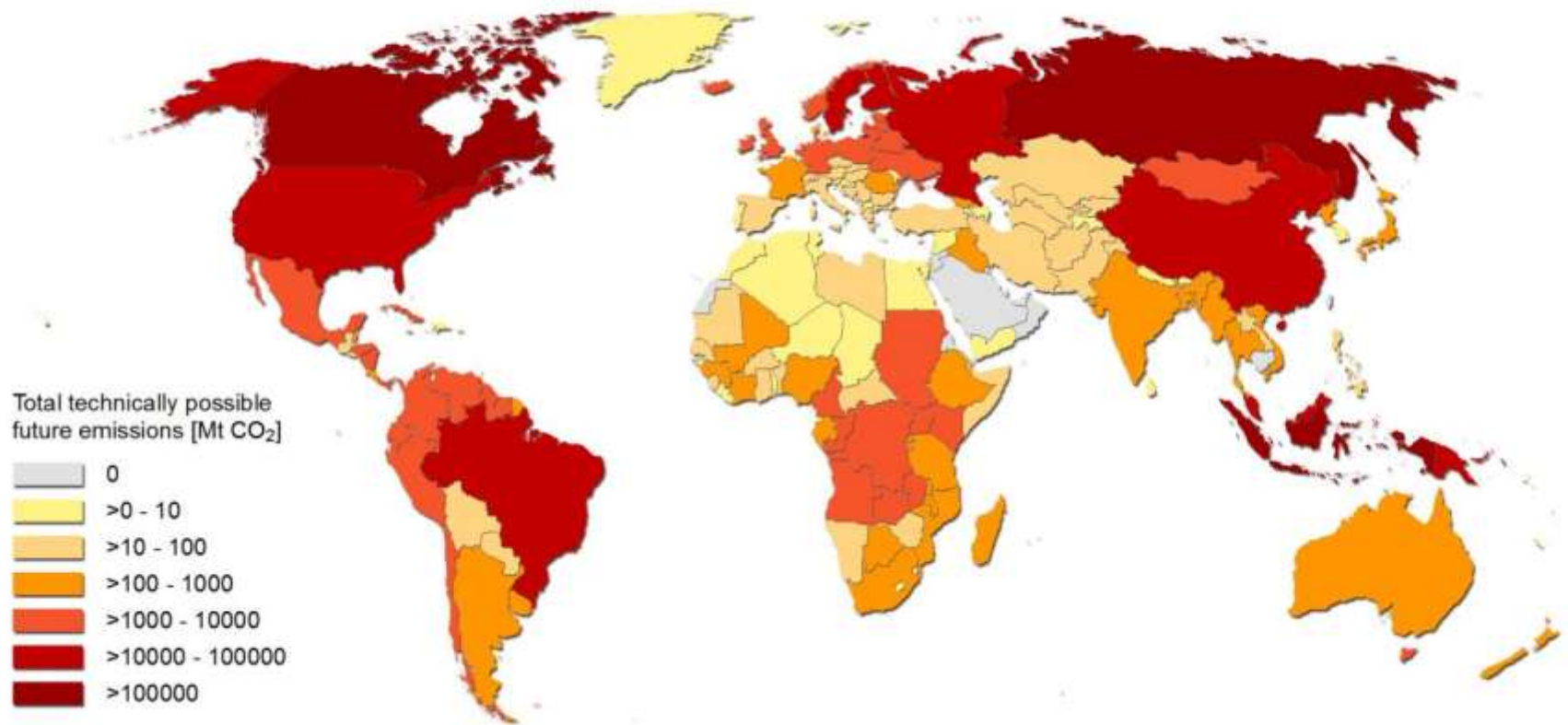
In continental areas peat soils degrade irreversibly. In Belarus, Ukraine and Russia millions of hectares have been deserted



Frank Edom

...and burn, even under snow...

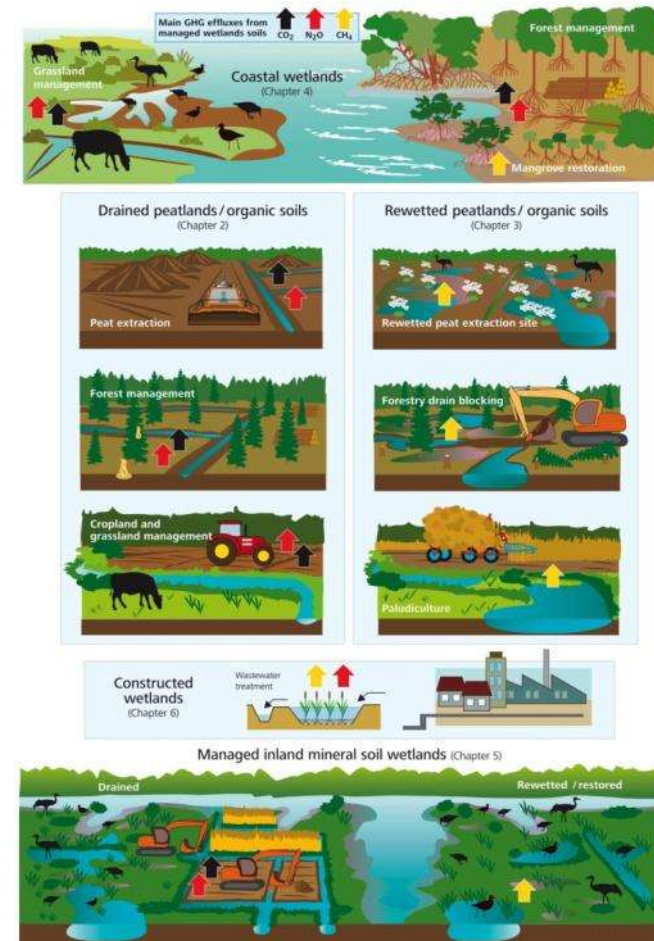
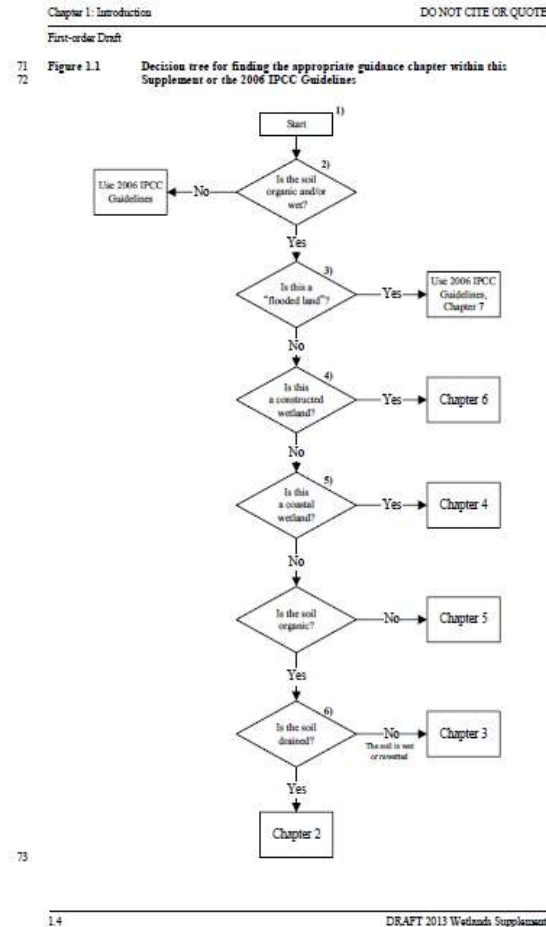
We can't continue like this!



Many countries are huge *potential* peatland CO₂-emitters

Recent policy developments: rewetted

"Wetland drainage and rewetting"" is a system of practices for draining and rewetting on land with organic soil that covers a minimum area of 1 hectare. The activity applies to all lands that have been drained since 1990 and to all lands that have been rewetted since 1990 and that are not accounted for under any other activity as defined in this annex, where drainage is the direct human-induced lowering of the soil water table and rewetting is the direct human-induced partial or total reversal of drainage.



2012 Durban
UNFCCC - KP

IPCC 2013-
Supplement

IPCC 2013
GPG LULUCF

Recent carbon market developments

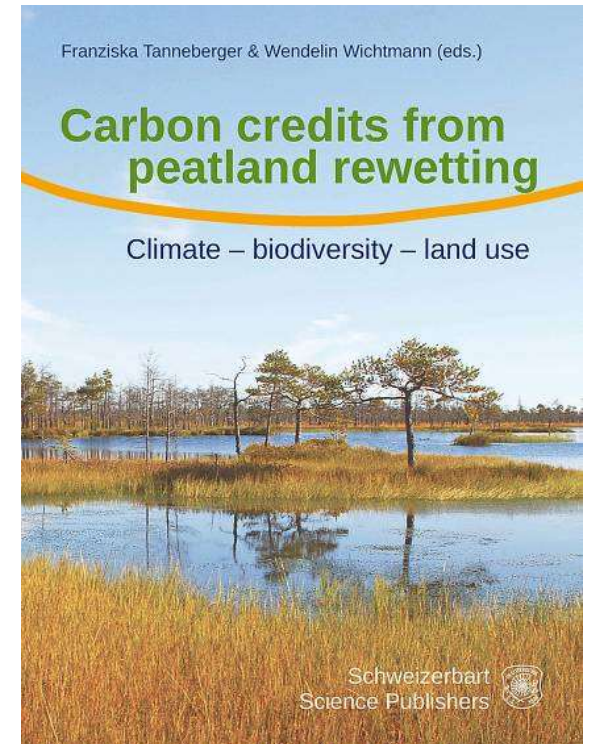


Peatland conservation & rewetting



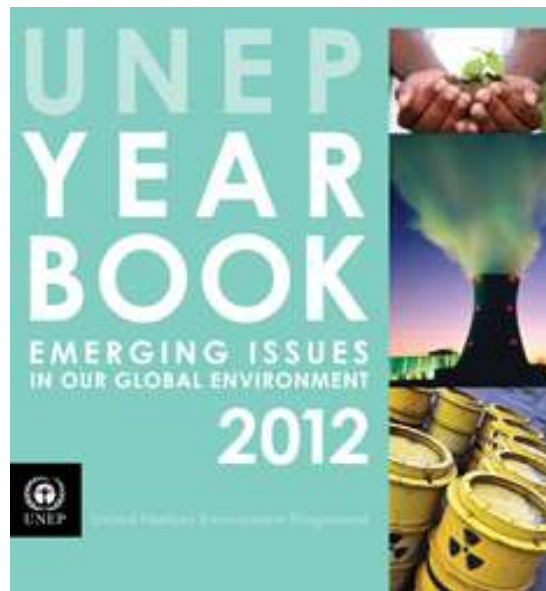
Since March 2011
global standard

Local standards

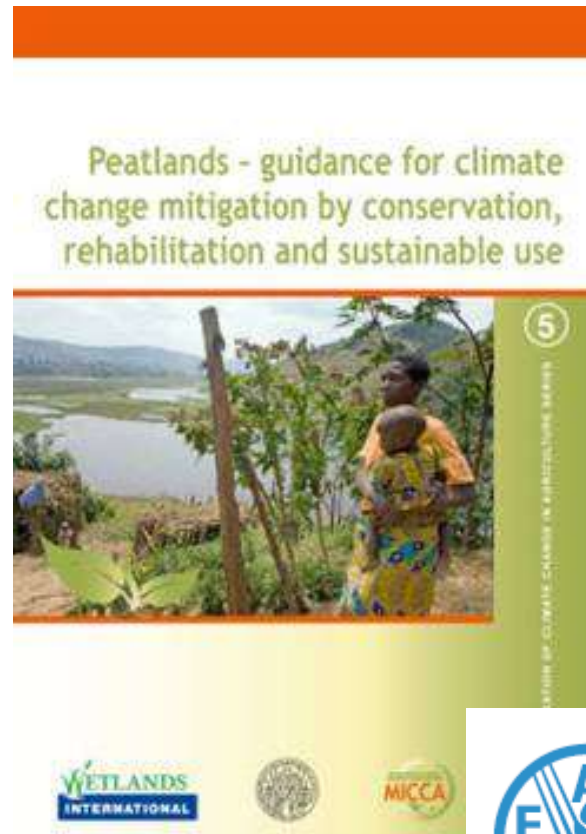


Experiences
summarized

Recent new policy attention



UNEP



UN-FAO



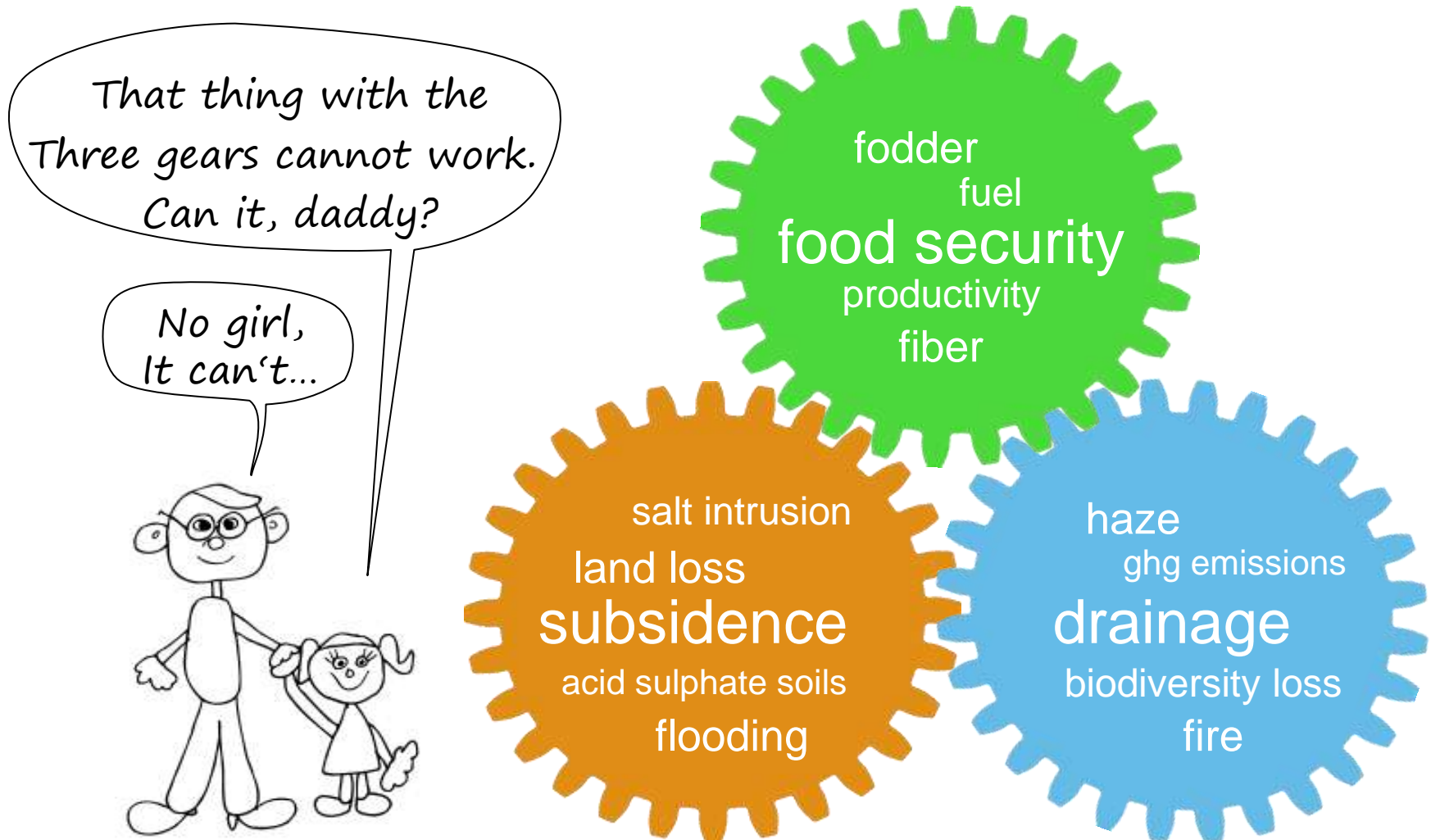
UNESCO-
SCOPE



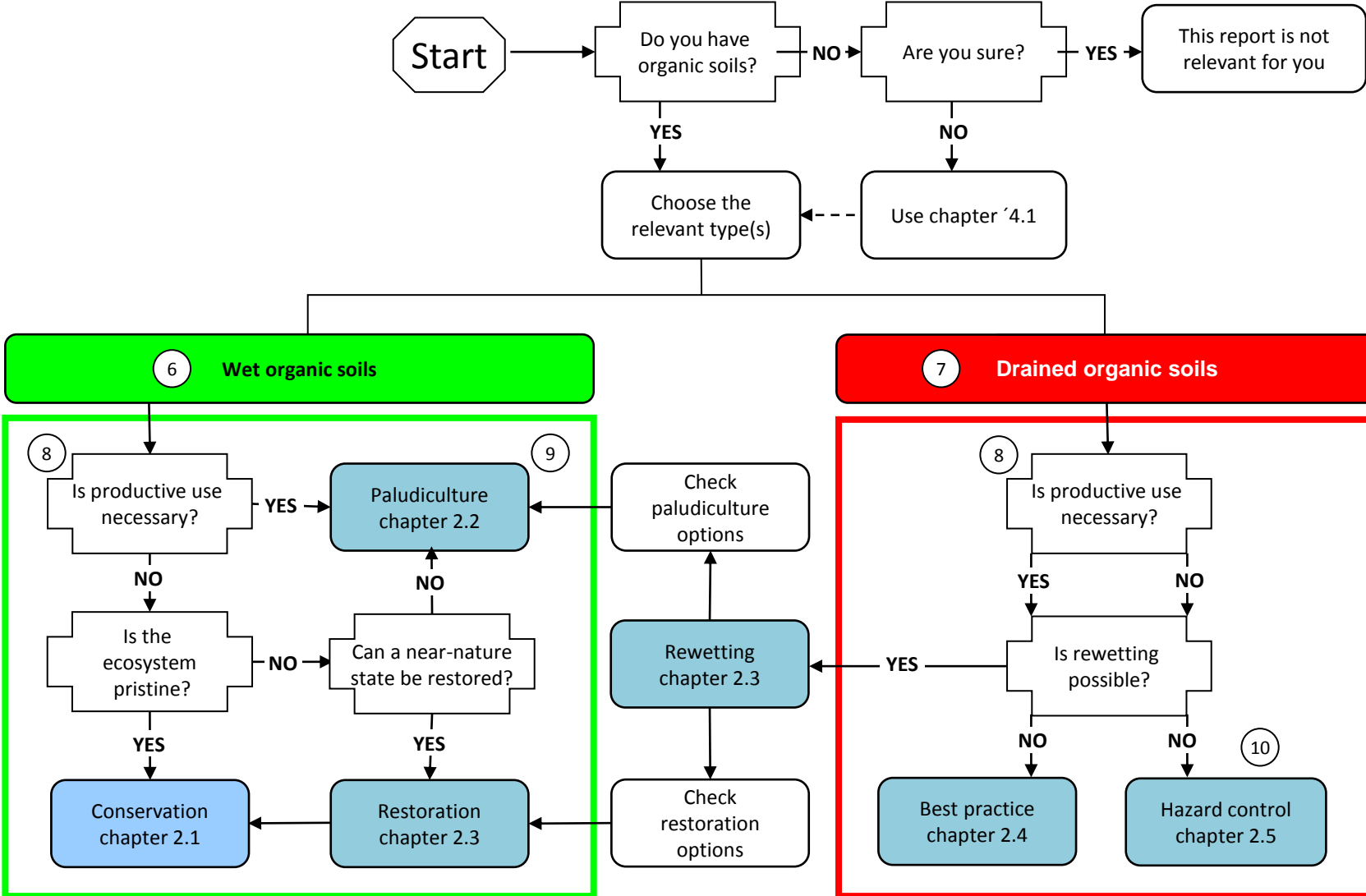
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FAO: Causes → peatlands → consequences
Climate change mitigation ↔ food security

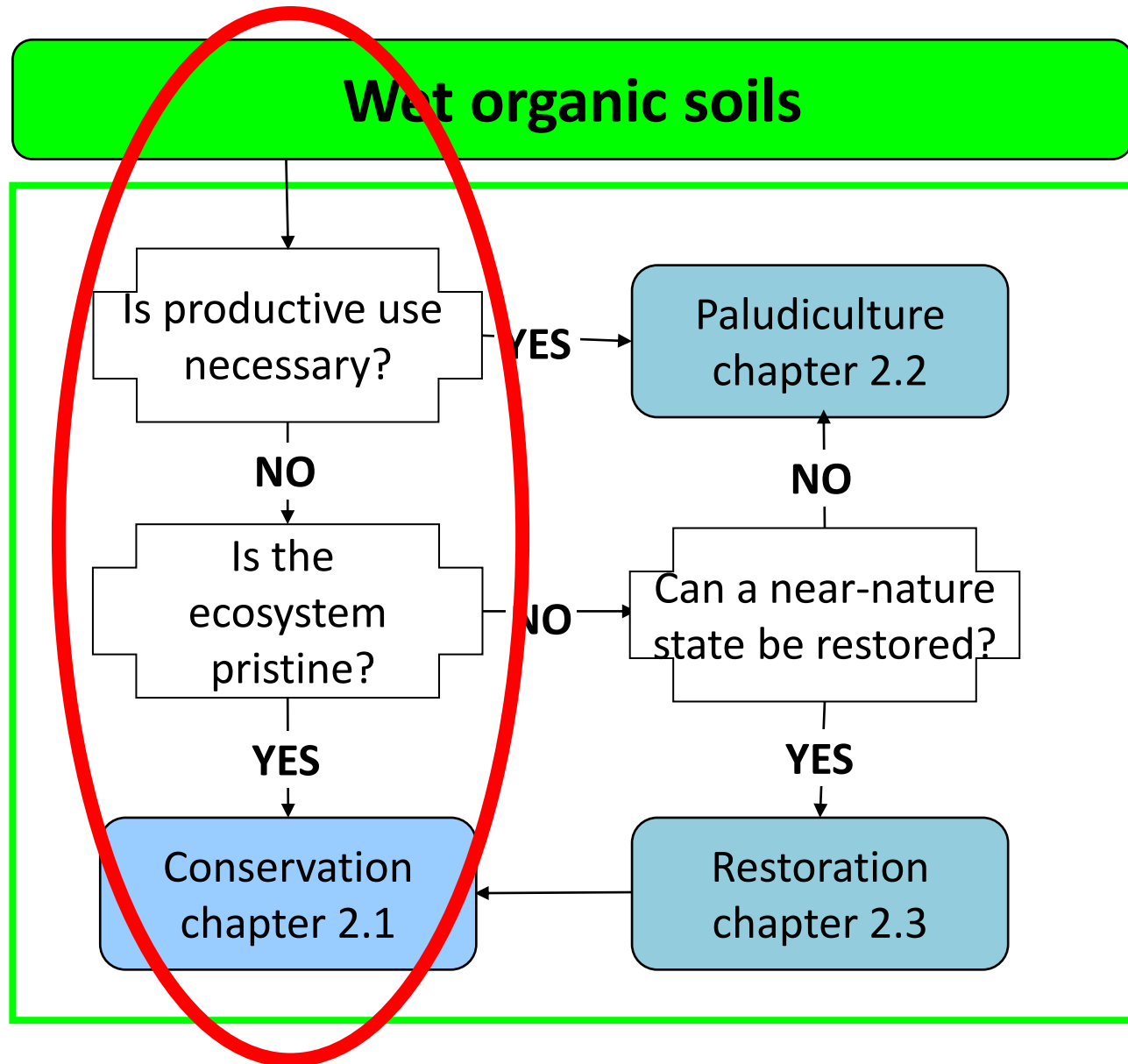
Drained peatland use destroys its subsistence base



FAO: Decision support tree



FAO: Decision support tree

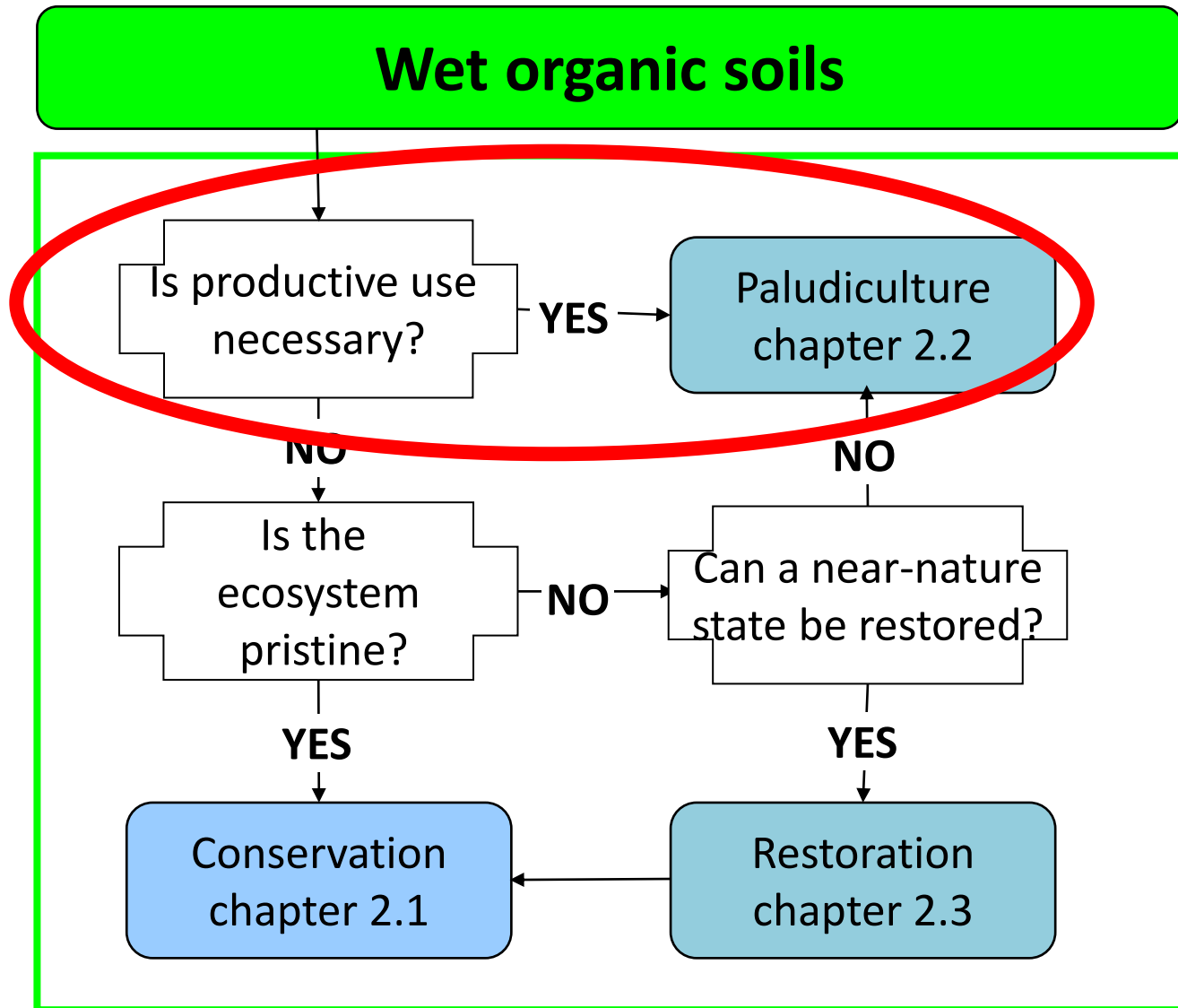




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Non-used peatlands are not use-less: they provide vital ecosystem services and biodiversity ...

FAO: Decision support tree





If you need to use them, use them wet: paludicultures!

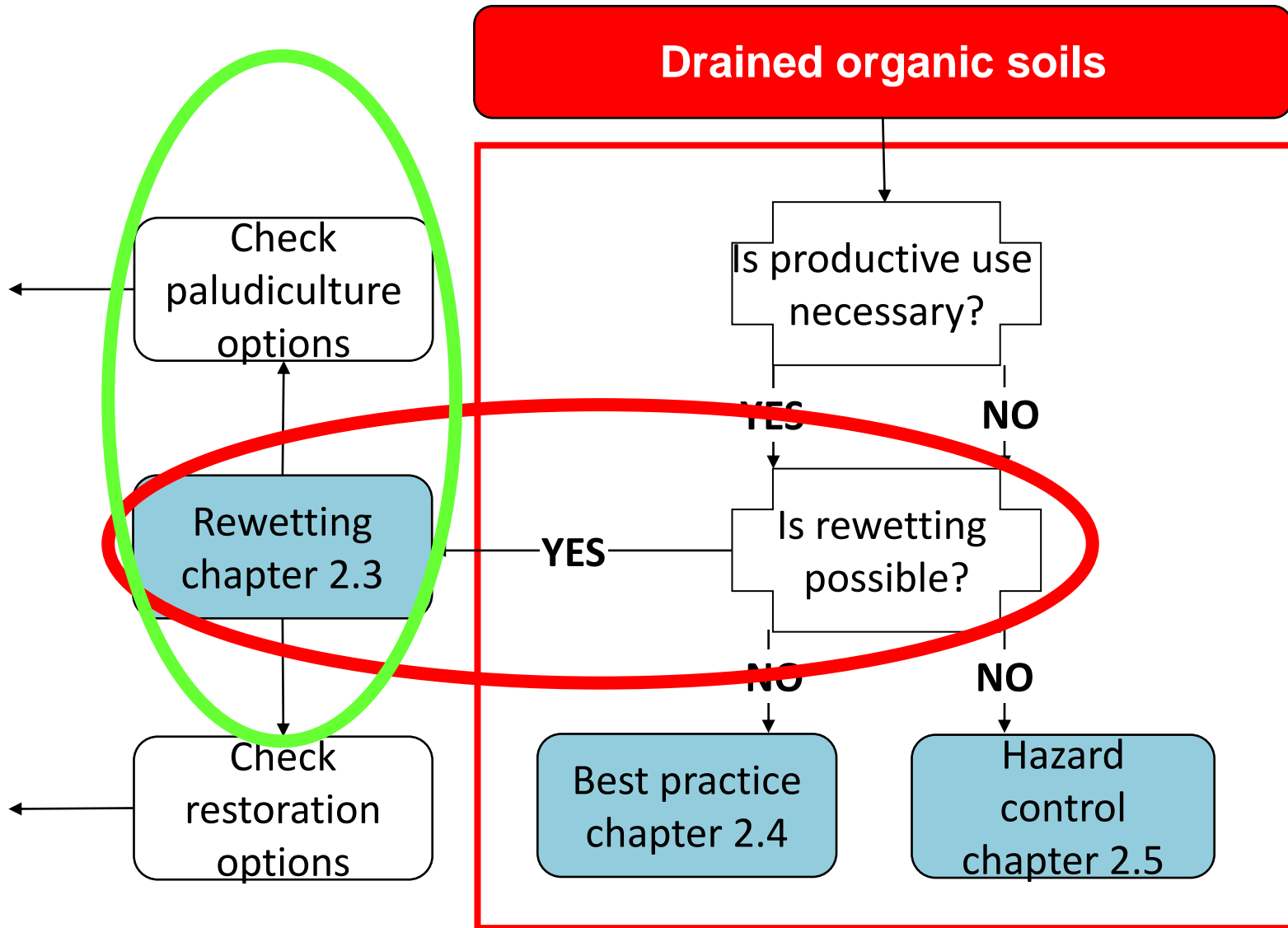
Lars Lachmann



Michael Succow

Paludiculture is agriculture/forestry on wet peatland

FAO: Decision support tree





Rewetting to reduce emissions and to reduce drainage costs



Tiemo Timmermann

Rewetting with paludiculture to reduce emissions and to produce renewable biomass resources: reeds!



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Reeds: for food, fodder, fiber and fuel...



Hans Joosten

...in Africa...



René Dommain

...in Asia...



Hans Joosten

...in Latin-America...



Hans Joosten

...paludiculture - wet agriculture...



Hans Joosten

...a way out of the desert...



Michael Succow

...and all you need is...





Happy valentine!

