GREIFSWALD
MIRE
CENTRE

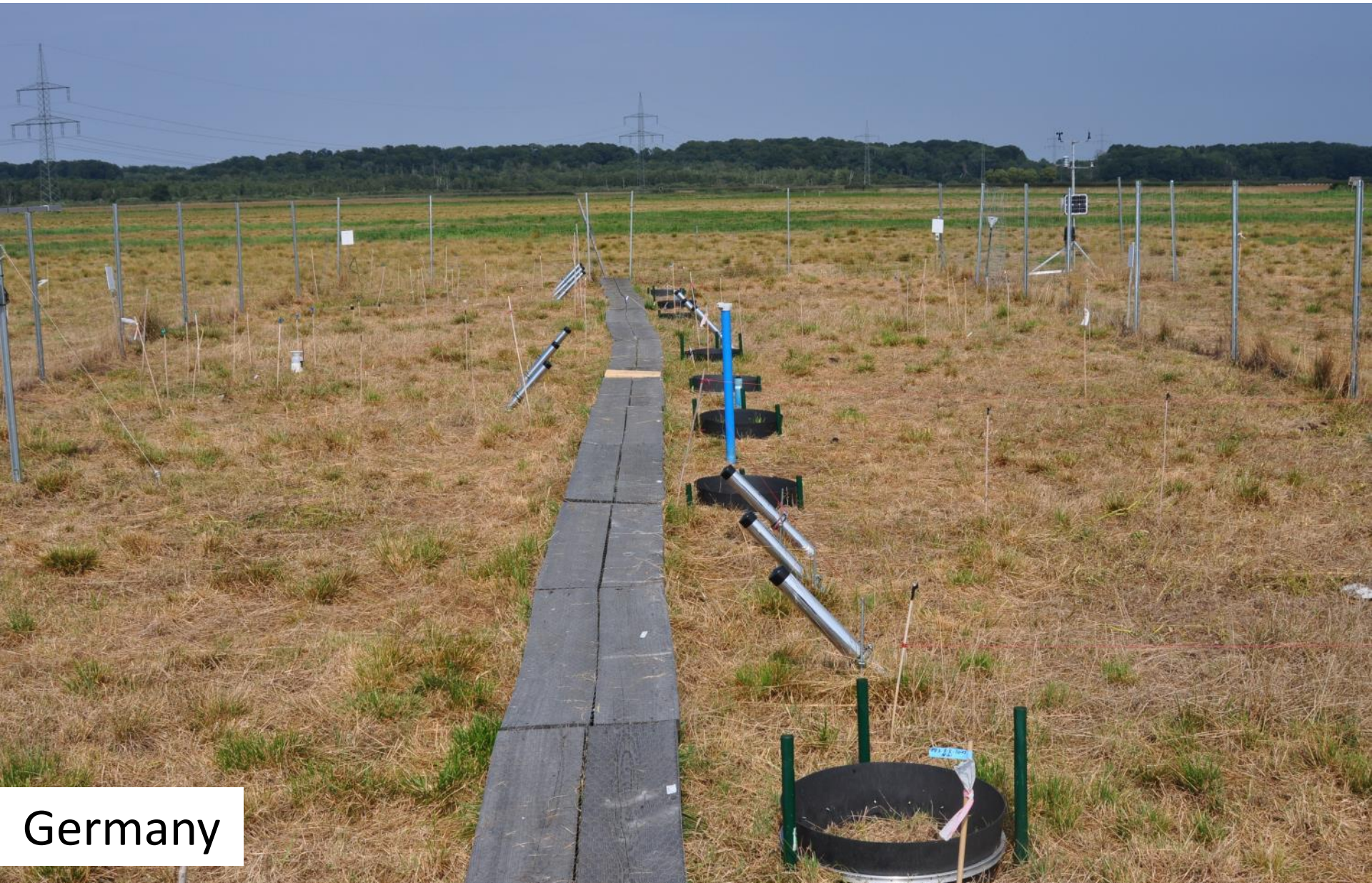
UNIVERSITÄT GREIFSWALD
Wissen lockt. Seit 1456

Challenges in cultivating peatland for agriculture

Hans Joosten

joosten@uni-greifswald.de

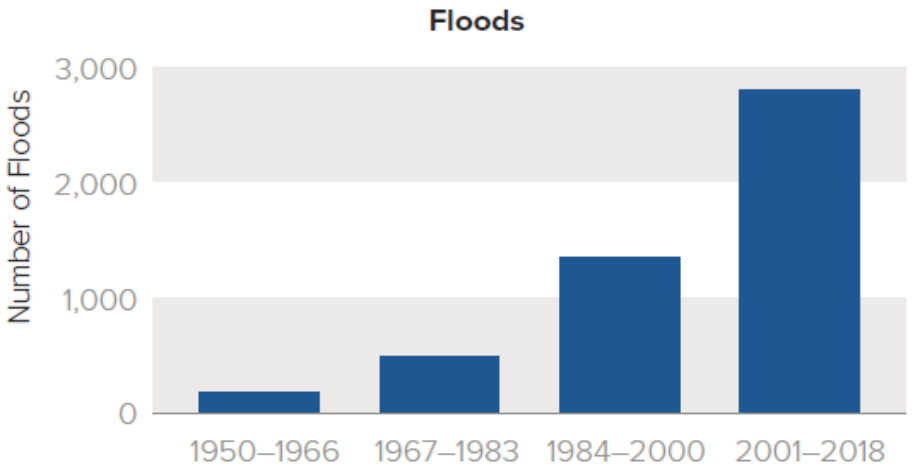
The last 19 years were the 18 warmest years on record, with increasing risks for food and water security …

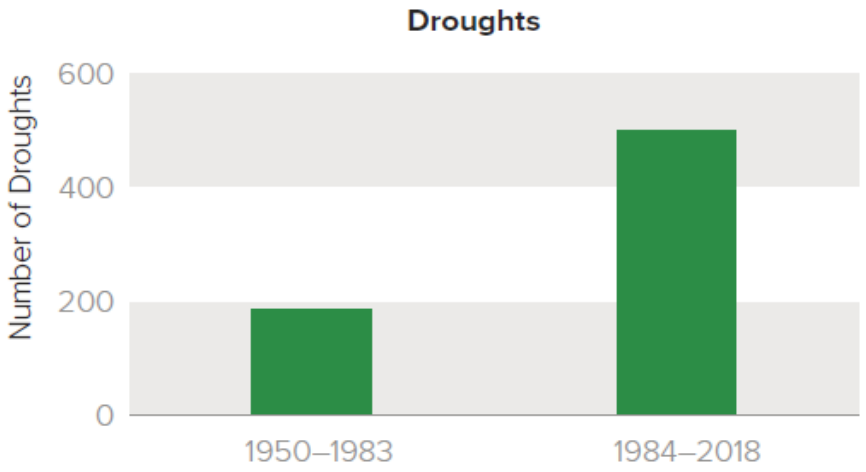


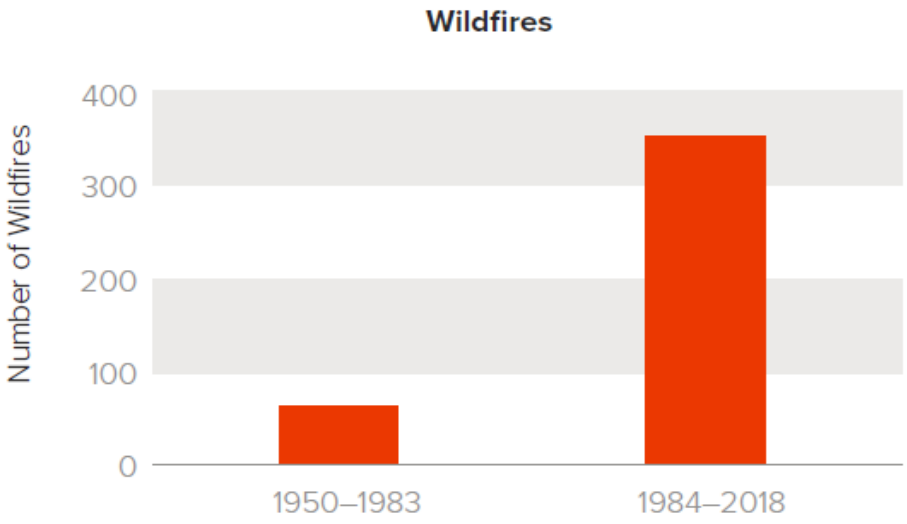
Disasters triggered by climate caused in 2017 thousands of deaths and US$320 billion in losses…

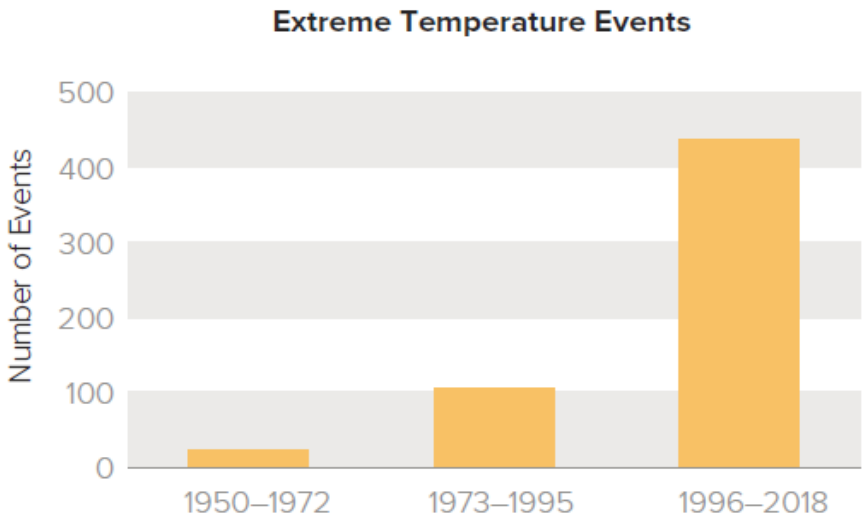
Kalimantan

Frequency and severity of disasters have since 1950 increased







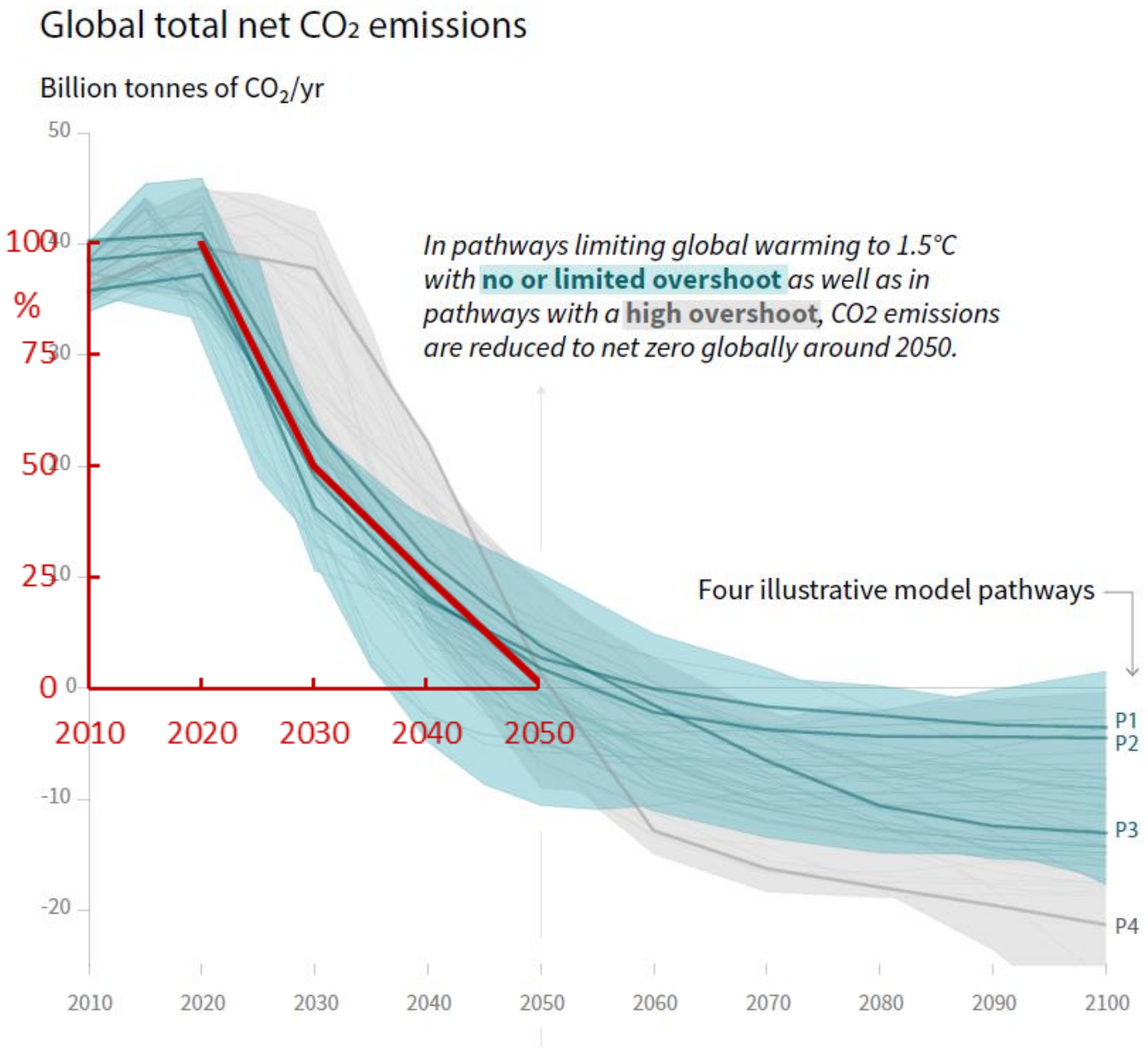


These developments – we *all* agreed – have to stop….

Paris has made the world simple: one common goal: < 2°

Georgia

1.5° (IPCC 2018): CO_2 **Zero** in 2050, Non- CO_2 -30% in 2030



Paris agreement (+ SDGs): “…in the context of sustainable development and efforts to eradicate poverty”…

North Korea

→ break radically with wrong developments from the past, also with respect to peatlands

Belarus

In living peatlands (‘mires’):

- Biomass production larger than decay
- Dead plants accumulate as ‘peat’

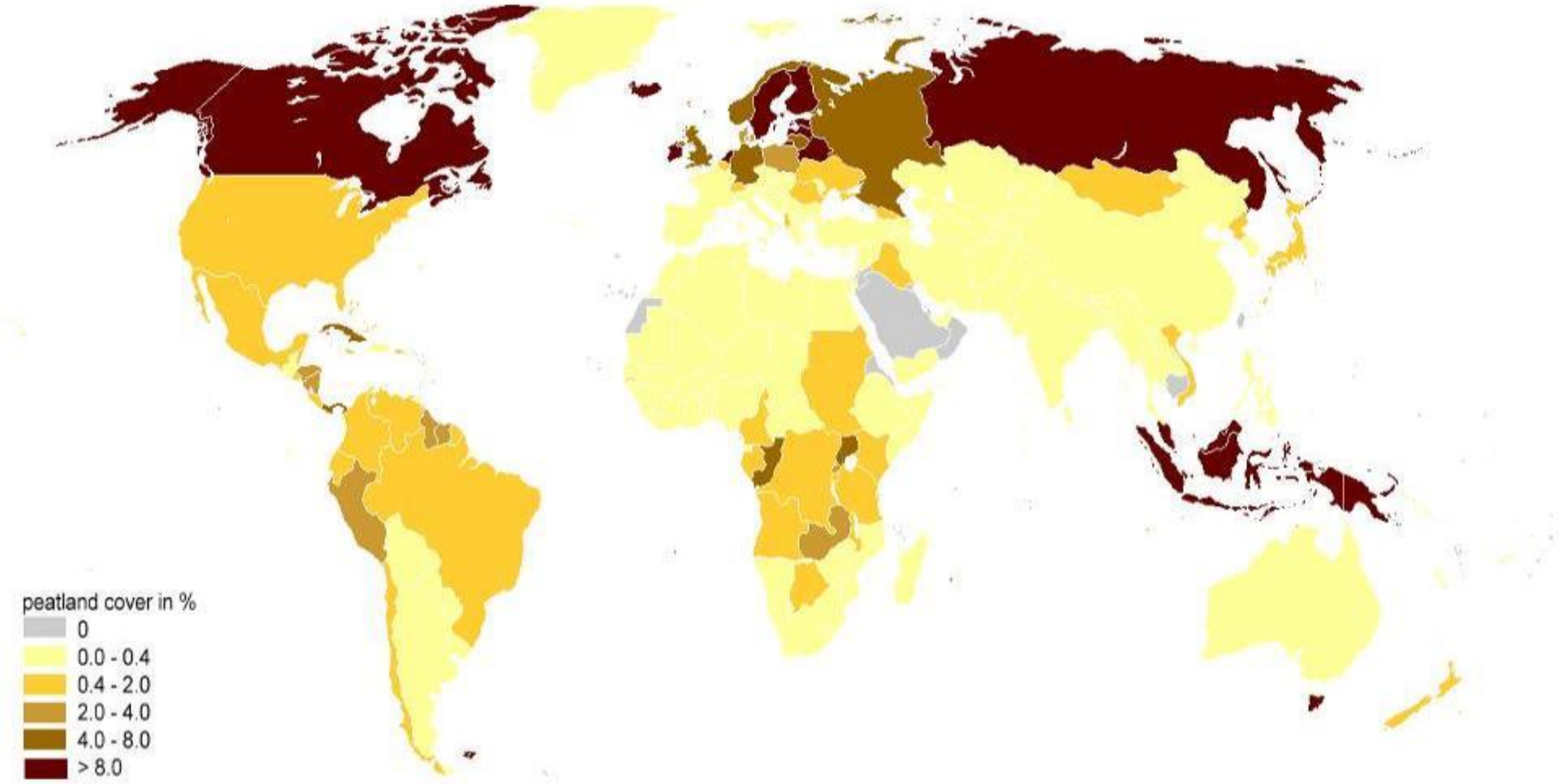
Georgia

Peat accumulates through water saturation…

Belarus

Peat accumulates during thousands of years and stores concentrated carbon in thick layers

Peatlands are found in almost every country, worldwide 4 million km^2



Mire C-sink is small: compensates globally for only 1% of the C-emissions from burning fossil fuels

Germany

More important: carbon stock! Peatlands are the most space-effective carbon stores of all terrestrial ecosystems

Java, Indonesia

A 15 cm thick peat layer contains per hectare more carbon than a High-Carbon-Stock tropical forest

Gabon

While covering only 3% of the World's land area, peatlands contain >500 Gigaton of carbon.

Germany

i.e. twice the carbon stock of the World's total forest biomass on 30% of the World's land

Sabah

Peat is like pickled vegetables: when you remove the conserving water, the organic matter rots away

Deeply drained grassland on peat in Germany emits 29 T CO_2e per ha per year = 145,000 km with middle class car

Germany

A potato field on peat in Europe emits 37 T CO_2e /ha/yr
= 185.000 km with car…: every hectare, every year

Germany

Oil palm on peat emits 60 T CO_2e per ha per year
= 300.000 km by car *or* 50x Berlin-Jakarta v.v. (economy class)

Malaysia

Globally, drained peatlands emit 2 Gigatonnes CO_2e /yr,
i.e. 0.4 % of the land produces 5% of all global emissions

Indonesia leads the list of global top emitters…

Indonesia

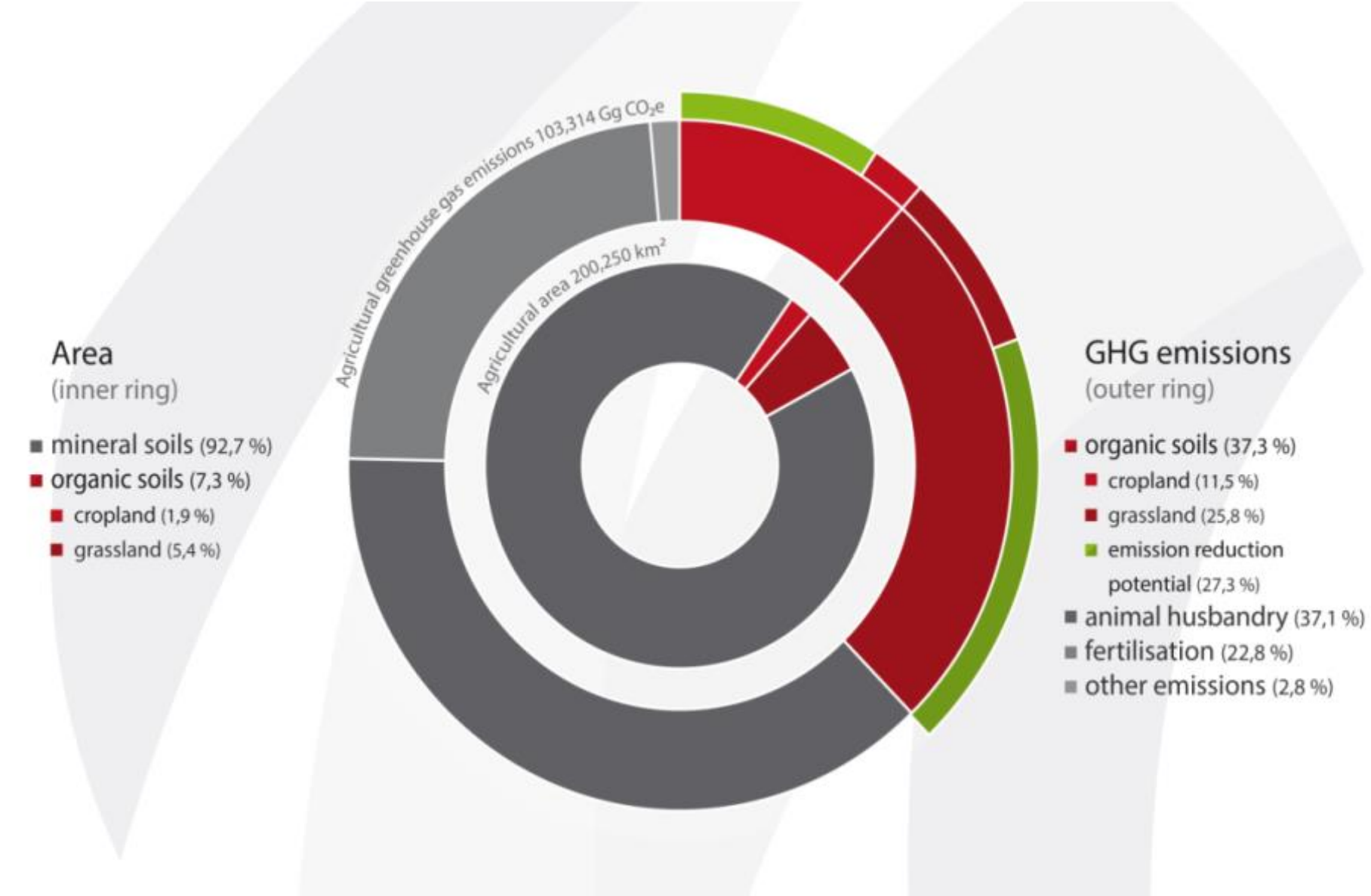
But, and that is often forgotten:
the European Union is a good second …

Netherlands

Peatlands produce 30 % of all emissions from all agriculture

Indonesia

Agriculture in Germany: 7% of land causes 37% of <u>all</u> emissions (incl. CH_4 from cattle and N_2O from fertilizers)

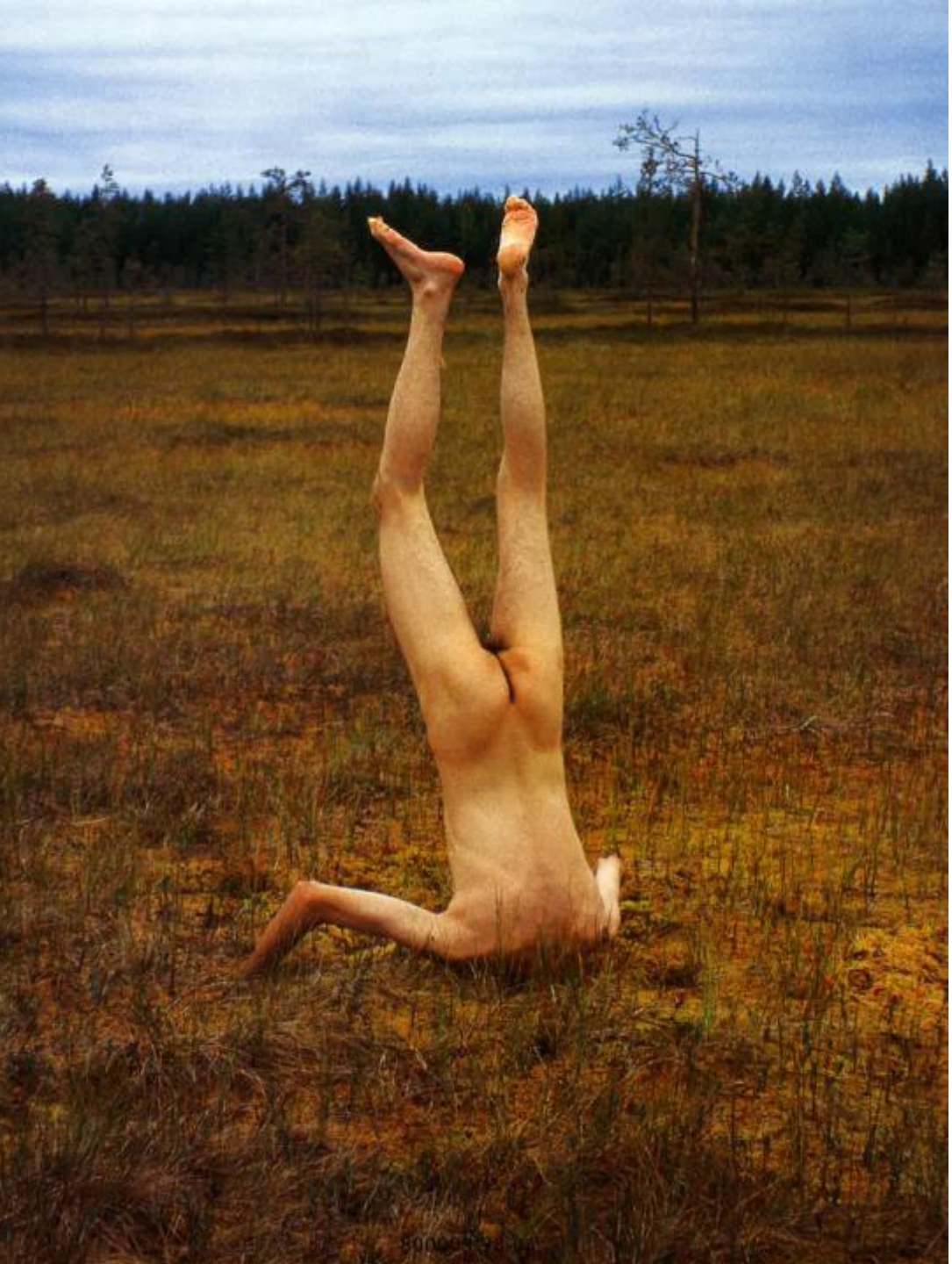


In Germany peatland agriculture causes annually a climate damage of € 3.6 billion, and gets 300 million EU-grants (CC)

Mecklenburg-Vorpommern

Maik Stegmann

“Biogas” from mays on peat causes 8x more climate damage than burning lignite…but receives green energy subventions



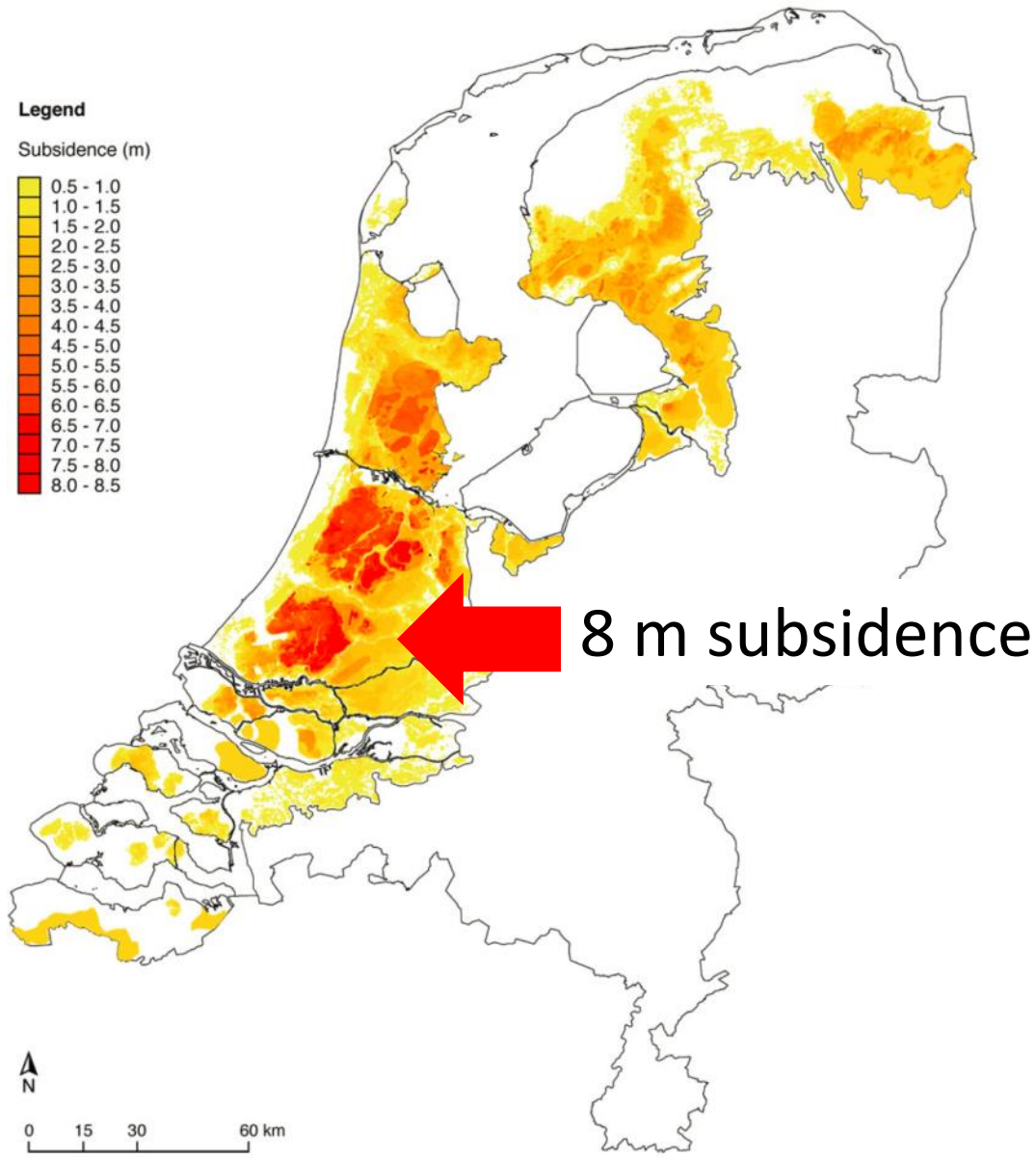
The ‘polluter pays’ principle is put on the head:

We pay peatland agriculture for causing massive climate damage

… and frustrate in this way sensible solutions

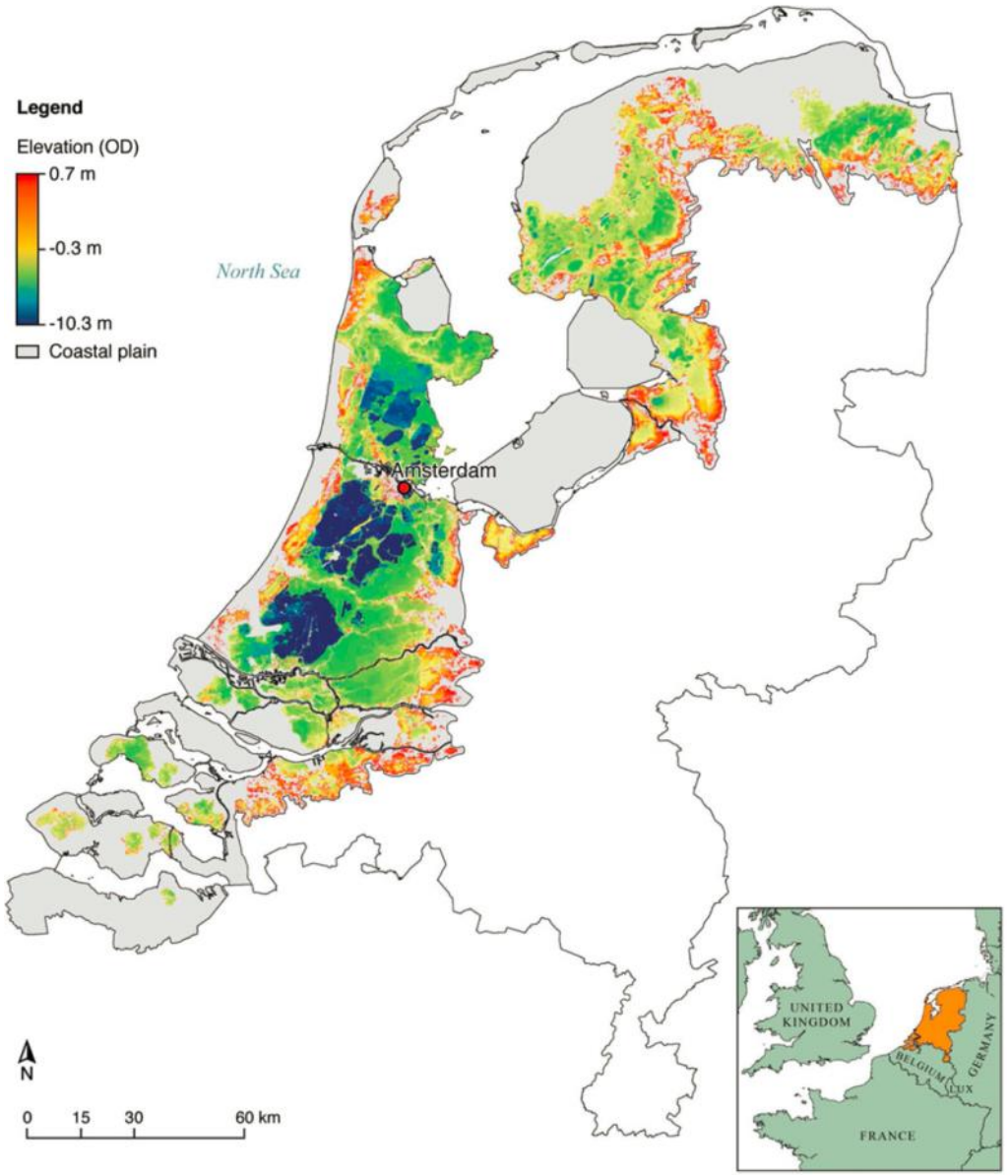
Too little recognized: **subsidence**.

Nether-lands: 1000 yr of peatland drainage and subsidence

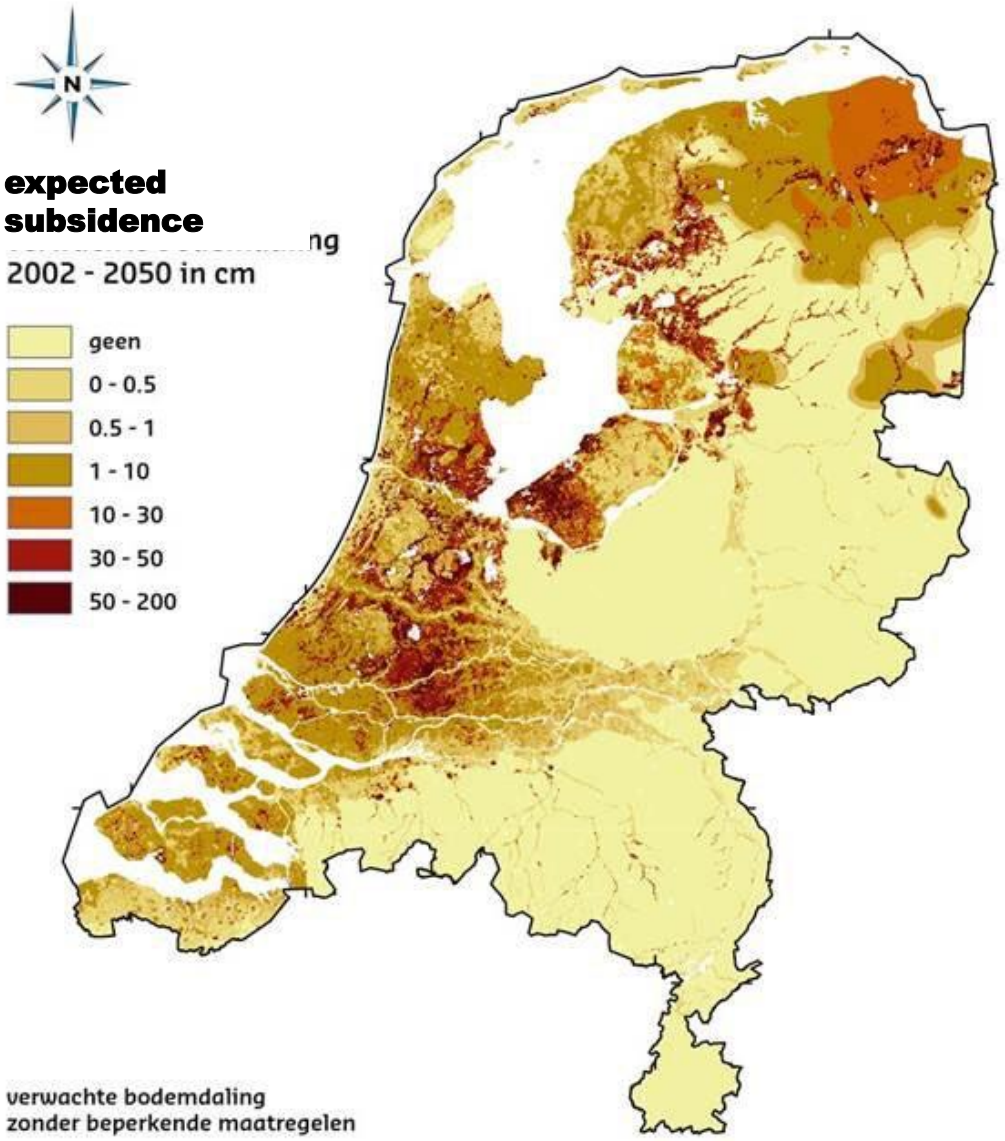


8 m subsidence

…*Nether*-lands: now 26% of the land area under sea level… and additional 29 % treathened by flooding by rivers

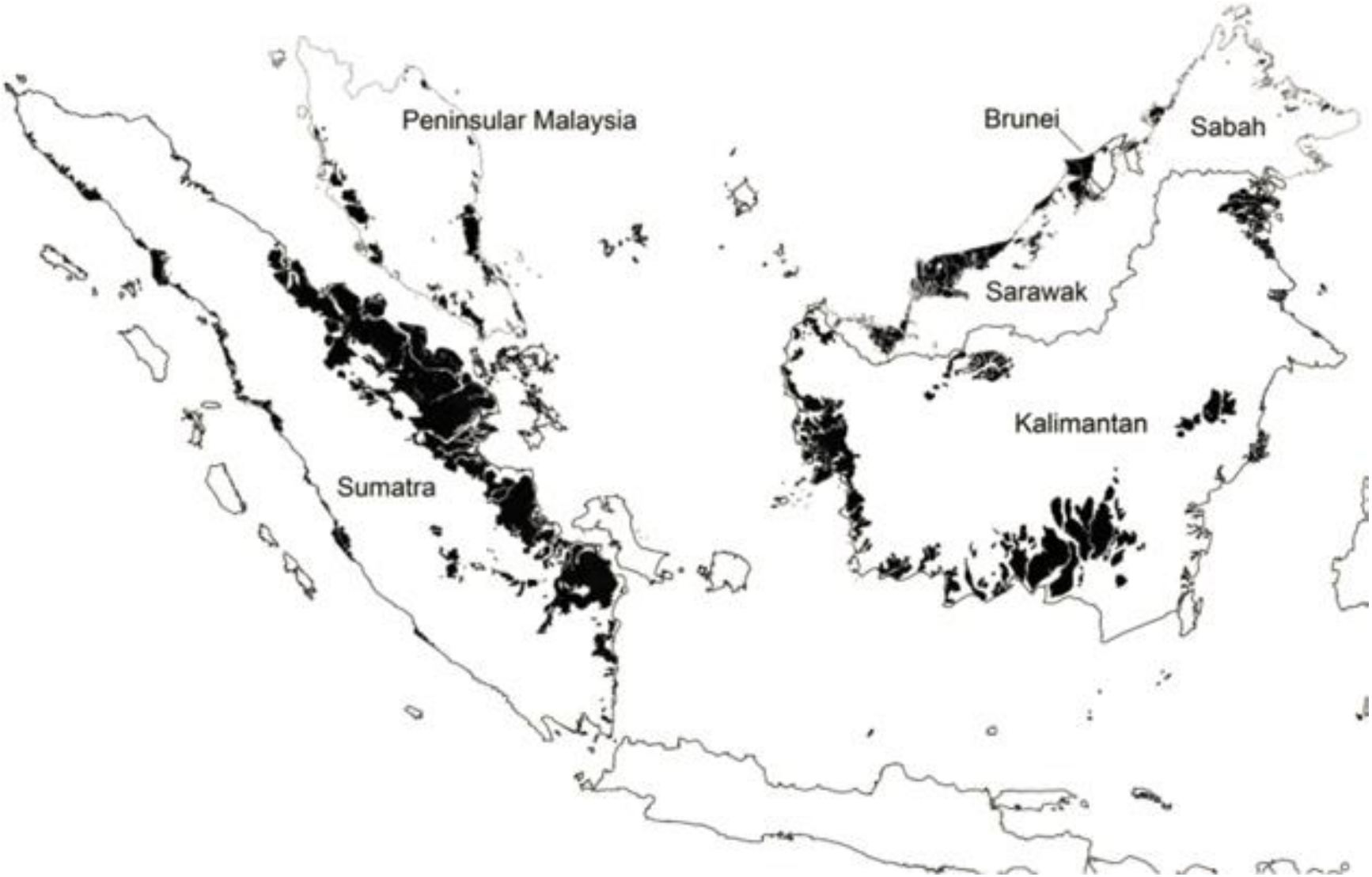


…and subsidence continues as long as you drain peat…



In tropics subsidence 5 times faster!

Many peatlands worldwide are coastal and low-lying and will - with continuing drainage - be flooded…



Irma could harm Florida's crops, especially sugar cane and citrus

BUSINESS By Susan Salisbury - Palm Beach Post Staff Writer

USA

Netherlands: We cannot continue keeping peatland drained for farmers (27-10-2018 © Het Financieele Dagblad)

MILIEU EN KLIMAAT

We kunnen veengronden niet blijven ontwateren voor de boeren

Lars Hein is hoogleraar Milieusysteemanalyse, Wageningen Universiteit

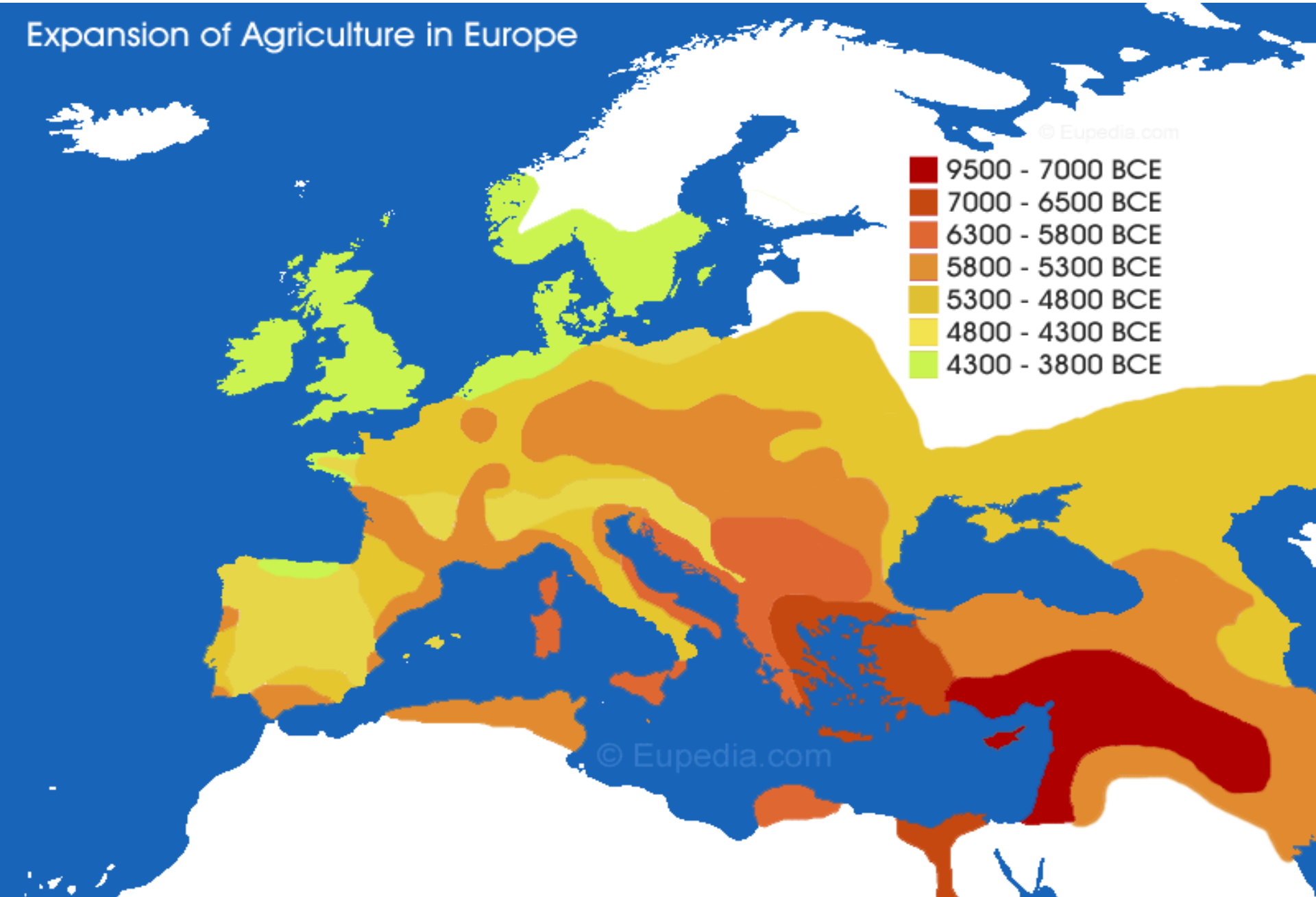
Een controversieel element van het klimaatbeleid is de omgang met veengebieden. Deze worden gedraineerd voor de land-

Peatland subsidence will in this century lead to uncontrolled flooding of 10-20 million ha of productive land worldwide

We are loosing land, now that we need it most: for more people, for less poverty, and for replacing fossil resources

Kalimantan

Root problem: Our agriculture had a semi desert as a cradle…



…and has since the idea that productive land must be dry…

Qatar

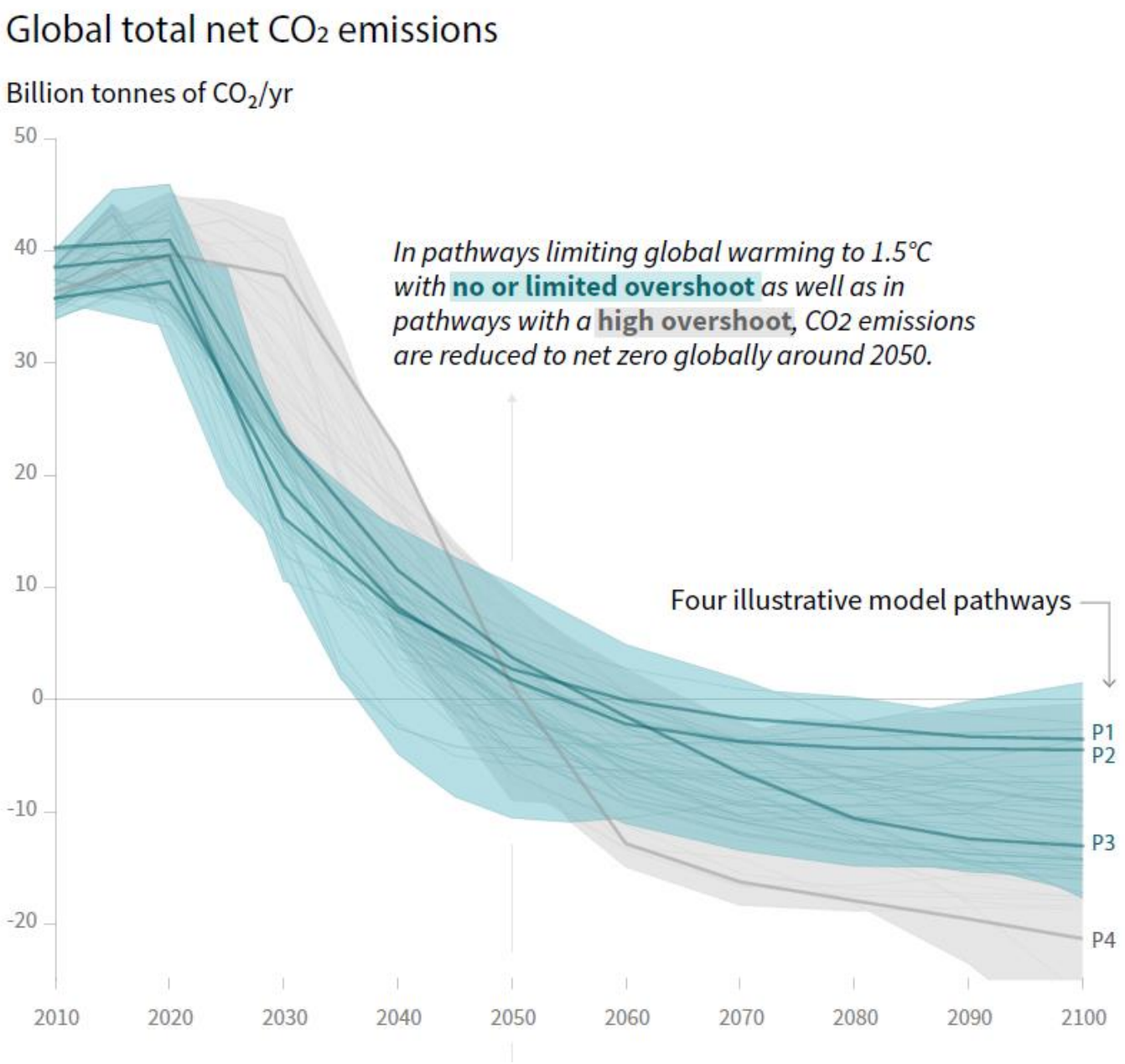
…illusions that we worldwide apply to wet, organic soils…

with desert plants on drained peat in Indonesia: *Aloe vera*

… or semi-arid Maize on drained peat in Germany…

Rewetting solves most of the problems

Paris implies: We must rewet 20,000 km^2 of peatland per yr!



Rewetting in Europe has hitherto focused on the easy stuff: abandoned and low productive land with few emissions

Scotland

… but we have to go to the core problem:
intensive agriculture and forestry on drained peat...

Gouda cheese is the Dutch equivalent of palm oil: produced on the base of peatland emissions and subsidence

Netherlands

But we cannot flood all drained peatlands worldwide and take them out of production

Sumatra

We can only solve the drainage problems while maintaining production…

Tobias Dahms, lensescape.org

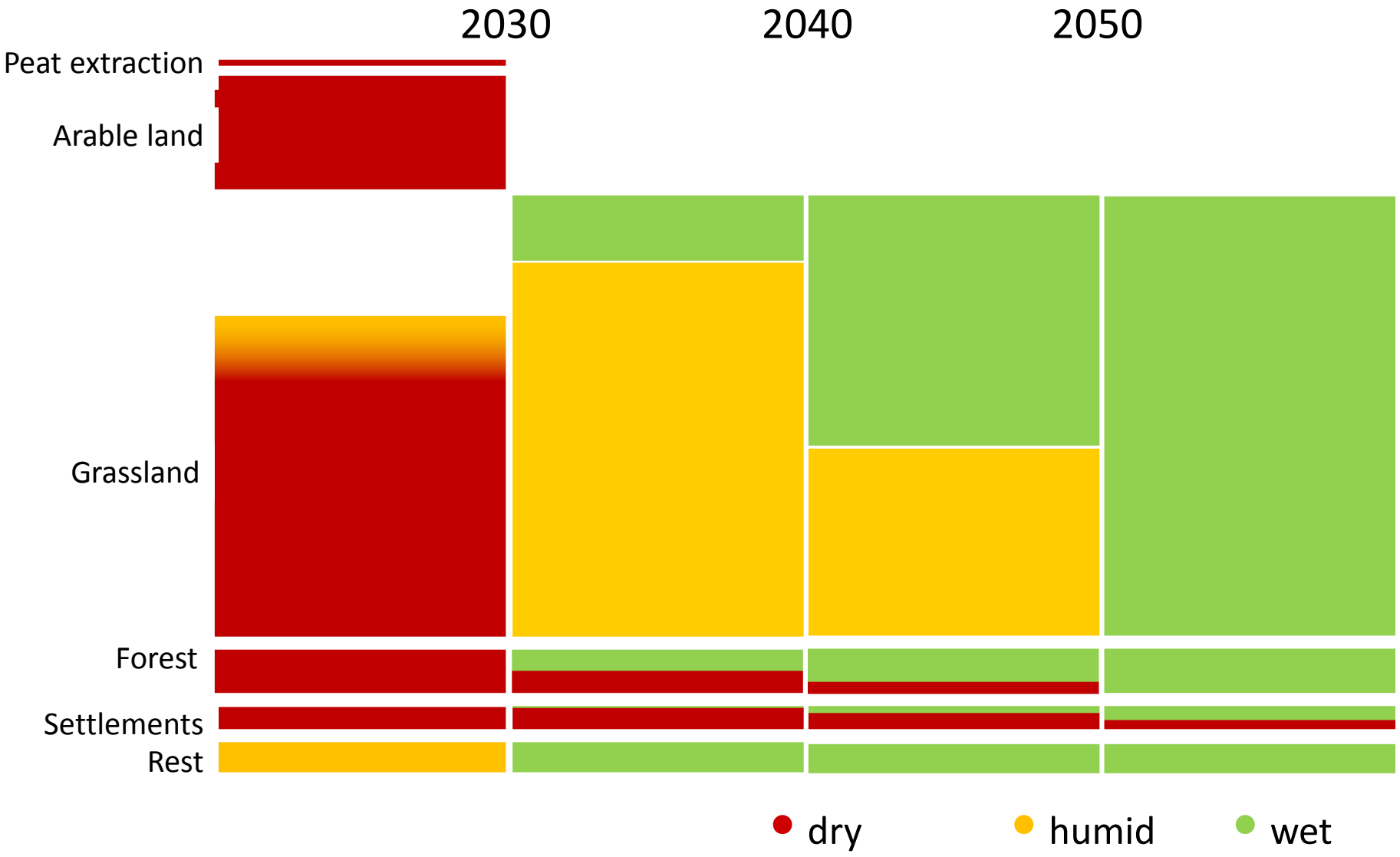
i.e. with *paludiculture*: wet agriculture/forestry

Indonesia needs paludiculture for its huge peatland rewetting program (24,000 km^2!), e.g. Jelutung (rubber tree)

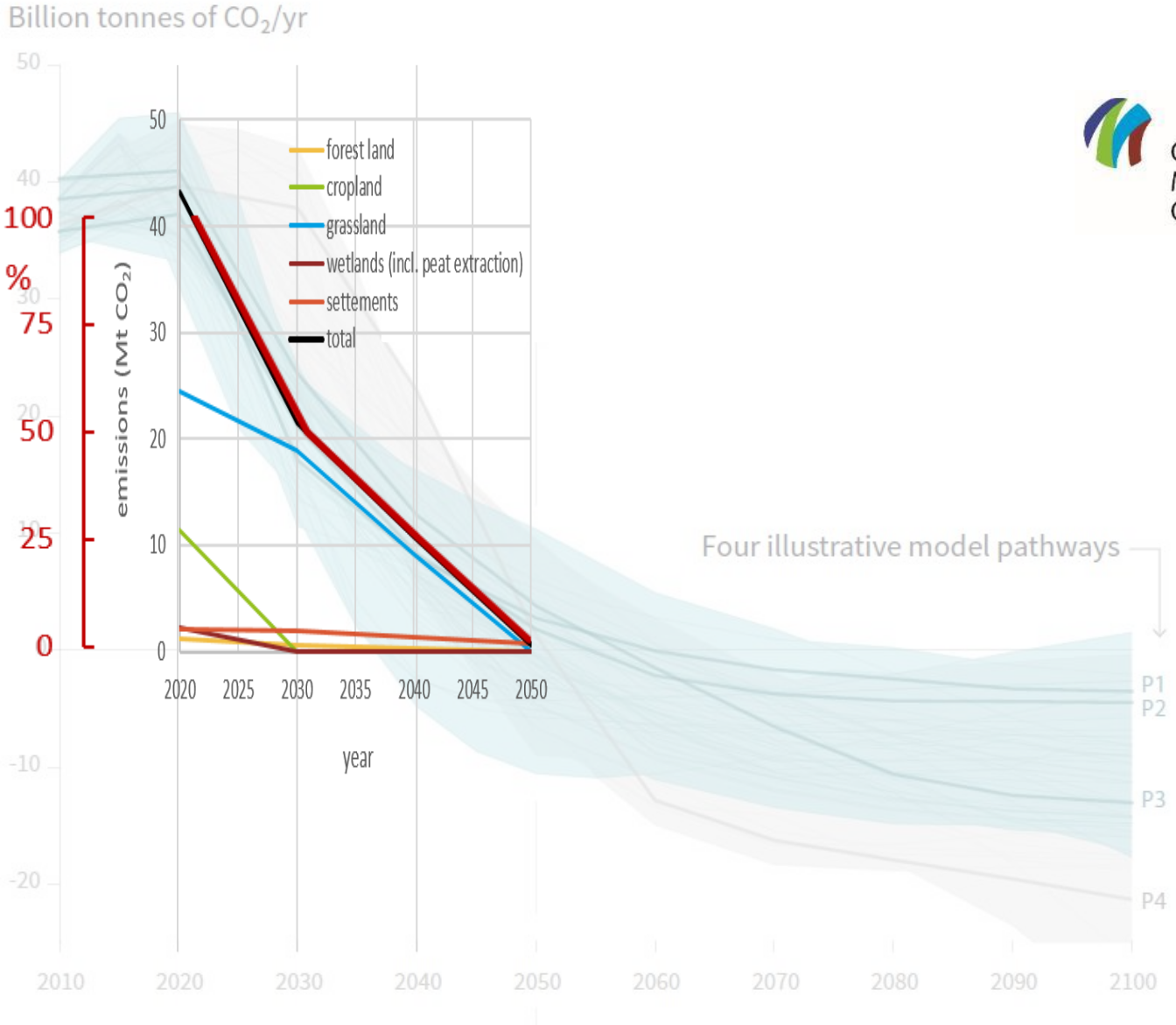
Marcel Silvius

Indonesia

Transformation pathway for German peatlands: from dry to humid to wet



Pathway follows IPCC scenarios



GREIFSWALD MOOR CENTRUM

IPCC 2018

Similar scenario in Indonesia: I. raise water level (to -40 cm). II. fade out oil palm + change to paludiculture (~0 cm)

Kalimantan

Develop paludiculture: Indonesian Platform Paludikultur 2018

Germany: until 2050 rewet 400 km^2 per year…

Illusory, naive…?

Finland drained in the 1970s 3,000 km^2 every year!

Indonesia has *in 2017 and 2018* rewetted double as much peatland as *entire* Europe in its *entire* history: > 4,000 km^2!

Sumatra

- Keep wet peatlands wet!
- Make drained peatlands wet again!
- If you use them, use them wet: paludiculture!


No Paris without peatlands!
Peatlands must be wet:
for the climate, for the land,
for the people, for ever…
Cuba