

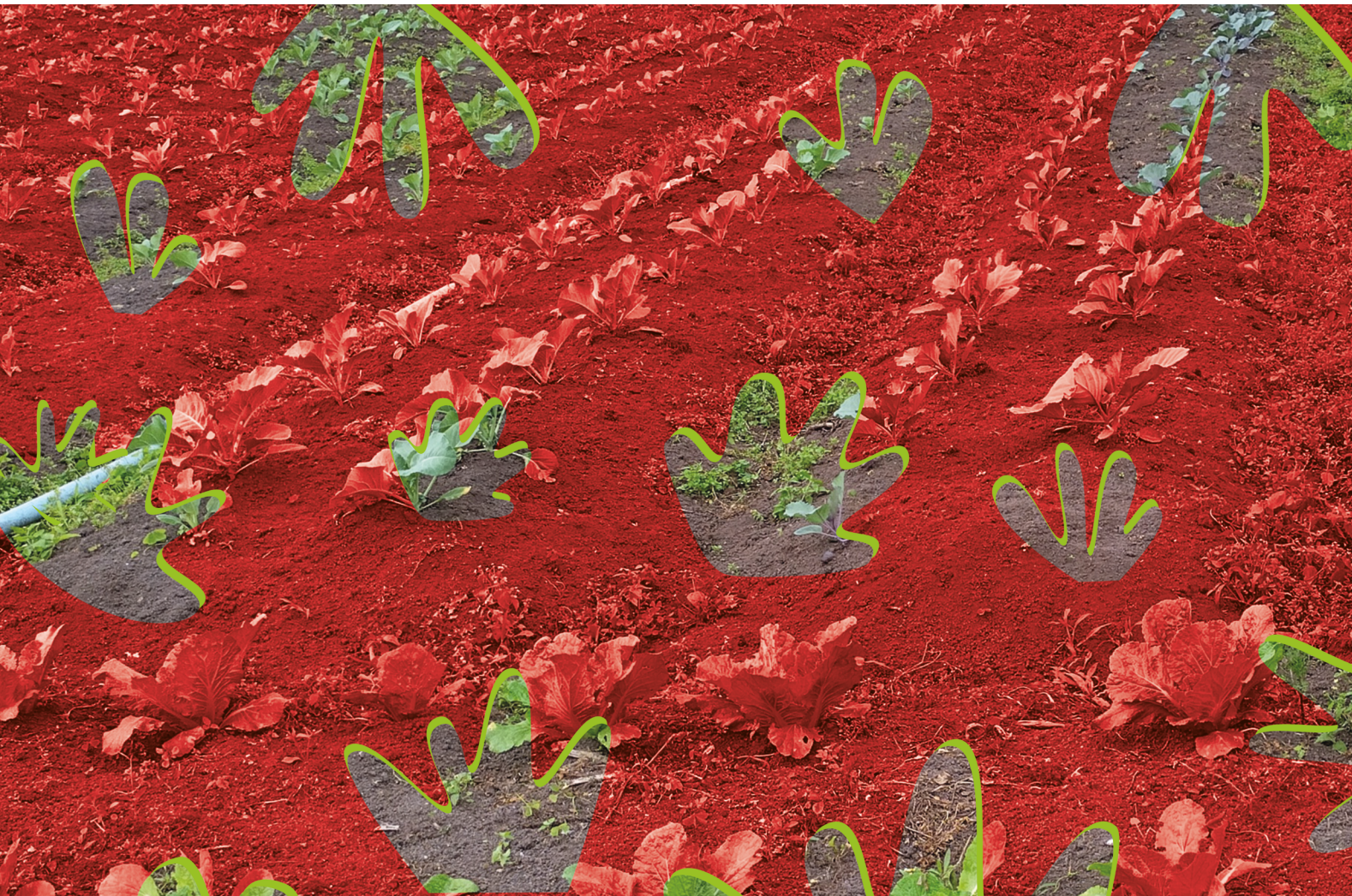


Global Peatland Hotspot Atlas:
The State of the World's Peatlands in Maps
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Agriculture on peatland

In temperate, tropical, and subtropical climates, drainage for arable agriculture, livestock farming, and oil palm cultivation is the main drivers of peatland degradation. Ongoing research on paludiculture offers promising sustainable alternatives.



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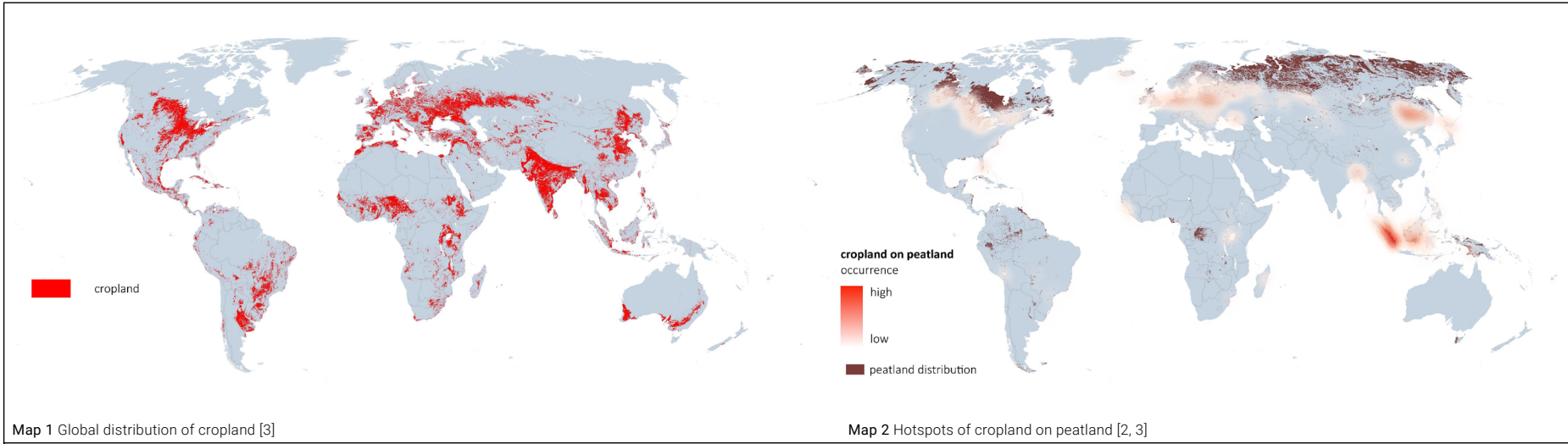
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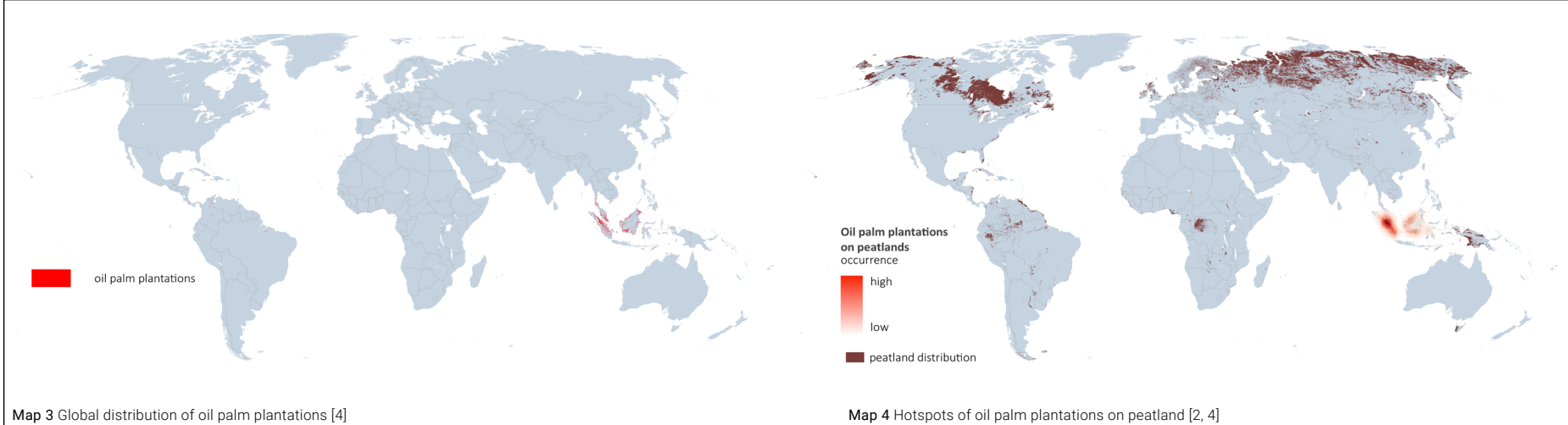
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Map 1 Global distribution of cropland [3]

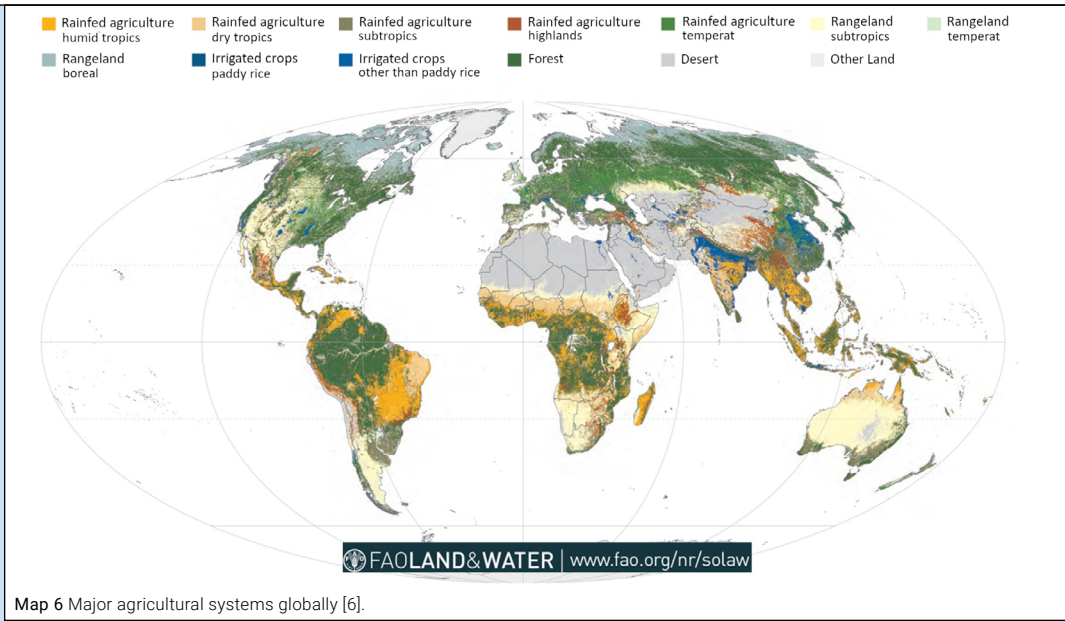
Map 2 Hotspots of cropland on peatland [2, 3]



Map 3 Global distribution of oil palm plantations [4]

Map 4 Hotspots of oil palm plantations on peatland [2, 4]

In temperate, tropical, and subtropical climates, drainage for arable land, livestock farming, and oil palm plantations are the primary drivers of peatland degradation, yet ongoing research on paludiculture offers promising sustainable alternatives.



Map 6 Major agricultural systems globally [6].

Hotspots of cropland and palm oil plantations globally occur in central and eastern Europe, Northeast China, Bangladesh, Indonesia, the Great Lakes region in the USA, and on the Canadian Shield (Map 2 and Map 4 [1, 2, 3, 4]). When agriculture is practiced on organic soils, the wetlands are usually deeply drained to provide the necessary conditions for the crops. Map 6 shows the regional distribution of major agricultural systems globally – of which rainfed agriculture prevails on drained peatland in the temperate and tropical zones, accompanied by irrigated rice.

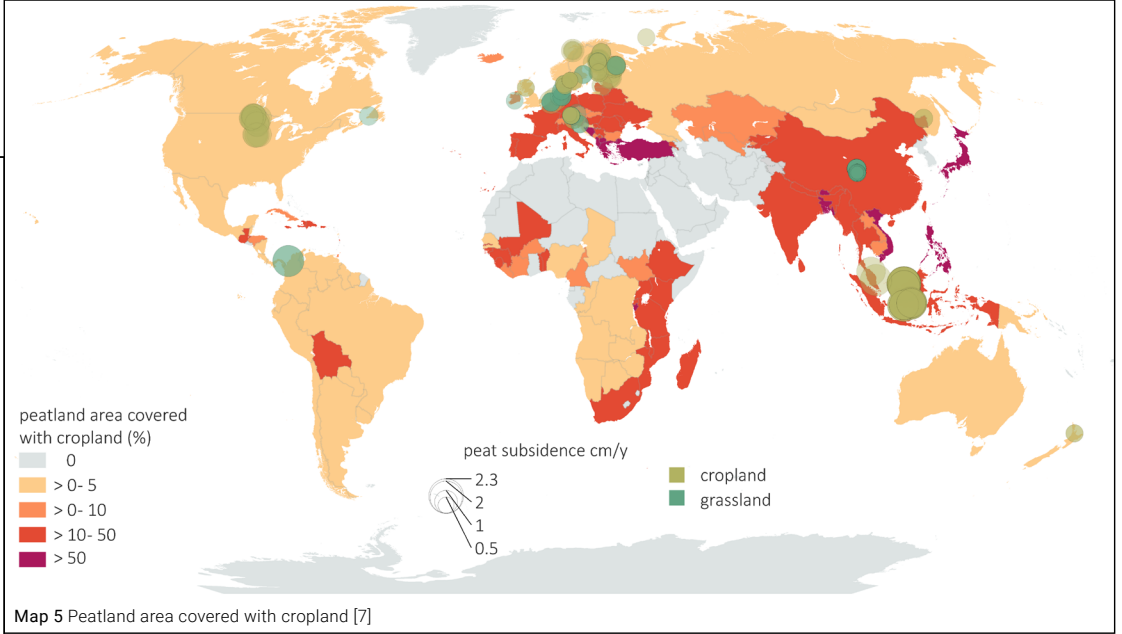
Deeply drained and regularly plowed peat soils undergo rapid peat oxidation and compaction. Soil degradation and subsidence of the soil surface, make them increasingly susceptible to flooding, land slides and

erosion, ultimately resulting in the loss of agricultural land [5]. Ongoing subsidence requires drainage infrastructure to be deepened continuously, literally “boggling the peatland down”, which is described as **“the vicious cycle of drained peat soils utilisation”**. Known regions with peatland subsidence and its relation to cropland on peatlands are shown on the Map 5. Recent research reveals that emissions from organic-rich agricultural (‘peaty’) soils with soil organic carbon (SOC) contents of 6–18 % are likely highly underestimated in peatland-rich countries, as they are often treated as low-emitting mineral soils in national greenhouse gas inventories.

Increasing research on paludiculture (farming on wet and rewetted peatlands) may provide alternatives to the current

destructive practices of draining peatlands for agriculture and oil palm plantations. In regions where peatlands are predominantly used for food production, land use strategies could include shifting food production to mineral soils and using the rewetted peatlands for producing biomass for fodder, fiber and fuel (in temperate zones) and restoring degraded mineral soil cropland to reduce pressure on peatlands (e.g., in tropical East Africa and Indonesia).

Shallow-drained peatlands used for subsistence farming are common in certain parts of Africa. They consist of hand-dug shallow ditches surrounding small cropland parcels. The GHG emissions from these cropping systems are still unknown.



Map 5 Peatland area covered with cropland [7]



Carrot field, Smøla, Norway © H. Joosten



Subsistence agriculture, Kenya © H. Joosten



Aloe vera field, Indonesia © B. Radjaguguk



Tilled field, Germany © G. Gaudig



Rice cultivation, Rwanda © S. Elshehawi



Vegetable growing, Brazil © F. Beer



Sources: 1. UNEP (2022) Global Peatlands Assessment – The State of the World's Peatlands: Evidence for action toward the conservation, restoration, and sustainable management of peatlands. Main Report. Global Peatlands Initiative. United Nations Environment Programme, Nairobi. 2. Greifswald Mire Centre (2022) Global Peatland Map 2.0. Underlying dataset of the UNEP Global Peatland Assessment. 3. Winkler, K., Fuchs, R., Rounsevell, M.D.A., Herold, M. (2020) HILDA+ Global Land Use Change between 1960 and 2019. PANGAEA, <https://doi.org/10.1594/PANGAEA.921846>. 4. Descale, A., Wich, S., Meijard, E., Gaveau, D., Pedell, S., Szantoi, Z. (2020) High resolution global industrial and smallholder oil palm map for 2019 (Version v0) [Data set]. Zenodo. <https://doi.org/10.5281/zenodo.3884602>. 5) Ma, L., Gaofeng, Z., Bolong, C., Kun, Z., Shui, N., Jinsong, W., Cui, P., Hongchao, Z. (2022) A globally robust relationship between peat table decline, subsidence rate and carbon release from peatlands. Commun. Earth Environ. 3, 254. 6. FAO 2011. The state of the world's land and water resources for food and agriculture (SOLAW) – Managing systems at risk. Food and Agriculture Organization of the United Nations, Rome and Earthscan, London. 7. Greifswald Mire Centre (2022) Country-wise Global Peatland emission Database. Statistics for (drained) peatlands and GHG emissions in 268 countries and regions.