

Course in Forest Protection
High Diploma Level
2023-2024

PhD. Dr. Zana Ahmed Lak. Forest Ecophysiology

Man as a Source of Injury to Forests

- ✓ Man himself is a primary source of injury to the forest.
- ✓ Part of this injury is directly caused by him and part follows indirectly as a consequence of his activities.
- ✓ He contributes to so much of the damage caused in the forest that his influence is felt either directly or indirectly.

Following kinds of damage are caused by humans:

- Deforestation
- Forest fire
- Faulty management

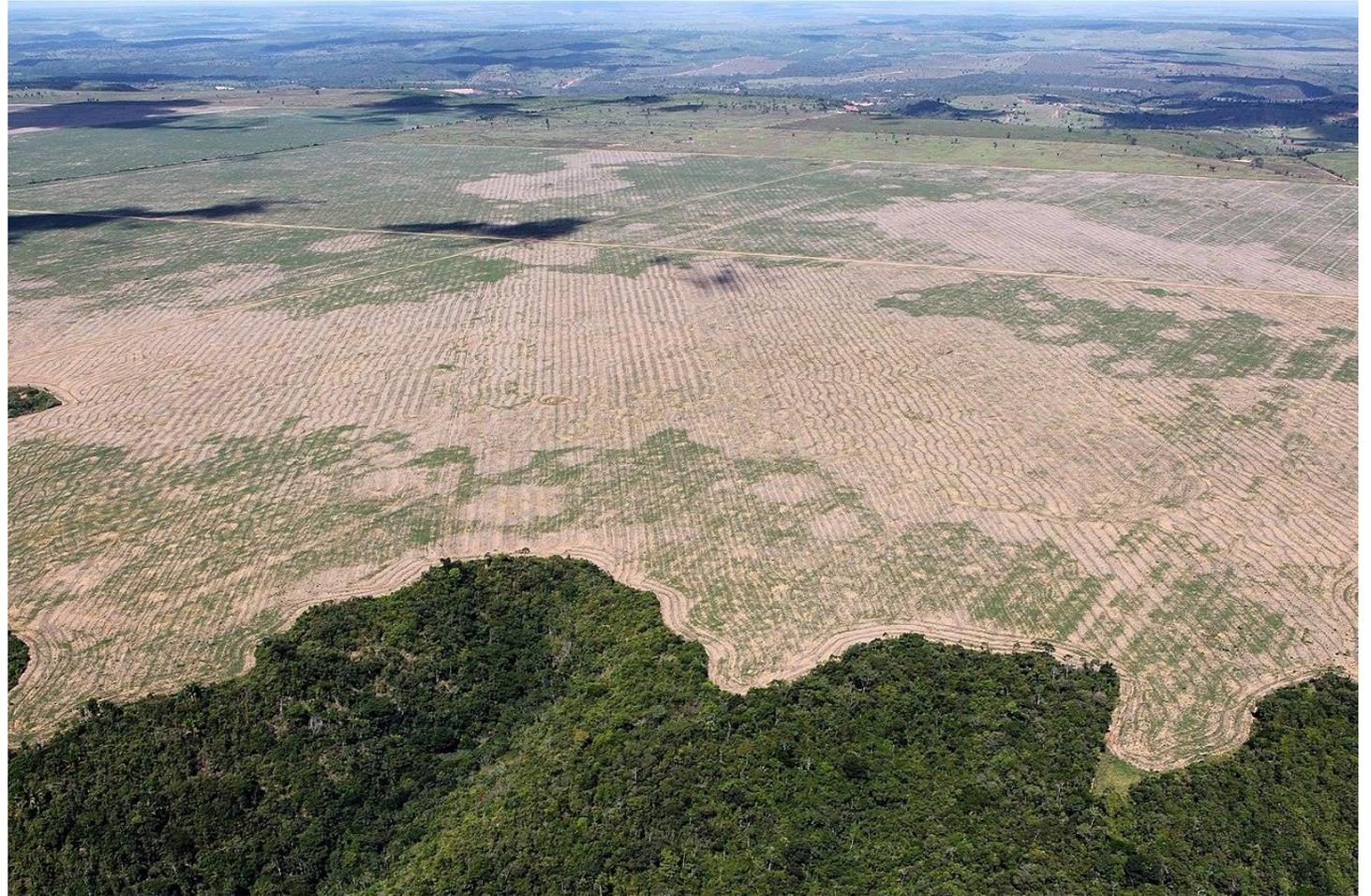
Deforestation

Deforestation means removal of forest crop from a piece of land without any plan or intention to reforest the land.

The major factors that are responsible for deforestation are:

- (i) Diversion of forest land for non-forestry purpose
- (ii) Shifting Cultivation
- (iii) Mining

The most concentrated deforestation occurs in tropical rainforests. About 31% of Earth's land surface is covered by forests at present.



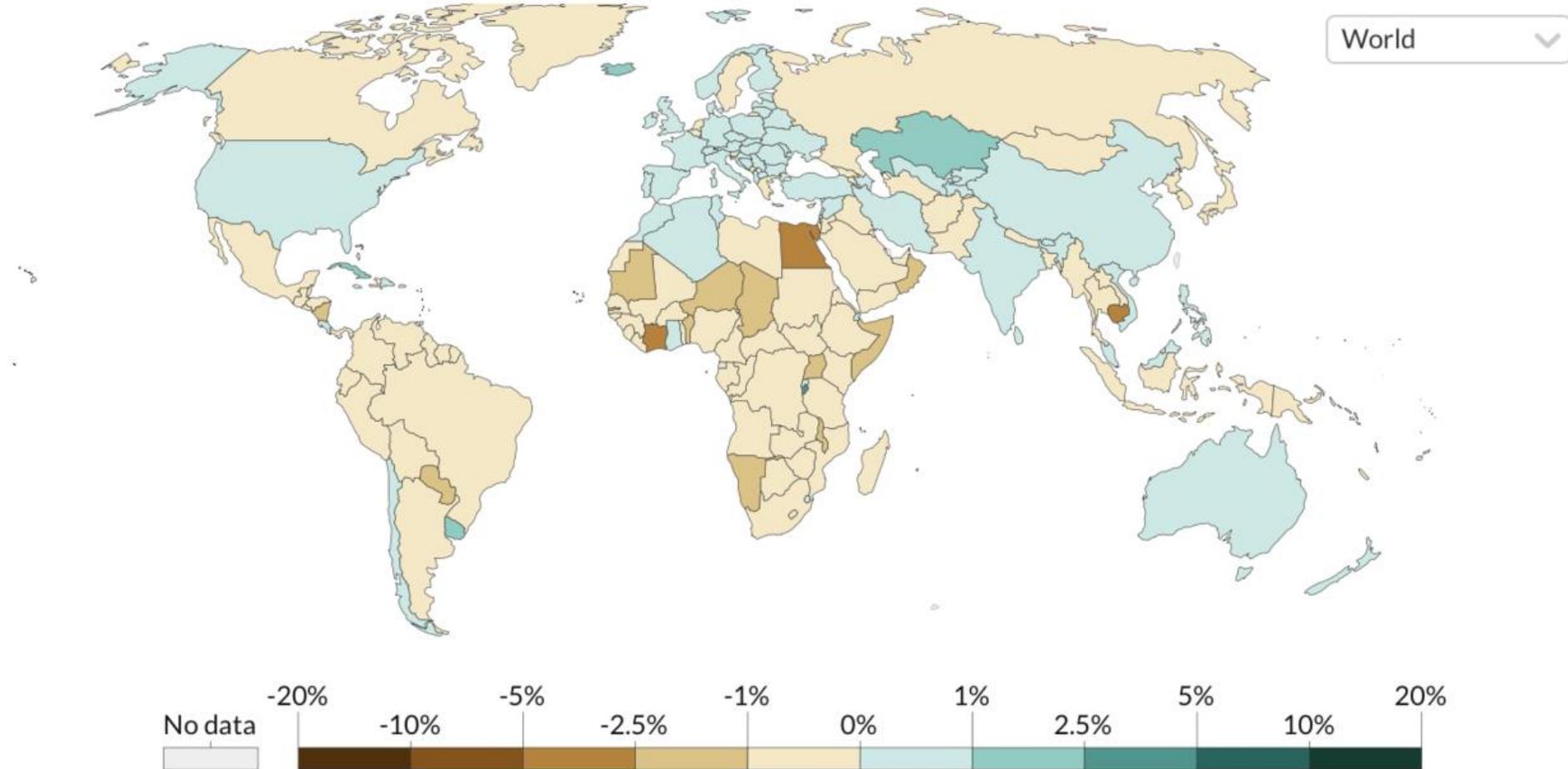
Deforestation of the Amazon rainforest in Brazil's Maranhão state, 2016

Deforestation Risks !

- ✓ Deforestation has resulted in habitat damage, biodiversity loss, and aridity.
- ✓ Deforestation also causes extinction, changes to climatic conditions, desertification, and displacement of populations, as observed by current conditions and in the past through the fossil record.
- ✓ Deforestation also reduces bio sequestration of atmospheric carbon dioxide, increasing negative feedback cycles contributing to global warming.

Annual change in forest area, 2020

Forest area net change rate measures the annual net change in forested area, as a percentage of total forest area. Negative values indicate a net loss of forest, and positive values a net gain.

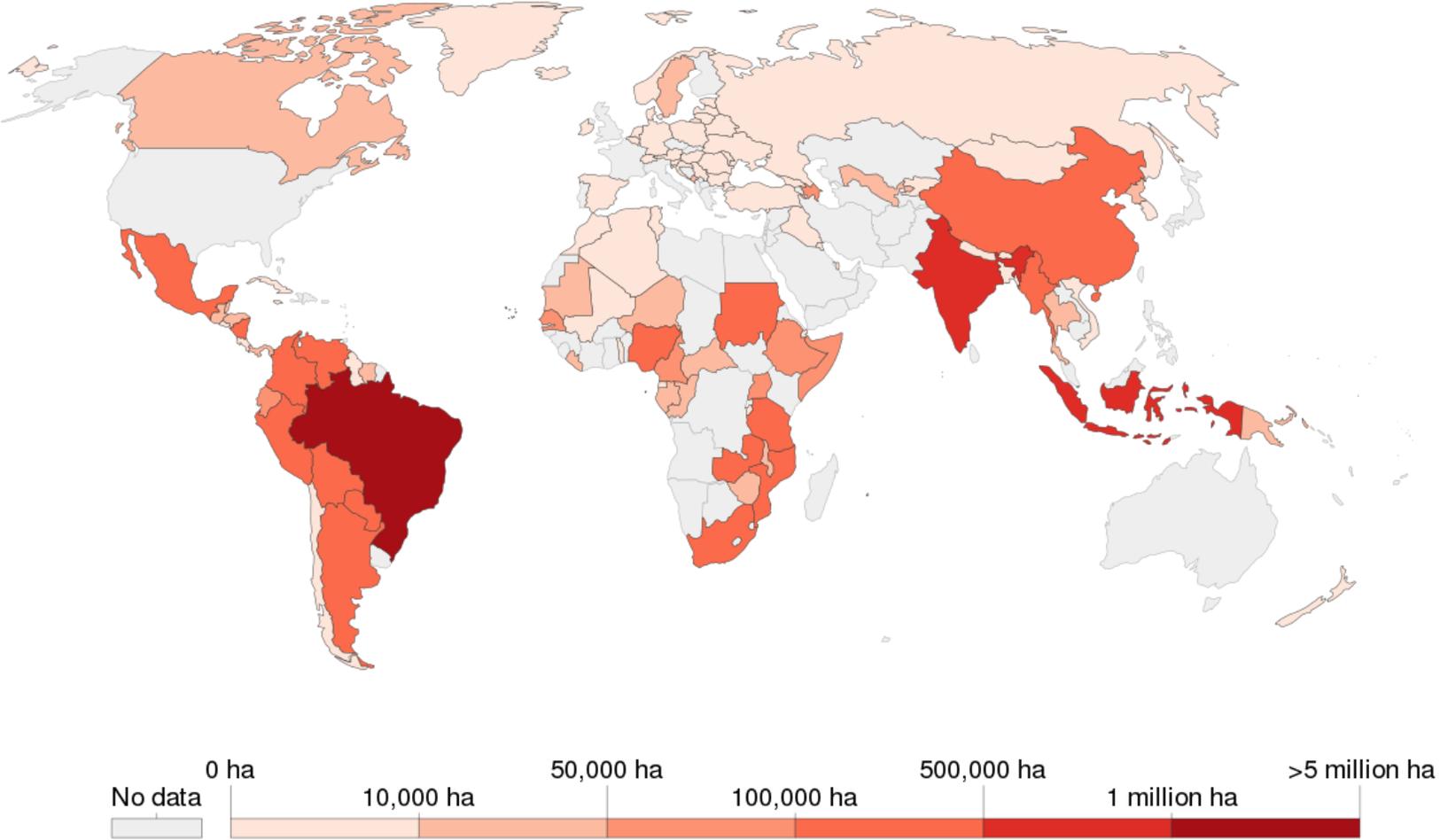


Source: Food and Agriculture Organization of the United Nations

OurWorldInData.org/forests • CC BY



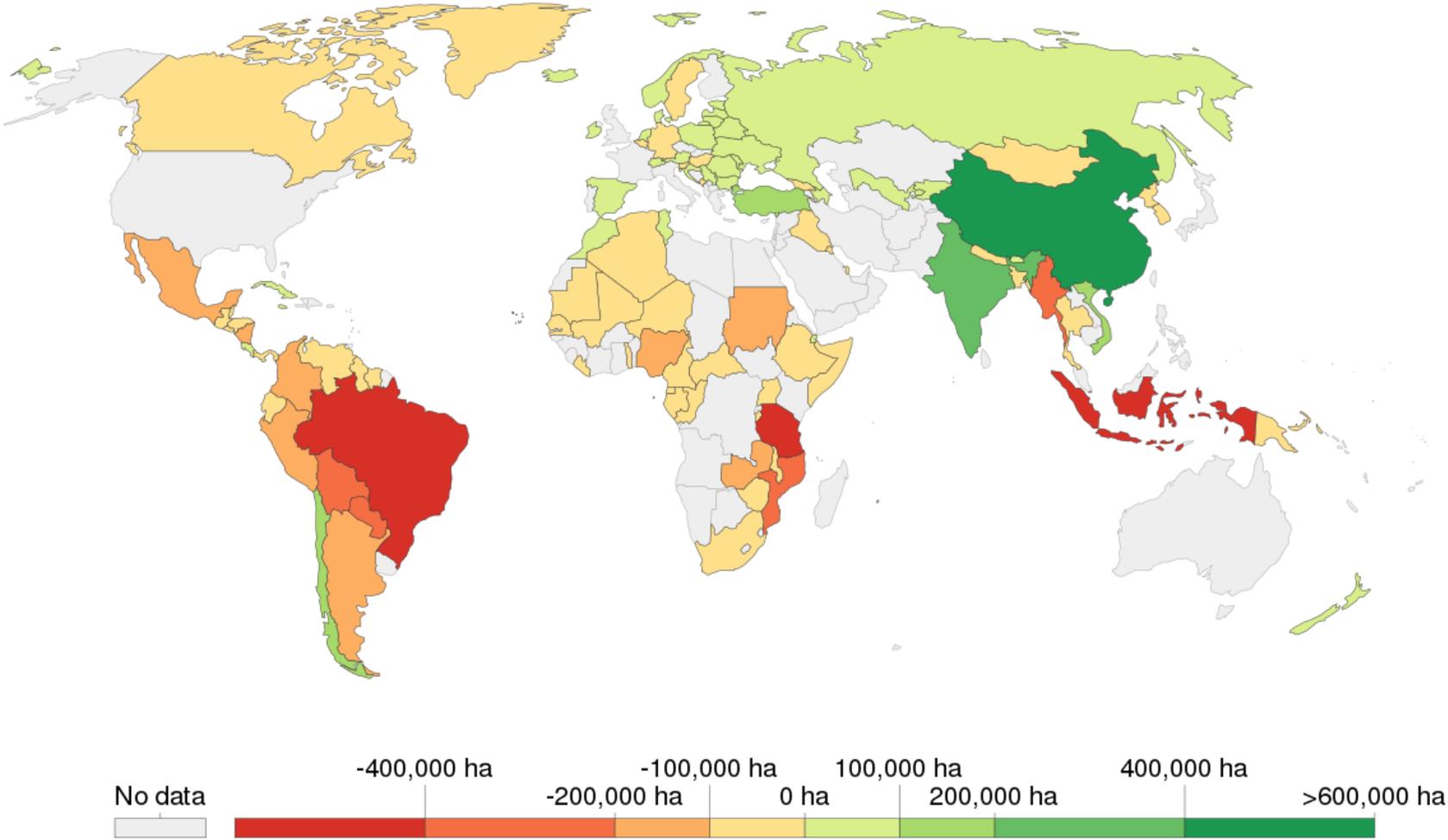
Annual deforestation



Source: UN Food and Agriculture Organization (FAO). Forest Resources Assessment.
Note: The UN FAO publish forest data as the annual average on 10- or 5-year timescales. The following year allocation applies: "1990" is the annual average from 1990 to 2000; "2000" for 2000 to 2010; "2010" for 2010 to 2015; and "2015" for 2015 to 2020.

Annual change in forest area

Net change in forest area measures forest expansion (either through afforestation or natural expansion) minus deforestation.



Source: UN Food and Agriculture Organization (FAO). Forest Resources Assessment.
Note: The UN FAO publish forest data as the annual average on 10- or 5-year timescales.

Climate change impacts on deforestation!

- ✓ More wildfires, insect outbreaks, invasive species, and more frequent extreme weather events (such as storms) are factors that increase deforestation.
- ✓ A study suggests that "tropical, arid and temperate forests are experiencing a significant decline in resilience, probably related to increased water limitations and climate variability" which may shift ecosystems towards critical transitions and ecosystem collapses.

Impacts !!

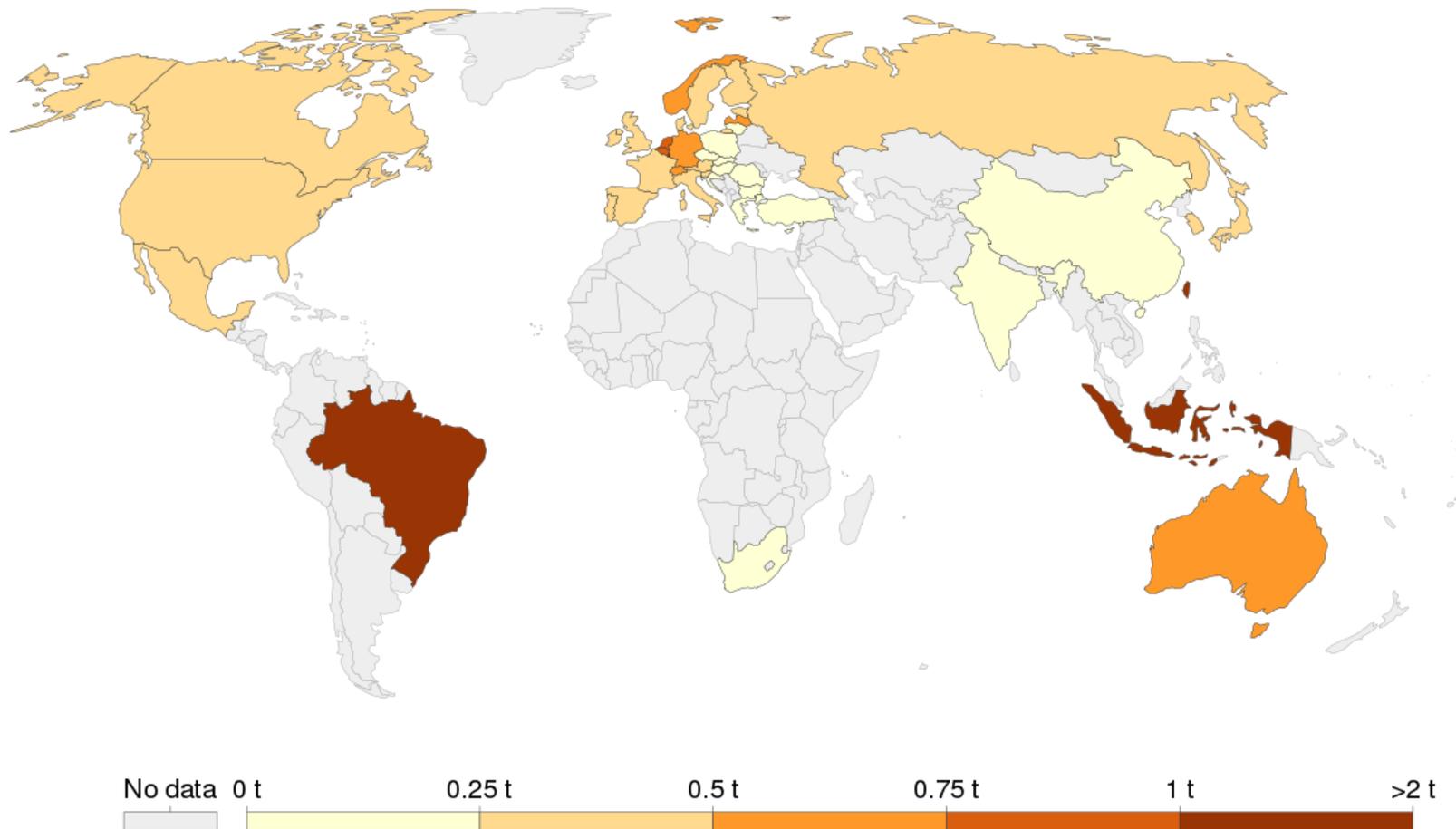
On atmosphere and climate

- ✓ Deforestation is a major contributor to climate change.
- ✓ It is often cited as one of the major causes of the enhanced greenhouse effect.
- ✓ Recent calculations suggest that CO₂ emissions from deforestation and forest degradation contribute about 12% of total CO₂ emissions, with a range from 6% to 17%.

Per capita CO₂ emissions from deforestation for food production



This measures per capita CO₂ emissions linked to deforestation for food production – it is trade-adjusted so reflects the carbon footprint of diets within a given country. It is based on the annual average over the period from 2010 to 2014.



Source: Pendrill et al. (2019). Agricultural and forestry trade drives large share of tropical deforestation emissions.

Changes to the water cycle

- ✓ The water cycle is also affected by deforestation.
- ✓ Trees extract groundwater through their roots and release it into the atmosphere.
- ✓ When part of a forest is removed, the trees no longer transpire this water, resulting in a much drier climate.
- ✓ Deforestation reduces the content of water in the soil and groundwater as well as atmospheric moisture.
- ✓ The dry soil leads to lower water intake for the trees to extract.

Biodiversity loss

- ✓ The removal or destruction of areas of forest cover has resulted in a degraded environment with reduced biodiversity.
- ✓ Forests support biodiversity, providing habitat for wildlife; moreover, forests foster medicinal conservation.

Control

Forest management

- ✓ Efforts to stop or slow deforestation have been attempted for many centuries because it has long been known that deforestation can cause environmental damage sufficient in some cases to cause societies to collapse.