

# Food & Animal feed



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**The recommended daily intake of protein depends on body weight: it takes about 0.8 grams of protein for every kilogram you weigh.**

**The average protein consumption in France is 1.4 g protein/kg body weight/day of which about 65% is of animal origin.**

**In order to meet the current demand for food (and in consequence animal feed), whether of plant or animal origin, a substantial area of cultivation and paturages is needed.**



# Forestry

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**13% of tropical deforestation (680,000 hectares) is driven by expansion of tree plantations into native forests for paper and wood.**

**Tropical wood is used for commercial purposes (by public or private groups) and for domestic use, or to make firewood, perchis, and coal.**

**France is the sixth European importer of timber from illegal deforestation.**

# Pasture

An aerial photograph of a large-scale sheep farming operation. A wide, light-brown dirt road runs diagonally from the bottom left towards the top right. On either side of the road, the land is divided into numerous rectangular pastures by thin, light-colored fences. Each pasture is densely packed with sheep, mostly white, with some black sheep scattered throughout. The ground in the pastures appears dark brown, possibly due to soil or manure. The background shows a vast, flat green landscape under a clear sky.



**A lot of lands are needed in order to raise the animals we feed on, especially beefs.**

**Thus, 41% of the tropical deforestation, or 2.1 million hectares per year, is driven by pasture expansion for beef.**

An aerial photograph showing a landscape divided into two main areas. On the left, there are several large, irregularly shaped plots of brown, tilled soil, representing cropland. On the right, there is a dense, lush green forest. A semi-transparent green horizontal band runs across the top of the image, containing the word 'Cropland' in white text.

# Cropland



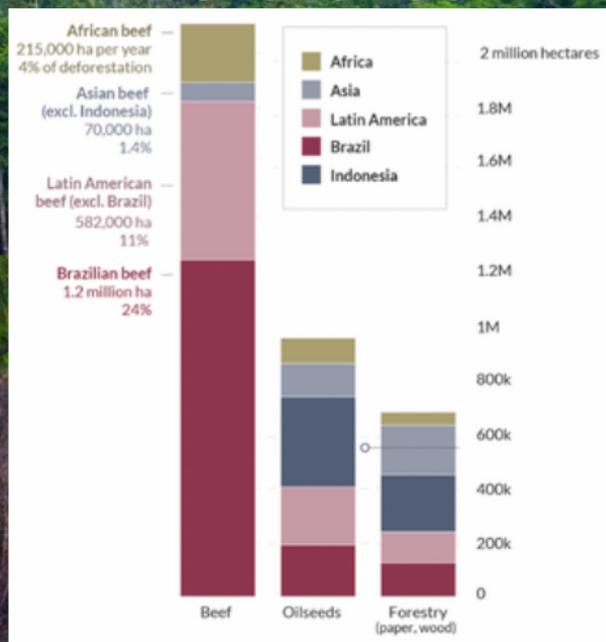
**Many human activities require resources cultivated on deforested lands.**

**Croplands are therefore divided in different cultures depending on their use, including livestock feed.**

**However, most of the croplands that drive the deforestation are used for oilseeds production (mainly soybean and palm oil). Oilseeds are responsible for 18.4% of tropical deforestation, even if other crops have non-negligible impact on deforestation.**

# Tropical deforestation

## The main drivers



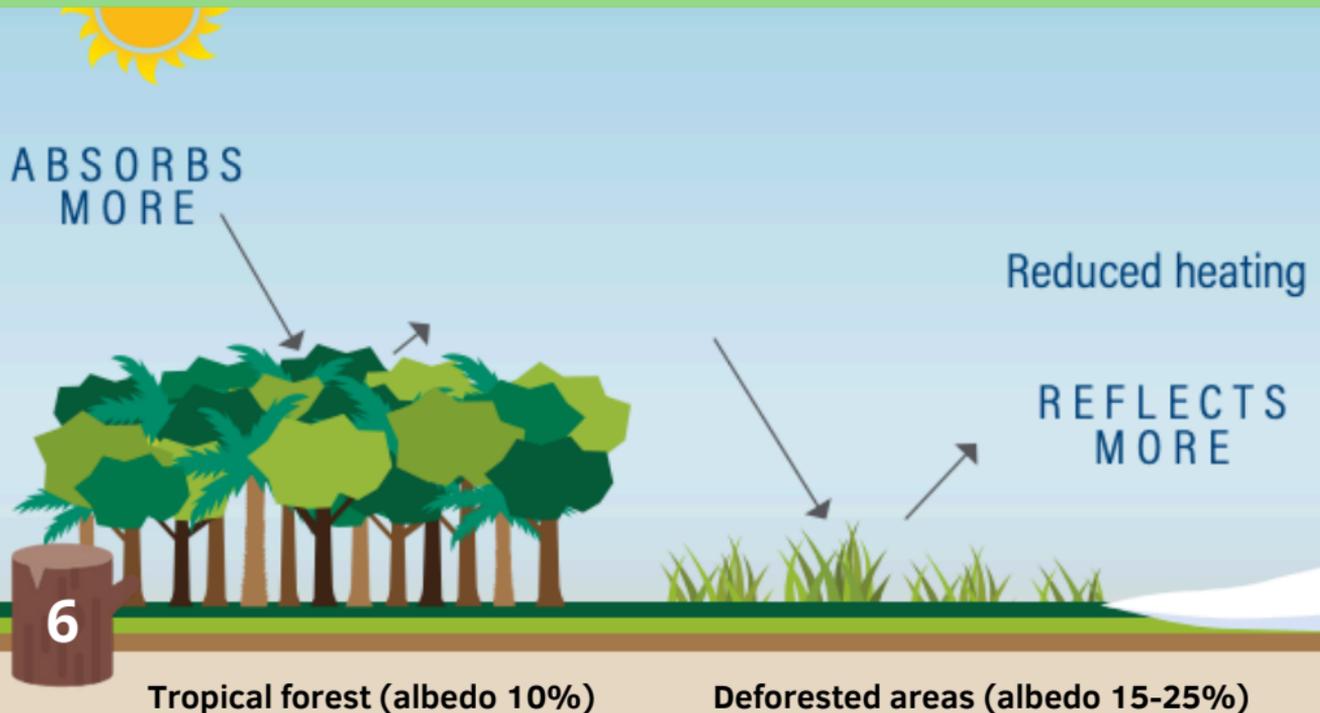
Source : OurWorldInData



**Tropical forests register the highest rate of deforestation (89%), with the greatest losses in the tropical rainforests, where 40 percent of the total forest losses occur. Half of this tropical deforestation takes place in Brazil and Indonesia.**

**If the rate of deforestation slowly decreases - especially in tropical areas - it is still not enough to compensate for the levels of deforestation we face currently.**

# Albedo change



Source : Wolosin and Harris 2018



**The albedo is the fraction of solar radiation reflected by any surface (in %).**

**Forested areas have lower albedo values than cropland, and therefore reflect less incoming solar radiation.**

**Thus, surfaces of forest warm up by absorbing solar radiation.**

**By only looking at the change of albedo, you could conclude that deforestation will lead to a decrease in temperature...**

# Evapotranspiration change

**HIGH EVAPOTRANSPIRATION**

cool, wet

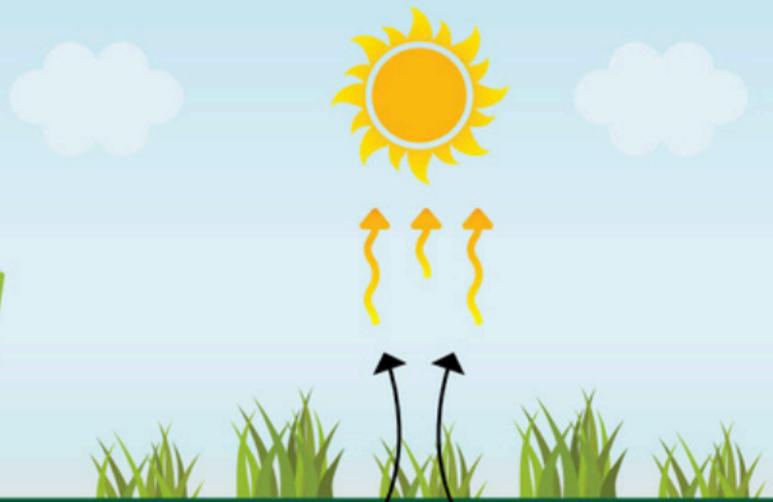


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**WET**

**STRONG SENSIBLE HEAT FLUX**

warm, dry



**DRIER**

Source : Wolosin and Harris 2018



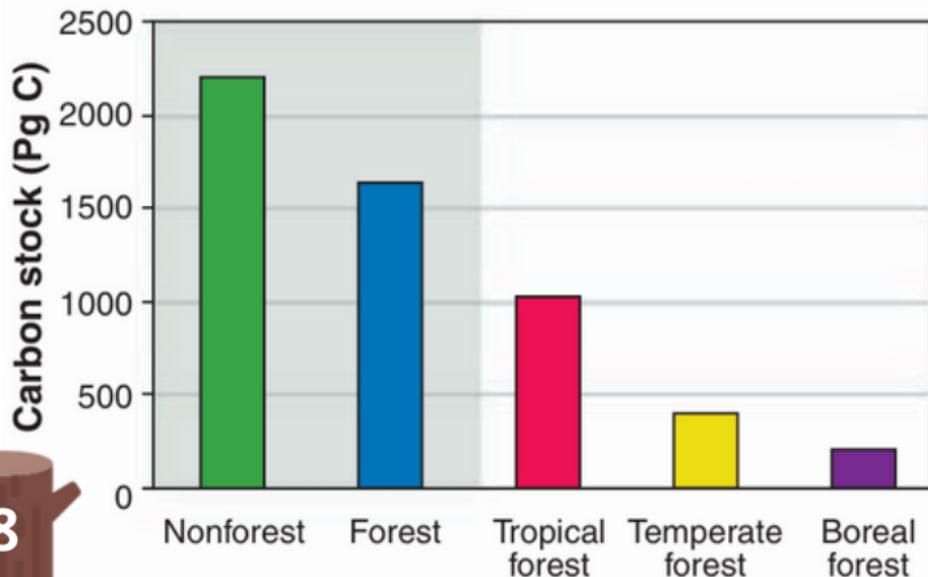
**Energy is dissipated at the surface via latent heat (evapotranspiration) or sensible heat.**

**Forests release more energy in the form of latent heat than sensible heat, and thus tend to maintain a cooler surface. Therefore, deforestation leads to a decrease in air humidity and thus an increase of local temperature.**

**Moreover, a reduced evapotranspiration has an impact on the water cycle and especially leads to a smaller cloud cover.**

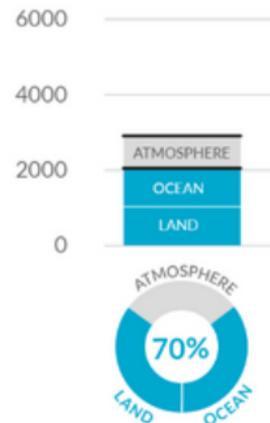
# Land carbon stock

## Global carbon



Source : G.B. Bonan 2008, Forest and Climate Change

## Cumulative CO<sub>2</sub> emissions since 1850 (GtCO<sub>2</sub>)



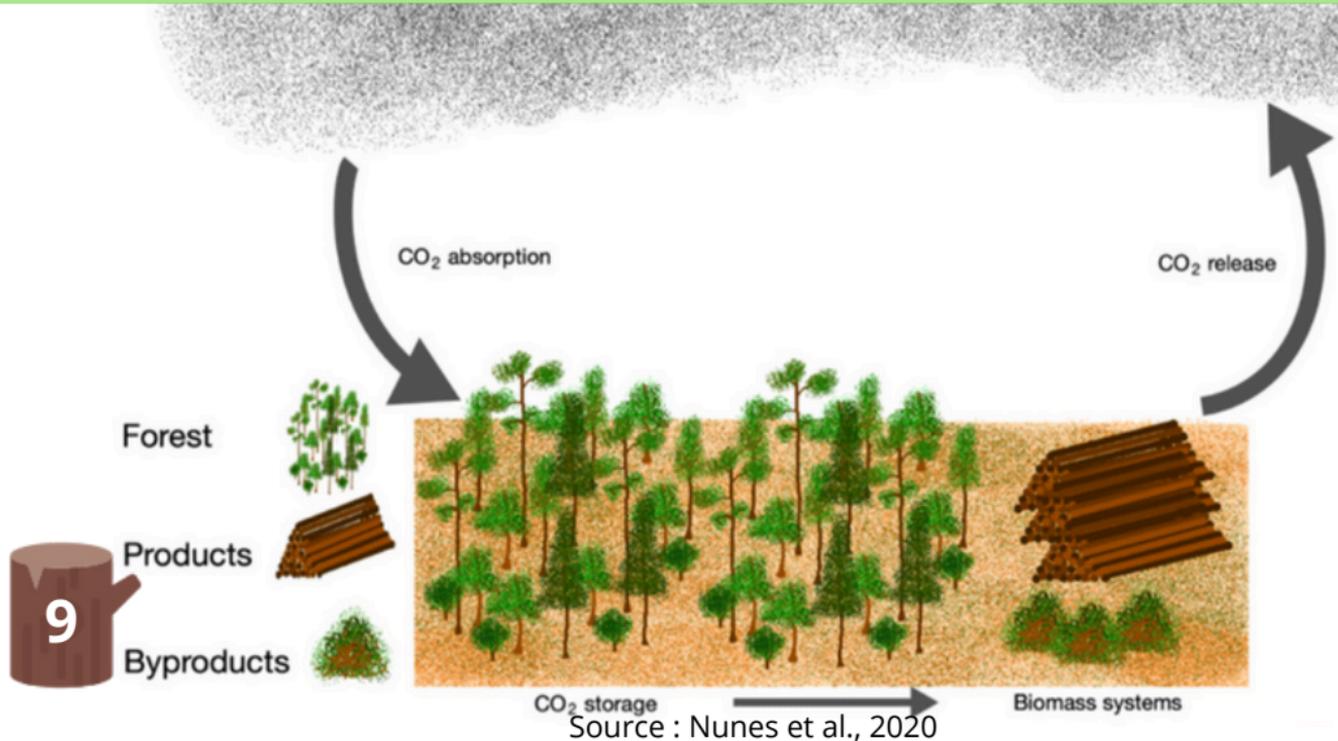
Source : IPCC Report AR6



**Worldwide, forests represent about 40% of the land carbon stock, of which tropical forests are the ones containing the most carbon.**

**Tropical forests are also the ones that capture the most carbon in biomass and soil. CO<sub>2</sub> is absorbed thanks to photosynthesis. A smaller part of this is released through respiration by plants and microbes.**

# CO<sub>2</sub> emissions





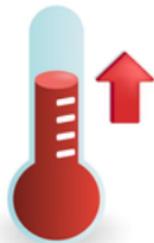
**Deforestation is the main driver of land-use emissions, remaining high at 6.7 +/- 1.5 GtCO<sub>2</sub> per year for 2012-2021.**

**Tropical forests, which store the most carbon, are also those which release the most CO<sub>2</sub> when they are deforested. The trees which allowed the storage of CO<sub>2</sub> are transformed into wooden products, which will ultimately be burned releasing CO<sub>2</sub>.**

**Then, this CO<sub>2</sub> will participate to the additional greenhouse effect leading to an increase in temperature.**

# Temperature impacts

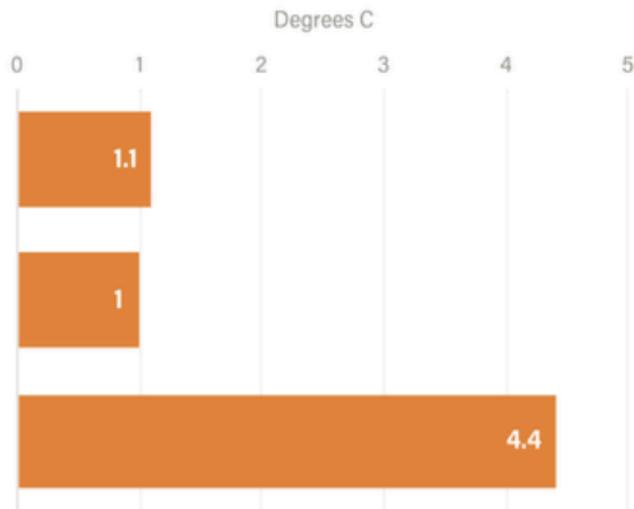
Heat stress is rising in tropical areas, due to climate change and local deforestation



Increase in **global average temperature** due to greenhouse gas emissions since pre-industrial times

Additional increase in **average temperature in tropical areas with nearby deforestation**

Increase in **average daily high temperatures in tropical areas with nearby deforestation**



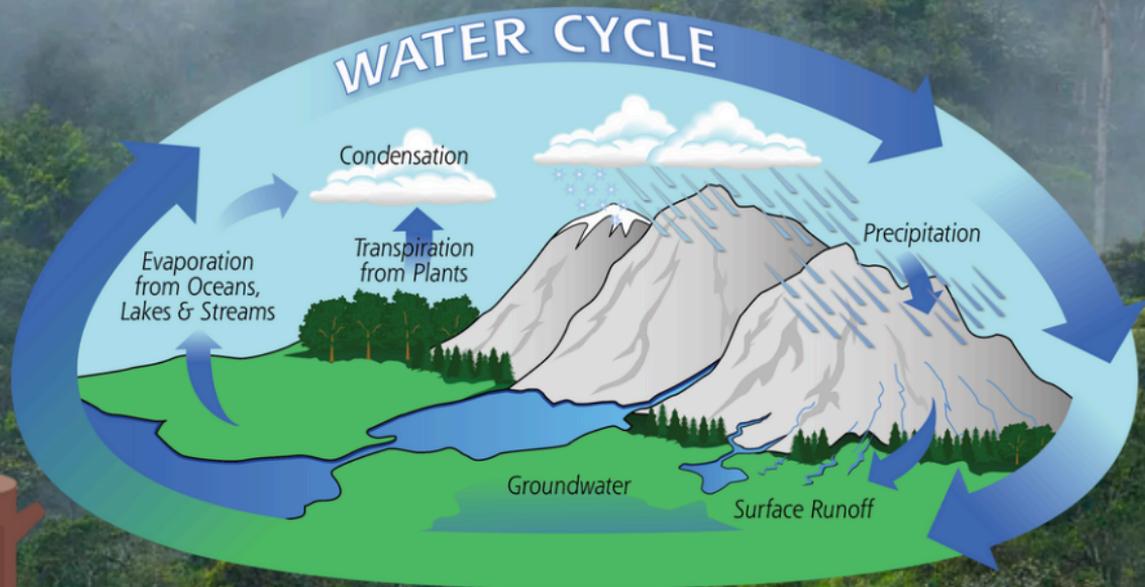


**Deforestation has local and global effects on air temperature.**

**It contributes to global warming since it emits GHGs, but it mainly leads to a high local increase in temperature.**

**The balance between albedo change, evapotranspiration change and CO<sub>2</sub> emissions can increase by 4.4°C the average daily high temperatures in tropical areas with nearby deforestation.**

# Disruption of the water cycle





**Tropical forests play a vital role in regulating the water cycle through a process called transpiration, where trees release water vapor into the atmosphere.**

**Deforestation disrupts this process, reducing transpiration rates and altering regional precipitation patterns.**

**Consequently, areas experiencing deforestation may face decreased rainfall, leading to droughts or increased rainfall intensity, causing floods.**

# Soil erosion



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Source : WWF

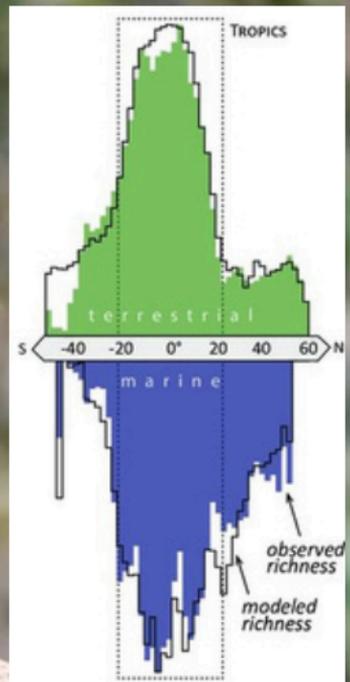


**Throughout the tropics, the erosion is due to the loss of trees, which anchor the soil with their roots. When agricultural plants such as coffee, cotton, palm oil, soybean and wheat replace trees it actually worsens soil erosion.**

**Erosion sweeps the land into rivers.**

**Costa Rica loses about 860 million tons of valuable topsoil every year. Meanwhile the Great Red Island, Madagascar, loses so much soil to erosion (400 tons/ha) that its rivers run blood-red, staining the surrounding Indian Ocean.**

# Biodiversity





**Tropical forests, which cover only about 7% of Earth's land surface, are home to over half of the world's plant and animal species.**

**It is estimated that deforestation contributes to the extinction of approximately 27,000 species every year, according to the World Wildlife Fund (WWF).**

**This loss of habitat not only affects iconic species like orangutans and jaguars but also disrupts intricate ecological networks, impacting everything from pollination to nutrient cycling.**

# Indigenous population

A woman with long dark hair, wearing a traditional indigenous garment with a white and yellow floral pattern, stands in a lush forest. She has a crown of yellow and white flowers on her head and is looking upwards. The background is filled with dense green foliage and tree trunks.

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**Tropical forests are the home of several indigenous civilizations. They represent 5% of the global population and more than 200 million live in tropical areas.**

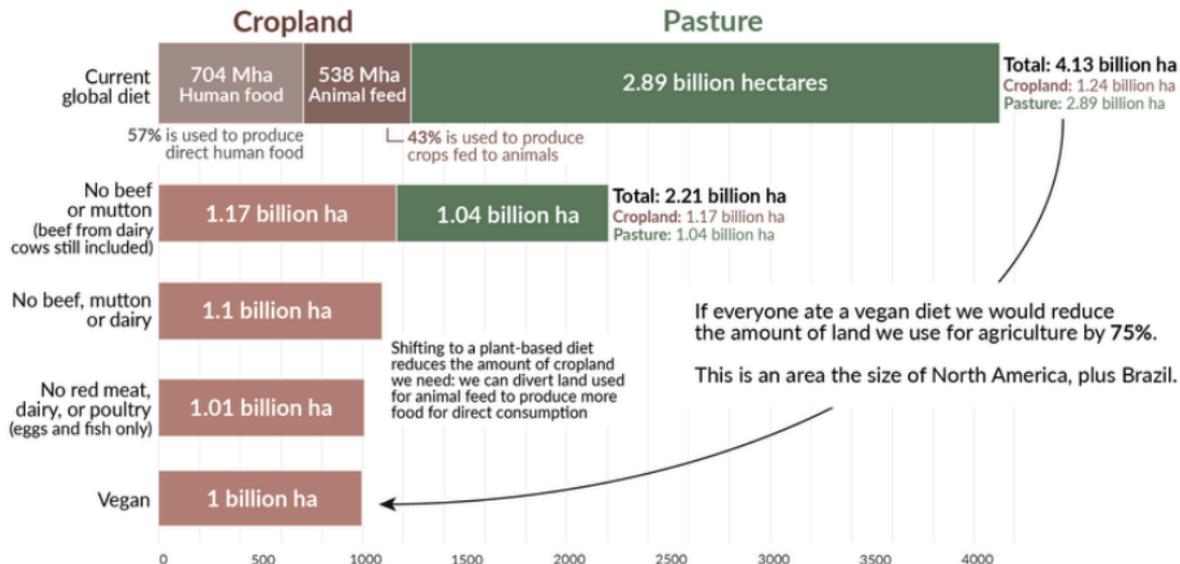
**These communities, which have profound cultural and historical linkages to their ecosystems of forests, encounter a range of devastating repercussions due to the rampant destruction of their ancestral territory. These impacts include loss of traditional land, health impacts due to water contamination and air pollution, threats to cultural identity, and the loss of subsistence and livelihoods.**

# Dietary changes

## Global land use for agriculture across different diets

Our World  
in Data

Global agricultural land use is given for cropland and pasture for grazing livestock assuming everyone in the world adopted a given diet. This is based on reference diets that meet calorie and protein nutritional requirements.



Data Source: Joseph Poore & Thomas Nemecek (2018). Reducing food's environmental impacts through producers and consumers. *Science*.

OurWorldinData.org – Research and data to make progress against the world's largest problems.

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**In order to reduce the tropical deforestation, dietary changes are necessary.**

**Indeed, 4.13 billion ha of lands are currently used for agriculture, of which more than half is devoted to paturages. To drastically reduce our consumption of beef would save almost 2 billion ha of lands.**

**Transitioning towards plant-based diets can lower the need for large-scale agriculture, and thus reducing pressure on tropical forests.**