

11. Planetary boundary 5: Land use change

Introduction

The intensification of agricultural areas and urban sprawl lead to the deforestation of forest areas. Over the past fifty years, the transformation of natural and semi-natural environments (forests, meadows and other ecosystems) into agricultural land has increased by an average of 0.8% per year (Rockström et al., 2009). This has the following consequences: loss of biodiversity and ecosystem services, soil erosion, risk of flooding and mudflows, increased greenhouse gas emissions, carbon de-stocking ...

11.1. Issues of land use change

The "land use change" limit is understood in terms of the percentage of the total land area converted to agricultural land. The threshold not to be exceeded is set at 15% of agricultural land. In 2009, around 12% of the world's land surface was cultivated.

Two indicators are defined within the framework of this planetary limit:

The first concerns, at the global level, the area forested in relation to the area covered by forest before human intervention, ensuring that at least 75% of the land once forest remains forested. In 2015, only 62% of previously forested land was forested, so the limit was exceeded. This reduces the Earth's ability to serve as a carbon sink.

The second concerns the area of the three main forest biomes (tropical, temperate and boreal forests) with regard to the potential forest cover. Among forest biomes, tropical forests converted to non-forest systems, have significant effects on climate (evapotranspiration), while boreal forests affect soil albedo (reflective power of a surface) and therefore the exchange of regional energy. The limit, at the biome level for these two forest types, was set at 85% of the potential forest cover. It was set at 50% for temperate forests, as changes would have a lower impact.

11.2. Situation in France

Contrary to the global situation, agricultural land is declining there, in particular under the effect of the artificialization of soils. However, given its high level of consumption, associated with population growth, and the insufficiency of raw materials on the national territory, France imports significant quantities of agricultural and forestry raw materials from the deforestation of tropical forests. It thus indirectly uses land located in other regions of the world, and contributes to exerting strong pressure on foreign land resources: consumption of resources, disappearance of natural habitats.

According to WWF, France imports and consumes large quantities of agricultural and forestry raw materials from tropical forest deforestation: soybeans (4.8 million tonnes), palm oil (970 kilotons), cocoa (460 kilotons) . France's ecological footprint linked to these imports represents 14.8 million hectares, or more than a quarter of the metropolitan area and half of the French agricultural area. About 5.1 Mha are in countries with a high risk of deforestation (Argentina, Brazil, China, Ivory Coast, Indonesia, etc.).

11.3. Impact of land use change

Forests are home to a great diversity of species and help mitigate climate change by storing large amounts of carbon. Their role is central in adapting to climate change, protecting soil and providing fresh water. Thus, deforestation has a strong influence on the environment: disappearance of natural habitats, loss of biodiversity and ecosystem services, increase in the intensity and frequency of weather extremes amplifying climate disasters, decrease in water resources, increase in greenhouse gas emissions responsible for global warming.