Forest Plantations in Brazil

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In the public discussion, the role of sustainable forestry in climate protection is hardly noticed. It is often described as a forest destroyer, especially when forest plantations are mentioned.

Forest plantations are forests established for commercial timber production. They consist of fast-growing tree species that provide a large amount of wood in a short time. Forest plantations are established in rows or blocks to facilitate management. Trees are grown from seedlings and planted at regular distances. Harvesting usually takes place every six to ten years.

The example of Brazil can be used to demonstrate the potential and sustainability of a bioeconomy based on forest plantations. The total area of all Brazilian forest plantations in 2021 was about 10 million hectares, with an upward trend, and today covers about one percent of Brazil's land area. Forest plantations have not traditionally been established in the Amazon regions. Rather, they are located in the south and southeast of Brazil in the regions of the eastern Atlantic-Coastal-Regions and the wet savannas of the Cerrado, which were cultivated long ago and where large areas of degraded rangeland are located today. Today's forest plantations have been established almost exclusively on these lands.

Forest plantation management began in Brazil in 1960, with further expansion supported by government funding from 1966 onwards. Over the past 60 years, Brazilian forest plantation management has become one of the most advanced in the world. The high productivity of an average of 38.9 cubic meters per hectare per year of forest growth achieved today with

eucalyptus plantations is outstanding by global standards. To achieve this, experience and technology played a key role. A great deal of development effort was required to achieve this level on a sustainable basis. For example, in 1970 productivity was only 10 cubic meters per hectare per year.

The reason for the strong growth of the eucalyptus genus is the efficient use of water, nutrients and sunlight. Another advantage is its natural resistance to all forms of pests that otherwise plague large-scale monocultures.

Frequently mentioned arguments against eucalypts are the leaching of soils and the lowering of groundwater levels. In the climatic zones of Brazil, however, negative effects on the water balance due to the high precipitation are not to be feared; nutrients withdrawn are replaced by fertilization.

Brazilian eucalyptus plantations today are not only very productive, but also sustainable. Plantations are established on former rangeland, mostly degraded areas. In no case is rainforest cleared for this purpose today. It is also important to note that forest owners are required by law to convert an area of at least 30 percent of the plantation into natural forests. This approach, known as forest mosaic forestry, links plantation areas with protected areas and creates ecological corridors with benefits for biodiversity, soil and water balance.

In 2021, the total area of natural forests in these forest mosaic plantations was 6 million hectares, resulting in richer biodiversity than the former rangeland had. Some of the new natural forests now consist of rare and endangered ecosystems.

In recent years, Brazil has also made considerable progress in integrating the social pillars of sustainability into plantation management. The Brazilian Ministry of Agriculture established the Sectoral Chamber on Forestry in 2008. The aim is to integrate agricultural cultivation, livestock and forestry, which is also known as agroforestry. This enables the basic needs of the local population to be better met and generates additional income for farmers. Today, agroforestry covers an area of 17.4 million hectares and is expected to increase by another 9 million hectares by 2030.

The Brazilian eucalyptus plantation economy and the associated industry have become an indispensable economic factor for Brazil. Today, eucalyptus is produced for three industrial sectors: Charcoal production for ore smelting, short fiber pulp production for paper manufacturing, and the wood industry for veneer and sawlogs.

Renewable biogenic fuels from wood do not yet play a role and are currently limited to the pulp industry, which produces small-scale liquid fuels from the byproducts of pulp production. However, renewable biogenic fuels (ethanol) have been produced in large quantities from sugarcane in Brazil for decades and are used extensively in the transportation sector.

Land reserves of unused degraded soils in the eastern Atlantic-Coastal regions (150 million hectares) and the wet savannas of the Cerrado (220 million hectares) would be available for expanding forest plantations for biofuel production. Intensification of the agricultural economy in these regions would make sense, also to reduce settlement pressure on the Amazon region. Brazilian agricultural representatives share this view and claim that higher specific yields protect the tropical forest.

Brazilian forest plantations not only provide raw materials for the current and future industrial sectors described above, but also contribute to climate change mitigation by storing atmospheric carbon in their biomass. There are approximately 1 billion tons of carbon stored in the biomass of the current Brazilian forest plantation. Around 400 million tons of CO2 are added annually, which is equivalent to approximately 50 percent of Germany's CO2 emissions.

The climate protection effect of the Brazilian forest plantation industry is considerable but should not obscure the fact that Brazil has emitted more than 50 billion tons of CO2 since 1990. Most of these emissions are due to deforestation in the Amazon, which is still occurring.

One frequently voiced criticism is that forest plantations are indirectly responsible for this, because the conversion of former rangeland into forest plantations means that the farmers, who settled there, had to move to the Amazon region and create new rangeland there, destroying the forest in the process.

Several arguments speak against this. Today's forest plantations occupy only about one percent of Brazil's land area. This does not put any pressure on the huge Amazon region. Moreover, the government and the forestry industry have recognized that they need to meet the basic needs of local farmers. The 2008 Sectoral Chamber on Forestry laid the foundation for this. Meanwhile, agroforestry has gained recognition and visibility. In addition, forest plantation management has created many new jobs - in forest maintenance, in tree nurseries and in the associated industries. In this context, the pulp industry should be mentioned with many jobs for the local population, also in the high-tech sector. Basically, it can be said that the forest plantation industry with processing plants attracts rather than repels people.

So, the circular bioeconomy plays a critical role in addressing the challenges of both climate change and resource scarcity. At the heart of the circular bioeconomy with sustainable forestry are forests for renewable energy and biobased resources.