

Planting trees in grasslands won't save the planet – rather protect and restore forests

By [Susanne Vetter](#)

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Tree planting is one of the nature-based solutions being used to offset greenhouse gas emissions. Trees absorb atmospheric carbon dioxide. Many of these [tree planting projects](#) target Africa's rangelands (open grasslands or shrublands used by livestock and wild animals).



Rangelands provide a wealth of ecosystem services and support rural economies while harbouring native biodiversity. Courtesy Rauri Alcock

They include agroforestry initiatives such as the [Great Green Wall](#) in the Sahel, or commercial timber plantations that double as [carbon offset projects](#). These target [millions of hectares](#) in countries like Mozambique, Madagascar and Rwanda.

I am part of a team of ecologists and social scientists who are working to highlight the [International Year of Rangelands and Pastoralists](#) in 2026. Our goal is to protect and [promote rangelands](#) that combat desertification and support economic growth, resilient livelihoods and the sustainable development of pastoralism. In pursuit of this goal, we [reviewed all the scientific studies](#) we could find on the effects of planting trees in rangelands.

We concluded from our review that tree planting in rangelands is largely ineffective in addressing climate change, because it has limited potential to store additional carbon. It is only beneficial to restore forests in areas where they naturally occurred in the past.

Why rangelands matter

Rangelands cover [more than half](#) of Earth's land area. They are made up of shrublands, grasslands, savannas and other vegetation with naturally low tree cover and they support free-ranging wildlife and livestock.

Rangelands provide [critical ecosystem services](#), but these are lost when open grassy vegetation is converted to forest or plantation. Many rangelands are too dry, steep or rocky to grow crops but are suited for livestock grazing to produce meat, milk and fibres such as wool.

They also play an important role as water catchments and have great cultural value for outdoor recreation, tourism and ways of life.

They harbour a wealth of [plant and animal biodiversity](#). Livestock grazing on rangeland have [less impact on biodiversity](#) than other land uses such as crop farming or plantations, because rangelands aren't ploughed and consist of natural or semi-natural vegetation.



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The ecosystem services provided by rangelands are generally overlooked while those provided by forests and trees are assumed to be far superior. In Africa alone, grasslands and savannas totalling an [area the size of France](#) are inappropriately targeted for tree planting, and rangelands in South America, India and other regions are [similarly earmarked](#) for planting schemes.

But, as we found in our review, these initiatives are not only misplaced, they can also do harm.

Afforestation in the wrong places often fails

In looking for “empty” land to “reforest”, rangelands are often incorrectly chosen for tree planting because they have low tree cover, and aren't covered in croplands or settlements. This ignores the fact that rangelands are used as they are for livestock or wildlife. This is a suitable form of land use for those environments, which would be harmed by planting trees.

Tree planting projects are commonly portrayed as reforestation, which implies that the target areas have lost their original forest cover. In fact, planting trees in rangelands that naturally have low tree cover is [afforestation](#). This often fails because they [don't have enough rainfall](#) throughout the year to support high tree cover. The alternation of wet and dry seasons also promotes frequent fires.



Rangelands support most of the world's large mammals. Courtesy Urs Kreuter

Planting trees on rangelands is not guaranteed to capture and store extra carbon. It can even lead to a net loss in carbon when soils are disturbed to plant trees. Global rangelands store some 30% of the carbon pool on land. Most of this is locked away below ground, [in the soil](#), where it is much less likely to be lost through fires and other disturbances than carbon stored in trees.

Plantations are also not the same as natural forests. Many climate mitigation projects take the form of commercial plantations such as pines and eucalypts for pulp and timber, since they grow fast and generate revenue. But these [store far less carbon](#) than old-growth forests or rangelands. This means that turning rangelands into plantation or forest achieves [little extra carbon storage](#).

Afforestation can be damaging to people, water and climate

Local people pay the price and bear most of the cost of afforestation. Despite being portrayed as supporting local economic development and ecosystem restoration, afforestation projects often exclude existing land users and limit their access to land and resources. Claims that afforestation will create employment, fuelwood and other forest products that will benefit the local community are often overstated or slow to materialise, while negative impacts can be felt immediately.



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Rangeland afforestation [also reduces streamflow](#) and lowers water tables as trees use much more water than grasses. Tree plantations, especially of pines and eucalyptus, also [increase the risk](#) of destructive wildfires that add greenhouse gases to the atmosphere.

Another drawback of afforestation on land where forests never grew is that forests and plantations absorb more of the sun's radiation than rangelands due to their darker colour, creating a [warming effect](#). This can significantly counteract the cooling effect of removing carbon dioxide from the atmosphere.

What is a better solution?

Forest protection and restoration, including tree planting, should focus on the very large areas that are natural forest and where there is [plenty of opportunity](#) and need to do so. For example, a [recent analysis](#) for Africa shows that only a third of degraded forest is included for forest restoration under AFR100, the [African Forest Landscape Restoration Initiative](#) which aims restore Africa's degraded and deforested land, while half of the total area pledged targets non-forest areas. If these initiatives were focused on degraded forest instead, three-quarters of degraded forests could be restored.

In rangelands, the best approach is to protect and enhance their existing carbon stores rather than replacing them with forests or plantations. [Successful examples](#) such as the Southern Plains Land Trust in the US are starting to show that grazing management can increase soil carbon while safeguarding biodiversity and local livelihoods.

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