

Forest restoration

Transformative trees

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Forest restoration: Transformative trees

We welcome the attention given to forest and trees by the Report “The global tree restoration potential” (5 July, p. 76), in which J. F. Bastin *et al.* study the potential of tree cover to reduce climate change. However, we are concerned by their neglect of the water cycle. They consider how water influences tree cover but disregard how tree cover influences water. Bastin *et al.* recognize that their extrapolations are not “future projections of potential forest extent” but instead represent potential tree cover “under existing environmental conditions.” However, given the influence of forest on its environment, the concept of potential tree cover under current conditions is problematic. Trees influence several of the variables Bastin *et al.* used to model tree cover, including precipitation quantity, variability, and seasonality, as well as soil moisture and atmospheric water transport (1–4).

While much remains uncertain (2), we know enough to foresee that afforestation and reforestation have potential for both negative and positive hydrological impacts. Negative impacts can result if plantings deplete groundwater and thus exacerbate local water scarcity. Changes can manifest quickly and are a recognized problem with fast-growing monoculture plantations (5). Positive impacts can result when tree cover improves soil and groundwater recharge and storage, such as through suitable species and tree densities (6). Forest cover can also promote rainfall recycling, and thus bolster and stabilize regional and downwind rainfall (1, 7, 8). In suitable circumstances, increased forest cover may even return wetter climates to currently drier regions, expanding the land available for trees (2). These outcomes have profound implications given that reliable access to water is central to achieving the UN Sustainable Development Goals. Accounting for the potentially transformative power of trees regarding both water and carbon offers crucial constraints as well as vast benefits.

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