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## Environment

### Down with trees

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#### Planting trees can exacerbate drought and fail to tackle climate change

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CONVENTIONAL wisdom says trees are good for the environment. They absorb carbon dioxide—a greenhouse gas—from the atmosphere and store it as carbon while releasing oxygen, a process for which forests have been dubbed “the lungs of the planet”. The roots of trees have been thought to trap sediments and nutrients in the soil, keeping nearby rivers free flowing. Trees have also been credited with steadying the flow of these rivers, keeping it relatively constant through wet and dry seasons, thus preventing both drought and flooding. Pernicious nonsense, conclude two pieces of research published this week.

The first, a four-year international study led by researchers at the University of Newcastle, in Britain, and the Free University of Amsterdam, identifies several myths about the link between forests and water. For example, in arid and semi-arid areas, trees consume far more water than they trap. And it is not the trees that catch sediment and nutrients, and steady the flow of the rivers, but the fact that the soil has not been compressed.

The World Commission on Water estimates that the demand for water will increase by around 50% in the next 30 years. Moreover, around 4 billion people—one half of the world's population—will live in conditions of severe water stress, meaning they will not have enough water for drinking and washing to stay healthy, by 2025.

The government of South Africa has been taking a tough approach to trees since it became the first to treat water as a basic human right in 1998. Trees lose water through evaporation (the technical term is transpiration) at twice the rate of grassland or South Africa's unique fynbos scrubland. In a scheme praised by the hydrologists, the state penalises forestry companies for preventing this water reaching rivers and underground aquifers.

In India, large tree-planting schemes not only lose valuable water but obfuscate the true problem identified by the hydrologists: the unregulated removal of water from aquifers to irrigate crops. Farmers need no permit to drill a borehole and, as most farmers receive free electricity, there is little economic control on the volume of water pumped. In the Kolar district in Karnataka, wells have dried up as the water table has plummeted from six metres to 150 metres below ground.

The report—“From the mountain to the tap: how land use and water management can work for the rural poor”, which is published by Britain's Department for International Development—concludes that there is no scientific evidence that forests increase or stabilise water flow in arid or semi-arid areas. It recommends that, if water shortages are a problem, governments should impose limits on forest plantation.

The second piece of research looked at how long the forests of the Amazon basin cling on to carbon. Growing trees consume carbon dioxide and it was thought that only when the tree died, perhaps hundreds of years later, would the carbon be returned to the atmosphere. No such luck. In a paper published in *Nature* this week, a team of American and Brazilian scientists found that trees were silently returning the carbon after just five years.

Before taking an axe to trees, however, consider the merits of the tropical rainforests. In Costa Rica, the upland cloud forests of the Arenal National Park trap water from clouds while losing little through transpiration. Water flowing from the forest feeds hydroelectric plants that provide a third of Costa Rica's electricity needs. It then irrigates farmland and drains into an important wetland that hosts migratory birds, before flowing into a hugely fertile fishery. The area has now become a prime destination for eco-tourists, Costa Rica's largest source of foreign exchange.

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