Forest density is increasing

The increased density of forests has been responsible for substantially increasing sequestered carbon in Europe and North America over the past 20 years, according to a recent study. The researchers suggest that managing forests for increased density offers one means of increasing carbon stocks.

More carbon can be stored in forests by increasing their area, or by managing them so as to increase the size and number per hectare of trees (density). Consequently, loss of forest area does not necessarily mean a relative loss of sequestered carbon, if the density of the remaining forests has increased.

The study investigated the relationship between changes in forest areas, the density of forests and the mass of carbon stored in forests around the world. The researchers estimated changes in global carbon stocks of forests from 1990 to 2010 using data obtained from the 2010 Global Forest Resources Assessment¹, produced by the United Nations Food and Agriculture Organization (UNFAO). A total of 68 countries, accounting for 72% of the global forested area and 68% of the global carbon stocks, were included in the analysis.

In general, across all regions, the density of forests had increased. For the countries in the study in Africa and South America, the density of forested areas had increased slightly, as the decline in carbon was not in proportion to the large reduction in forested area. Therefore, despite deforestation in South America, increased density has maintained carbon levels across the region.

Forest areas in the three countries of South America and the ten countries of Africa considered were found to have diminished by 10% over the 20 year study period. In contrast, forested areas in Europe (28 countries considered) grew by just over 4% and forested areas in Asia (21 countries considered) grew by around 2%. There was little change to the area covered by forests in the North American region (7 countries considered).

Carbon mass increased in the European region by over 15% and by just over 5% in North American countries, but declined by over 5% in African and South American countries. Countries in Asia demonstrated little change in carbon mass.

For countries in Europe and North America, results suggested that there have been significant increases in the density of forests in addition to slight increases in forest areas. They have therefore gained in sequestered carbon.

Forest areas are increasing in 45 of the studied countries, density is increasing in 45 countries, and greater forest areas and higher densities combined have a positive effect on carbon storage in 51 of the countries.

Despite uncertainties related to data collection required to describe national forest inventories, this study suggests managing forests for increasing density can increase carbon stocks e.g. forests can be managed to increase carbon density by promoting the growth of young forests and helping degraded forests to recover.


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