

Science for Environment Policy

Mountain grasslands and shrublands store significant amounts of carbon

Despite their general absence from climate policy discussions, the world's mountain grasslands and shrublands (MGSs) store between 60.5 and 82.8 billion metric tonnes of carbon, a new study estimates - more than three times that of ocean and coastal ecosystems. This research, which is the first to provide a global inventory of carbon stored in MGSs, argues that these ecosystems should be accounted for in climate policy.

MGS ecosystems are increasingly under threat from human activities. This is particularly so in developing countries, where rapid population growth is leading to more intensive agriculture, expansion of grazing and higher altitude mining. To add to these pressures, MGSs are especially sensitive to the effects of climate change.

MGSs provide a number of important ecosystem services, such as protection from avalanches and water purification. They also provide pasture for grazing and act as buffers for wildfires. However, to date, there has been little focus on their role in [climate](#) regulation through carbon storage.

Mountains cover 24% of the Earth's land area, yet despite the potential importance of MGS in storing carbon, they have been largely overlooked in climate policy discussions. This is likely due to a lack of information on the carbon stored in these ecosystems on a global scale. As part of this research, scientists reviewed existing studies as well as the [United Nations Convention on Climate Change](#) (UNFCCC) national greenhouse accounts, finding that carbon in MGSs was not reliably accounted for in international carbon budgets.

This study provides the first global estimate of MGS carbon stocks. To achieve this, the researchers first mapped 875 MGS areas and their global distribution. Then areas where carbon stocks had previously been estimated, such as arctic tundra, were removed. The researchers then overlaid this with data for soil and biomass estimates using the [Harmonised World Soil Database](#) and Global Landscape Cover 2000 database. In the final step, they calculated total and country-specific estimates of stored carbon.

Between 60.5 billion and 82.8 billion metric tonnes of carbon were estimated to be contained within the soils and biomass of MGSs, 98% of which was within the top metre of soil. The remaining 2% came from above or below ground biomass. EU Member States accounted for between 2.8 and 4.3 billion metric tonnes of the total.

The amount of carbon stored in these mountain regions, according to this study, is three times larger than estimated levels stored in ocean and coastal 'blue carbon' ecosystems, which receive much interest and conservation support through climate change policies and funding schemes.

If MGS ecosystems are to help mitigate climate change, their continued conservation and restoration is vital. The authors suggest that international climate financial funds (estimated to total €273-307 billion) could be used to finance their conservation. Support could be provided by the UNFCCC Green Climate fund, for example, which aims to support climate change and adaptation projects in developing countries with €79.7 billion per year by 2020.



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