

Exploring Forest Biomass Changes in Romania in the Last Three Decades

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Abstract : Forests are crucial for humanity and biodiversity, through the various ecosystem services and functions they provide all over the world. Forest ecosystems are vital in Romania as well, through their various benefits, known as provisioning (food, wood, or fresh water), regulating (water purification, soil protection, carbon sequestration or control of climate change, floods, and other hazards), cultural (aesthetic, spiritual, inspirational, recreational or educational benefits) and supporting (primary production, nutrient cycling, and soil formation processes, with direct or indirect importance for human well-being) ecosystem services. These ecological benefits are of great importance in Romania, especially given the fact that forests cover extensive areas countrywide, i.e. ~6.5 million ha or ~27.5% of the national territory. However, the diversity and functionality of these ecosystem services fundamentally depend on certain key attributes of forests, such as biomass, which has so far not been studied nationally in terms of potential changes due to climate change and other driving forces. This study investigates, for the first time, changes in forest biomass in Romania in recent decades, based on a high volume of satellite data (Landsat images at high spatial resolutions), downloaded from the Google Earth Engine platform and processed (using specialized software and methods) across Romanian forestland boundaries from 1987 to 2018. A complex climate database was also investigated across Romanian forests over the same 32-year period, in order to detect potential similarities and statistical relationships between the dynamics of biomass and climate data. The results obtained indicated considerable changes in forest biomass in Romania in recent decades, largely triggered by the climate change that affected the country after 1987. Findings on the complex pattern of recent forest changes in Romania, which will be presented in detail in this study, can be useful to national policymakers in the fields of forestry, climate, and sustainable development.

Keywords : forests, biomass, climate change, trends, romania

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