

267. Sustainable forest energy and ecosystem services by accounting for decomposition

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Abstract: One of the difficulties of measuring sustainability has been the difficulty of detecting when an activity will shift some land-use choice towards becoming 'unsustainable', i.e., less resilient or being able to recover after a disturbance. Several assessments have been conducted on determining the sustainability of land-use activities and whether humans are extracting too much of earth's productive capacity. Even though it is acknowledged that the productive capacity and resiliency of forests are being altered by land-use changes and climate change, the degree to which forest productive capacity is decreasing has been difficult to assess with a high degree of accuracy. These assessments have not addressed the quality of the soil environment and how that controls the level of plant growth possible at a location and how much more of the productive capacity can be harvested without causing degradation of the soil environment. We propose that by focusing on ecosystem service valuation, specifically on decomposition, we can assign value to ecosystem services. It also is an approach that will allow an assessment of the amount of biomass that can be removed sustainably to produce biofuels so that future forest productivity is not altered. Valuing ecosystem service has been difficult but possible by tracking ecosystem productivity and how this carbon is allocated to decomposers. We will present an approach to estimate how much forest materials could be collected for energy that is based on carbon and nutrient budgets (pools and fluxes) at the ecosystem level. Net Primary Production, litterfall and decomposition rates will provide the information that can be used to rank different forests in a cell matrix. Soils and climate change are also included as part of this cell matrix.

Keywords: biofuels, Decomposition, Ecosystem Services, Forests, NPP