

What is Photosynthetic Biomass

Currently, when discussions of climate change mitigation discuss carbon capture by plants, the primary focus is on woody biomass. There is a newfound appreciation of the ecosystem service provided by plants, in which they convert atmospheric carbon into a solid form. This process has been hailed as a tool by which the problem of increasing atmospheric carbon can be addressed. 'Plant trees which soak up the carbon dioxide' the reasoning goes 'and you can contribute to reducing the atmospheric burden of that gas'.

While the science of carbon sequestration is well understood, there is an urgent need to address the fundamental differences between the components of living biomass, photosynthetic biomass and respiring biomass. Photosynthetic biomass performs the act of primary production, the initial step in the manifestation of life. The biomass so termed has the ability to increase in mass through the absorption of solar or other electromagnetic radiation while releasing oxygen and water vapour into the atmosphere. Respiring biomass is that component of living biomass that uses the output of photosynthesis to make the complicated biological patterns of life.

It is only this photosynthetic biomass that powers carbon sequestration and the generation of oxygen, as well as the generation of woody biomass and its myriad functions: actions essential for the sustainability of the life support system of the planet. However, only one product of this photosynthetic biomass, sequestered carbon, usually represented by wood or timber, is currently recognized as having commercial value in the carbon market for mitigating climate change.

The ephemeral part, the leaves, are generally ignored, yet the photosynthetic biomass in terrestrial ecosystems are largely composed of leaves, this component needs a value placed on it for its 'environmental services'. It is not difficult to place value on photosynthetic biomass today. Initial computations are based on the current values of the carbon market are currently in excess of 125 billion dollars, assuming that the global market would pay at least a similar amount to maintain our life support system, the 93.1 billion tonnes of photosynthetic carbon currently in stock would be roughly worth about 1.35 dollars per tonne.

It is this biomass that has to grow in order to sequester the lost biotic carbon. With such growth we will see more oxygen generation, carbon sequestering, and water cleansing. Much of the biomass to be gained is in degraded ecosystems around the planet, many of which are also home to the world's rural poor. What these degraded ecosystems do have, however, is great growth potential for generating photosynthetic biomass.

If the restoration of these degraded ecosystems to achieve optimal photosynthetic biomass loads becomes a global goal, the amazing magic of photosynthesis could indeed help change our current dire course, create a new paradigm of growth and make the planet more benign for our children.

References

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