

## Tea and Its Working Methodology in the Biomass Estimation of Poplar Species

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**Abstract :** Populus spp. (poplar) are the fastest-growing trees in North America, making them ideal for a range of applications as they can achieve high yields on short rotations and regenerate by coppice. Furthermore, poplar undergoes biochemical conversion to fuels without complexity, making it one of the most promising, purpose-grown, woody perennial energy sources. Employing wood-based biomass for bioenergy offers numerous benefits, including reducing greenhouse gas (GHG) emissions compared to non-renewable traditional fuels, the preservation of robust forest ecosystems, and creating economic prospects for rural communities. In order to gain a better understanding of the potential use of poplar as a biomass feedstock for biofuel in the southeastern US, the conducted a techno-economic assessment (TEA). This assessment is an analytical approach that integrates technical and economic factors of a production system to evaluate its economic viability. The TEA specifically focused on a short rotation coppice system employing a single-pass cut-and-chip harvesting method for poplar. It encompassed all the costs associated with establishing dedicated poplar plantations, including land rent, site preparation, planting, fertilizers, and herbicides. Additionally, we performed a sensitivity analysis to evaluate how different costs can affect the economic performance of the poplar cropping system. This analysis aimed to determine the minimum average delivered selling price for one metric ton of biomass necessary to achieve a desired rate of return over the cropping period. To inform the TEA, data on the establishment, crop care activities, and crop yields were derived from a field study conducted at the Mississippi Agricultural and Forestry Experiment Station's Bearden Dairy Research Center in Oktibbeha County and Pontotoc Ridge-Flatwood Branch Experiment Station in Pontotoc County.

**Keywords :** biomass, populus species, sensitivity analysis, technoeconomic analysis

**Conference Title :** ICFBM 2024 : International Conference on Forest Biodiversity Management

**Conference Location :** Bangkok, Thailand

**Conference Dates :** March 04-05, 2024