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**Multi-criteria decision making and biomass feedstock supply feasibility: How does the Southeastern US stack up?**

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Chemical production from crude oil represents a substantial percentage of fossil fuel use worldwide, which could be partially offset using renewable feedstocks such as woody biomass and energy crops for a bio-sugar platform. Past techno-economic and environmental analyses have been conducted for isolated feedstocks in a regional or national scope. This cradle-to-gate biomass supply study encompasses complete supply chain logistics analysis, delivered cost financial analysis, national availability, and environmental life cycle assessment (LCA) for nine selected cellulosic feedstocks from the Southeastern United States and six other feedstocks from Southeast Asia and South America. A biochemical conversion route to monomeric sugars was assumed in order to estimate sugar yields and feedstock cost. US Corn was determined to have the highest delivered cost while rice hulls in Indonesia resulted in the lowest cost of the feedstocks studied. Monomeric sugar yields from literature ranged from 358 kg BDMT<sup>-1</sup> for US forest residues to 700 kg BDMT<sup>-1</sup> for corn syrup. Environmental LCA was conducted in SimaPro using Ecoinvent v2.2 data and the TRACI 2 method for mid-point impacts. Carbon sequestration during biomass growth contributed most substantially to global warming potential. Multi-variable weighted ranking analyses were conducted to explore the most preferred feedstock options. Aspects considered in this analysis included biomass availability, delivered cost, sugar conversion yield, and environmental impact. Pine and unmanaged hardwood species were predicted to be the most feasible biomass types in the Southeastern US. Oil palm empty fruit bunch and sugarcane were most feasible in Southeast Asia and South America, respectively.