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BIOCHAR PRODUCTION FOR CARBON SEQUESTRATION

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ABSTRACT: Greenhouse gas (GHG) emission is one of the important environmental issues facing the world today. Biomass usage, specifically capturing energy from biomass that would otherwise decay, is one of many options available to mitigate the impact of the buildup of GHG emissions from fossil fuel utilization. This work will explore the utilization of agricultural biomass (e.g. straw) for biochar production and its landfill for carbon sequestration. This pathway can help increase the rate of carbon sequestration. Biochar is a solid fuel which can be produced from agricultural biomass such as wheat and barley straw. It is an organic solid and it can be produced by slow pyrolysis of straw. This work involves a conceptual techno-economic study to estimate the cost of production of biochar from straw in a centralized plant and its storage in a landfill to sequester carbon. This study draws on actual data to determine the cost of biochar production. The specific objectives of the work include: estimation of the overall delivered cost of straw to the charcoal production plant; estimation of the transportation cost of charcoal to the landfill site; estimation of the cost of landfill; and estimation of the overall cost of carbon sequestration through charcoal landfill. Preliminary result suggests that the cost of carbon sequestration through this pathway is higher than \$50 per tonne of CO₂.

Keywords: Biochar; carbon sequestration; techno-economic assessment; cost of production; abatement cost.