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# ASSESSING WATER SUSTAINABILITY OF CELLULOSIC AND ADVANCED BIOFUEL IN THE UNITED STATES

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**ABSTRACT:** Water conservation and analysis of water use efficiency have been two key factors in achieving sustainable biofuel production from agricultural residue and other advanced feedstock. In this study, we aim to quantify blue, green, and gray water associated with second-generation and advanced biofuel by developing a life-cycle water analysis framework in which a standardized water footprint methodology is coupled with water quality modeling at county-level resolution for the entire United States. Types of feedstock analyzed include corn stover, wheat straw, corn, soybean, and algae. In our study, we estimate the water footprint covering the hydrologic cycle, irrigation, process water use, and grey water discharge for the major life-cycle stages of the biofuels: feedstock production, feedstock transportation, and feedstock conversion. Preliminary results indicate that green water use accounts for a significant portion of the water use in current cellulosic feedstock development. In the past few years, blue water use has been in decline as a result of conservation efforts and gains in irrigation efficiency. The trade-offs among production, water use, and water quality at the regional scale have been analyzed. Such analysis contributes to a consistent analytical framework for water resource, water use, and water quality with national coverage.

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