

Triple bottom line study of a biofuel feedstock industry

Topic: Input-Output economics and industrial ecology - LCA analysis

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Research into alternative fuel sources is gaining worldwide attention due to growing concerns about environmental degradation and resource depletion. Australia's oil self-sufficiency is rapidly declining, with the country importing over 30% of the oil products. This is projected to increase to 76% by 2030. Consequently, there is a world-wide urge for the expansion and use of energy obtained from renewable sources such as biofuels. Australia has the potential to sustain a biofuel industry to increase the country's oil self-sufficiency. This paper presents the results of a sustainability analysis of a promising biofuel feedstock producing region in Australia. The region chosen for this study is the Green Triangle, an area of south-east South Australia and south-west Victoria. The Green Triangle features an established forestry industry, well-connected by land and sea, abundant land and feedstock making it ideal for sustaining a biofuel industry.

In this study, we aim to evaluate the triple-bottom line (environmental, economic and social) consequences of a biofuel feedstock industry in the Green Triangle region of South-Australia by employing multi-region input-output (MRIO) based life-cycle assessment (LCA), also known as hybrid LCA. To this end, we augment a sub-national IO table of Australia with process data on different feedstock operations. The analysis was the first one conducted on the Australian Industrial Ecology Virtual Laboratory hosted on a cloud computing environment administered under the NeCTAR scheme. In particular, we assess the employment, economic stimulus and energy consumption to determine the proportion of both on-site and indirect impacts throughout the supply chain. Our results reveal that the biofuel feedstock industry will create new job opportunities and facilitate the development of other industries in the economy. This would constitute a positive step forward towards a sustainable bio-economy.