

Applying input-output analysis for assessing socioeconomic effects of different technological configurations of straw recovery for electricity production

Topic: Thematic IO analysis: Social and Socio-Economic Analysis

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Sugarcane straw recovery has a great potential to be used as a source to generate bioelectricity to supply energy demand in Brazil. SUCRE (Sugarcane Renewable Electricity project) aims at supporting the production of electricity with low emission of greenhouse gases (GHG), through the use of available straw, due to green sugarcane harvesting. Besides the economic and environmental impacts associated with straw recovery and using systems, the social assessment is very important to achieve more sustainable energy production systems. This paper makes use of a simulation framework (the Virtual Sugarcane Biorefinery) to assess how straw recovery technologies aiming at producing electricity affects social aspects such as job creation, occupational accidents, wages, workers' mean schooling and the participation of the woman in the workforce considering the entire supply chain. The social assessment is based on the Social Life Cycle Assessment (SLCA) methodology and comprises the simulation of agricultural and industrial scenarios followed by the application of an Input-Output Analysis (IOA), in order to estimate the mentioned social effects related to the sectors involved in the supply chain. IOA is performed using the Brazilian input-output matrix at national level and data (regarding social effects) from Brazilian official databases. Moreover, sensitivity analysis of important simulation parameters such as recovery system (bales and integral), transportation distances, fraction of recovered straw, electricity production yield (kWh/ton of sugarcane), among others will be performed to evaluate their potential impacts on the social sustainability. This study is important because of the lack of data concerning social effects associated with electricity production from biomass in Brazil. Moreover, it is a new example of the application of IOA in the SLCA for the quantification of social and socioeconomic effects.