Title:

An Assessment of Environmental Impacts of Cassava Starch Extraction Technologies

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Abstract: (Your abstract must use **Normal style** and must fit in this box. Your abstract should be no longer than 300 words. The box will 'expand' over 2 pages as you add text/diagrams into it.)

The environmental impacts of the transformation of cassava roots into starch were assessed for three contrasting technologies at small and large scale (1-2 and 100-200t starch per day), using the Life Cycle Assessment (LCA) methodology. The objective was to assess impacts for each unit operation, so as to identify impacts hotspots as well as sustainable practices, with a view to uncover opportunities for improving the environmental performance of cassava starch production. The system boundaries were defined as the unit operations used to transform fresh cassava roots delivered at factory gate into loose, dry cassava starch. Inventory data indicated wide variations in energy and water consumption. The large scale technology required 702kWh/t starch, mainly (75%) from fuel oil used for the drying operation, but was most efficient in terms of water use (10m3/t starch) due to water recycling between unit operations. The two small scale technologies were similar in terms of electricity use (59kWh/t starch), and relied on solar energy for drying. In contrast, their water consumption varied from 20 to 60m3/t starch due to differences in the design of the rasping and starch recovery (extraction) operations. The LCA characterizations, using the ReCiPe method, indicated that the main impact contributions were at the drying operation for the large scale technology, and at the extraction operation for the small scale technologies, mainly because of energy use, as well as water use in the case of the most water-intensive technology. Hence strategies to reduce the impacts of cassava starch production could focus on: Increasing the energy efficiency of the drying operation or replacing fossil energy with a renewable source (biogas), which can be produced from the factory wastewater; Improving the design of some unit operations with regards to water and energy efficiency; and Promoting the transfer and adoption of water recycling practices.