

An Assessment of Financial Viability and Sustainability of Hydroponics Using Reclaimed Water Using LCA and LCC

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Abstract : In developed countries, sustainability measures are widely accepted and acknowledged as crucial for addressing environmental concerns. Hydroponics, a soilless cultivation technique, has emerged as a potentially sustainable solution as it can reduce water consumption, land use, and environmental impacts. However, hydroponics may not be economically viable, especially when using reclaimed water, which may entail additional costs and risks. This study aims to address the critical question of whether hydroponics using reclaimed water can achieve a balance between sustainability and financial viability. Life Cycle Assessment (LCA) and Life Cycle Cost (LCC) will be integrated to assess the potential of hydroponics whether it is environmentally sustainable and economically viable. Life cycle assessment, or LCA, is a methodology for assessing environmental impacts associated with all the stages of the life cycle of a commercial product, process, or service. While Life Cycle Cost (LCC) is an approach that assesses the total cost of an asset over its life cycle, including initial capital costs and maintenance costs. The expected benefits of this study include supporting evidence-based decision-making for policymakers, farmers, and stakeholders involved in agriculture. By quantifying environmental impacts and economic costs, this research will facilitate informed choices regarding the adoption of hydroponics with reclaimed water. It is believed that the outcomes of this research work will help to achieve a sustainable approach to agricultural production, aligning with sustainability goals while considering economic factors by adopting hydroponic technique.

Keywords : hydroponic, life cycle assessment, life cycle cost, sustainability

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