Abstract

For a developing country like Pakistan, one of the major concerns are environmental problems specifically climate change. The country has recently experienced its worst floods in history. Experts claim that these floods are the result of climate change. Although concerning the United Nation's sustainable development goals, Pakistan has completed SDG13 regarding climate change still it is the most affected country because of climate change. Extreme heat waves, melting glaciers, and droughts are some of the major use concerns of the country. To sustain the country's future it is important to sustain our natural resources. Water is a crucial resource to sustain life. One of the major water consumers is the textile sector. A major subsector of textiles is the denim industry. The denim garment industry which has been operating for decades is a major consumer and polluter of freshwater resources. This study is aimed to fill the literature gaps concerning Pakistan. This research will determine the blue and grey water footprint of this industry, Life cycle impact assessment, and life cycle costing analysis in terms of economic indicators NPV, IRR, and BCR. The outcomes of this research revealed that the blue water footprint for a meter cube of denim fabric production requires 173138 liters of freshwater per year. For grey water footprint four parameters are studied in wastewater. This involves biological oxygen demand, chemical oxygen demand, total suspended solids, and total dissolved solids. The values for these four parameters were found to be -6192730, -2582066, 1584431 and 1904152.8 respectively. Eight impact categories were studied in this research climate change, freshwater eutrophication, photochemical ozone formation, and acidification potential were highest for cotton processing, boiler, and dyeing, finishing respectively. The economic indicators were also calculated including NPV,IRR and BCR values which were found to be 94$, 107%, 3.6, that showed that the denim industry generates remarkable profits and contributes to the country's economic performance. But the main concern is that the sustainability of this industry is important to retain freshwater resources to sustain future generations.