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## EVALUATION OF MUNICIPAL SOLID WASTE BY MEANS OF LIFE CYCLE ASSESSMENT: CASE STUDY IN THE SOUTH-WESTERN REGION OF THE DEPARTMENT OF NORTE DE SANTANDER, COLOMBIA

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### Abstract

The main objective of this research was to evaluate the environmental impact generated by municipal solid waste during its collection, transportation, treatment and processing in the south-west region of the department of Norte de Santander, Colombia, by means of Life Cycle Assessment (LCA). Three strategies for waste management were considered: the current baseline situation, wherein 100% solid waste was taken to the landfill; plus, an optimistic and a pessimistic scenario in which solid waste is properly and moderately recycled, respectively.

The results show that approximately 72% was organic waste, out of which 40% corresponded to organic material. Twenty seven percent corresponded to inorganic materials such as plastics, metal, glass, rubber and leather. In comparing waste management in the three proposed scenarios in terms of global warming, the optimistic scenario was the greenest one due to better Municipal Solid Waste (MSW) recycling and usage, since it prevents the emission of 460 kg CO<sub>2</sub>Eq inhab<sup>-1</sup> year<sup>-1</sup>. Finally, to achieve the reuse and recycling of waste, we propose the creation of small businesses which can improve people's socio-economic conditions. This will undoubtedly become a source of employment for many families in the community. Acceptance of composting is still low in the region because most farmers in rural areas show psychological resistance to products derived from waste, thus being more responsive to fertilizers. Finally, there is no doubt that LCA is definitely a methodology that helps decision making towards finding more sustainable solutions and hence is a good tool for improving environmental sustainability performance within the Municipal Solid Waste of the rural areas.

*Key words:* environmental impact, life cycle assessment, municipal solid waste, recycling

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