



CIGR 2018

XIX. World Congress of CIGR (Commission Internationale du Génie Rural)

“Sustainable Life for Children”

22 - 25 April 2018

Antalya, Turkey

PROGRAM & ABSTRACTS' BOOK



www.cigr2018.org



OP-025 [Section II: Structures and Environment]

APPLICATION OF ANALYTICAL HIERARCHY PROCESS TO DEVELOP A WEIGHTING SCHEME FOR LIFE CYCLE ASSESSMENT OF AGRI-FOOD SECTOR

Amin Nikkhah¹, Sami Ghnimi², Saeed Firouzi³, Nathan Pelletier⁴

¹Ghent University, Faculty of Bioscience Engineering, Ghent, Belgium

²Ghent University Global Campus, Incheon, South Korea

³Department of Agronomy, College of Agriculture, Rasht Branch, Islamic Azad University, Rasht, Iran

⁴IK Barber School of Arts and Sciences – Biology/Faculty of Management, Room 340, Fipke Centre for Innovative Research, 3247 University Way, University of British Columbia, Kelowna, BC V1V1V7, Canada

The Impact Assessment (IA) step in Life Cycle Assessment (LCA) studies is classified into three steps of characterization, normalization and weighting. In this study, the different impact categories were weighted using Analytic Hierarchy Process (as a multi criteria decision making tool). Iranian tobacco production system was the example agricultural system. The data for LCA analysis were collected from 225 farms. The data for AHP analysis were gathered by surveying 12 LCA experts. The results indicated that on-farm emissions of CO₂, CH₄, N₂O, NH₃, NO_x and SO₂ were accounted for 25, 96, 93, 99, 21 and 2% of the total emissions (cradle to farm gate), respectively. The characterization indices for the impact categories of global warming, terrestrial eutrophication, acidification, fossil resources depletion, phosphate resources depletion and potash resources depletion for one tone tobacco production were determined to be 1883.90 kgCO₂eq, 19.69 kgNO_xeq, 13.87 kgSO₂eq, 59659.23 MJ, 4.19 kgP₂O₅ and 6.14 kgK₂O, respectively. The LCA+AHP showed that the fossil resources depletion impact category was attributed the highest negative environmental impacts of tobacco production followed by depletion of phosphate resources.

Keywords: Environmental impact, Global warming, Life cycle assessment, Multi criteria decision making

