

## PAPER

# ENVIRONMENTAL ASSESSMENT OF THE CITRUS FRUIT PRODUCTION IN SICILY USING LCA

**A. LO GIUDICE<sup>1\*</sup>, C. MBOHWA<sup>2</sup>, M.T. CLASADONTE<sup>1</sup> and C. INGRAO<sup>3</sup>**

<sup>1</sup>Department of Economics and Business, University of Catania, Corso Italia 55, 95129  
Catania, Italy

<sup>2</sup>Departments of Quality and Operations Management, Faculty of Engineering and the Built  
Environment, University of Johannesburg, South Africa Doornfontein 2028, Johannesburg

<sup>3</sup>External collaborator of the Department of Economics and Business, University of  
Catania, Italy

Corresponding author: [a.logiudice@unict.it](mailto:a.logiudice@unict.it)

## ABSTRACT

Citrus production is one of the most important sectors of the Sicilian agriculture. In particular, Sicilian orange production is of the best quality producing mainly pigmented or blood oranges (cvv. Tarocco, Moro and Sanguinello). No other region in the Mediterranean area or on the American Continent produces, on a large scale, blood oranges. These have some special flavours and organoleptic and functional characteristics. The aim of this paper is to quantify the total environmental impacts of the life cycle of *Tarocco* oranges - integrated production. The study was conducted in accordance with the ISO standards 14040:2006 and 14044:2006. The analysis of the input and output materials and energy flows indicates that the production phase has the most environmental impacts, causing almost half of the total damage. In terms of the substances having the most environmental impacts, the study shows that: the emission to air of Nitrogen oxides, particulates, Sulphur dioxide and carbon dioxide; the emission into soil of zinc; and the consumption of resources such as crude oil, uranium and natural gas have the most impacts. These results enable us to propose different ways to reduce the impact of the production of the oranges on the environment.

- Keywords: agri-food, citrus fruit production, Life Cycle Assessment, environmental hotspots -