Environmental assessment of pig production in Cienfuegos, Cuba: Alternatives for manure management

Sagastume Gutiérrez, Alexis; Cabello Eras, Juan Jose; Billen, Pieter; Vandecasteele, Carlo H.A.

Abstract

As pork is indispensable in the diet of Cuban people, the government was forced to prioritize its production. Pig production causes several environmental impacts related with air, water and soil pollution, which can be quantified with the application of Life Cycle Assessment that allows to optimize products and processes by identifying their environmental impacts. Farming systems considered in different Life Cycle Assessment studies show substantial differences in their characteristics, namely: animal productivity, feed composition, manure management and production period, which influences the environmental performance of each system. Therefore, each study is unique for the system it assesses and should be analyzed individually. In Cuba, the environmental implications of pig production, whose understanding is cornerstone to eventually adopt more environmentally sound practices while ensuring high productivity standards, are yet to be quantified. This study provides some fundamental insights in the life cycle of pig production in the province of Cienfuegos. The assessment if focused in large farms of the province of Cienfuegos which causes large environmental impacts. Large farms accounts for the production of 77% of the pigs delivered to slaughter houses in the province. Pig production in Cienfuegos accounts for 7-12% of Cuban production. The quantification of the environmental impacts of pig production resulted in an impact per finished pig of 120 kg of live weight of 1892 MJ abiotic depletion of fossil fuels, 1019 kg-CO_2-eq. global warming potential, 36 kg 1.4-dichlorobenzene-eq. human toxicity, 17 kg 1.4-dichlorobenzene-eq. terrestrial toxicity, 1 kg 1.4-ethylene-eq. photo-oxidant formation, 12 kg-SO_2-eq. acidification potential and 6 kg PO_4-eq. eutrophication potential. It appeared that the main opportunities to improve the environmental performance of pig production in Cienfuegos are reduction of the impacts of the anaerobic lagoons used for manure management on global warming potential, acidification potential and eutrophication and the impact on acidification potential of pig housing. Direct land spreading of manure appears as the best alternative to lagooning, considering the current situation of pig breeding in Cienfuegos.

Keywords

Environmental impact, Life Cycle Assessment, Pig production