Evaluation of the environmental sustainability of different European pig production systems using life cycle assessment

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The environmental sustainability of 12 European pig production systems has been evaluated within the EU Q-PorkChains project, using life cycle assessment (LCA). One conventional and two differentiated systems were evaluated for each of four countries: Denmark, Netherlands, Spain and France. The information needed for the calculations was obtained from an enquiry conducted on 10 farms from each system. The environmental impacts were calculated at farm gate, including the inputs, and expressed per kg live pig and per ha land use. For the conventional systems, the impact per kg pig produced on climate change, eutrophication, acidification, energy, and land use were 2.01 kg CO_2-eq, 41.5 g SO_2-eq, 26.3 g eq PO_4-eq, 15.2 MJ and 4.0 m^2, respectively. The corresponding values for the differentiated systems were on average 40, 22, 49, 28 and 80% higher, but with large variations between systems. Conversely, when expressed per ha of land use, the impacts were lower for the differentiated systems, by 10 to 20% on average, depending on the impact category, due to higher land occupation per kg pig produced. The use of litter bedding tended to increase climate change impact per kg pig. The use of traditional local breeds, with lower productivity and feed efficiency, resulted in higher impacts per kg pig produced, for all categories. Differentiated systems with extensive outdoor raising of pigs resulted in markedly reduced impact per ha land use. The results indicated that the conventional systems were generally better for global impacts, expressed per kg pig, whereas differentiated systems were often better for local impacts, expressed per ha land use.

Measuring water footprints in dairy production worldwide in a climate change scenarios

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The decreasing water availability is a risk to food security. Water footprints has emerged as an important indicator for water use in agriculture and food production which is sensitive to climate change and can also benchmark water use efficiency in dairying. This study aims at developing a method for calculating water footprints in dairying. An extended version of the TIPI-CAL (Technology Impact Policy Impact Calculations model) of International Farm Comparison Network (IFCN) was used for this analysis. The underlying farm data set for this study are the typical farms of the IFCN. The method was tested on 12 typical dairy farms from six developed countries: Canada, Germany, New Zealand, Spain, Switzerland and USA and six developing countries: Argentina, Bangladesh, China, Czech Republic, Jordan, and Pakistan. The results show that cows have their highest water requirement during lactation period which varied from 66% of their total requirement in Bangladesh to 97% in Jordan. Water use during dry period was highest in Bangladesh (33%) due to very long dry period. The water footprint per kg milk varies from 430 l in USA to 2,400 l in Pakistan due to variability in milk yield and management system. The water used for drinking and servicing ranged between 3.5 and 56.0 liters for Germany and Pakistan respectively. It was concluded that feed production is the major driver for water footprints and the greatest challenges were in obtaining co-efficient for water input from feed production. The measuring of water footprints in dairying is a step towards achieving efficient water use which will augment food security and enhance climate change adaptability.