



Tropentag, October 6-8, 2009, Hamburg

“Biophysical and Socio-economic Frame Conditions
for the Sustainable Management
of Natural Resources”

Contribution of Dairying to Total CO₂ Emissions Impact on Climate Change in Different Countries

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Abstract

Based on sector calculations of IPCC (Intergovernmental Panel for Climatic Change) and FAO (Food and Agricultural Organisation), agriculture contribute about 13% of the global emissions. There is an increasing consciousness of global climate change. The emission of Green House Gases (GHS) from dairy cattle is a great concern as it is accepted worldwide as a threat to environmental sustainability.

The aim of this paper is to measure CO₂ emissions of different dairy farming systems in different countries and to quantify CO₂ emissions from milk production on total global anthropogenic emissions. The analysis is based on the IFCN database of typical dairy farms with an extension on the life cycle analyses.

The results show that, low yielding farming systems in Africa and South Asia have the highest emissions while high yielding farming systems show significantly lower emissions per kg of milk produced. Regarding the GHG emissions on the farm level, methane (CH₄) contributes highest followed by carbon dioxide (CO₂) and nitrous oxide (N₂O). Based on farm activities, and depending on farming systems, the most important emission drivers are manure handling and storage (10–20%), purchase feed (5–10%), fertiliser usage (up to 10%) and usage of energy in the form of electricity and fuel (5–10%). Meanwhile the major part of the emissions (about 50%) comes from rumen activities. The average emission of the 117 dairy farming systems from 38 countries is 1.50 kg CO₂ emissions per kg milk with the lowest emissions in Israel (0.88) and the highest in Cameroon (4.08).

The employed methodological approach of a life cycle analysis based on typical farms enables the comparison of dairy farming systems on an international level. Though the IFCN method uses typical farms which might not be statistically representative for a country the IFCN database is unique as a consistent international set of typical farms.

Keywords: Carbon footprints, dairy farming, sustainability