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A Holistic Approach for Analysing Sustainability in Dairy Farms Worldwide

OGHAIKI ASA AH NDAMBI¹, MARTIN HAGEMANN¹, OTHMAN ALQAI SI², MOHAMMAD MOHI
UDDIN³, TORSTEN HEMME¹, NADIRA SULTANA¹

¹University of Kiel, Department of Agricultural Economics, IFCN Dairy Research Center, Germany

²University of Kiel, Department of Animal Nutrition, Germany

³Humboldt Universität zu Berlin, Department of Animal Breeding in the Tropics and Sub-tropics, Germany

Abstract

The expanding world population and increasing per capita consumption have led to rapidly increasing demand for milk, hence intensification in resource use for its production. For this reason, sustainability issues have been very prominent in international debates, aiming at ensuring that current practices don't compromise chances for future generations to meet their own needs. Measurement of sustainability is challenging as it involves several parameters which are sometimes hardly quantifiable. The aim of this study is to initiate the development of a methodology to estimate a holistic sustainability of typical dairy production systems worldwide.

The TIPICAL (Technology Impact Policy Impact Calculations model) of the International Farm Comparison Network (IFCN) was used to collect and calculate variables. The IFCN approach is holistic as it considers three main aspects: economic sustainability (farm profitability, stability, prices, etc), environmental sustainability (life cycle analysis of milk, resource use, greenhouse gas emissions, etc) and social sustainability (living standard of family, farm succession, etc). In total, 30 Key Performance Indicators (KPIs) were developed and weighted for different dairy farms using either real or implicit units. The method was tested on four farming systems, extensive grazing and intensive zero grazing systems in developing countries and free stall and feedlot systems in developed countries.

Results were presented both collectively and separately for the different KPIs using tables and traffic light charts (green for very sustainable, yellow for marginally sustainable and red for unsustainable). The results show that, when considering production per kg of milk, the overall sustainability of farms is higher in developed countries than developing countries. However, when considering the sub-components of sustainability, farms from developing countries have higher social sustainability grades and lower economic and environmental sustainability grades. The main reason for the lower sustainability in developing countries was their lower milk yields which led to lower profits and higher environmental degradation per kg of milk. Meanwhile, social aspects such as the contribution of these farms to family income, rural employment and family health status accounted for higher social sustainability grades in these farms. Therefore, improving the productivity of farms from developing countries will greatly increase their sustainability.

Keywords: Dairy, environmental, holistic approach, Social, Sustainability analysis

Contact Address: Oghaiki Asaah Ndambi, University of Kiel, Department of Agricultural Economics, IFCN Dairy Research Center, Schauenburger Str. 116, 24118 Kiel, Germany, e-mail: ndamboa@yahoo.com