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Measuring Water Footprints in Dairy Farms Worldwide: Implications for Food Security

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Abstract

The increasing trend of worldwide water availability risk issues in dairying are becoming burgeoning important. In 2050, water availability is expected to decrease by 19–35 % due to climatic change and by 67 % due to the expanding population. The water crisis around the world is a potential threat toward achieving a Millennium Development Goal to cut the hunger people to a half in 2015. In order to ensure food security, it is necessary to ensure the optimum use of water in dairying. Measuring water footprint might be the option for efficient water use in dairying. So far, there is very little effort made in the calculation of water footprint for dairy production. The aim of this study is to develop a method for calculating water footprint in dairying worldwide.

The TIPI-CAL (Technology Impact Policy Impact Calculations model) of the International Farm Comparison Network (IFCN) was used to collect data and calculate variables of water footprint. The method was tested on 12 typical dairy farms from six developed countries: Switzerland, Germany, Spain, Canada, USA and New Zealand and six developing countries: Bangladesh, Pakistan, China, Jordan, Czech Republic and Argentina.

The results show that the milk yield per day varies between 2.6 kg in Bangladesh to 34 kg in USA. The cows have the highest water requirement during lactation period. Cows in Bangladesh use 66 % of their total requirement during lactation period compared to 97 % in Jordan. The water use during dry period for Bangladesh was the highest (33 %) due to very long dry period. The water input per kg milk production varies from 430 liters in USA to 2400 liters in Pakistan. The water used for drinking and washing was 3.5 liters and 56.0 liters for Germany and Pakistan.

The study shows that feed production is the major driver for water use on dairy farms. The greatest challenges were in obtaining coefficients on water input for feed production and water usage in dairy farms. The accurate measurement of water use in dairying can be a step towards achieving more efficient water use which will augment food production and thus ensure food security.

Keywords: Dairying, food security, water footprints