**Tropentag, September 17-19, 2018, Ghent**

"Global food security and food safety:
The role of universities"

# Efficacy of Dairy Management Strategies to Increase Milk Yield of East African Dairy Cattle Smallholders

Christian Bateki Adjogo[1], Suzanne van Dijk[2], Andreas Wilkes[2], Uta Dickhoefer[1], Robin White[3]

[1] *University of Hohenheim, Animal Nutrition and Rangeland Management in the Tropics and Subtropics, Germany*

[2] *Unique Forestry and Land Use GmbH, Germany*

[3] *Virginia Tech, Department of Animal and Poultry Science, United States of America*

## Abstract

Although East Africa (EA) is home to one of the most advanced dairy industries within sub-Saharan Africa, regional milk production does not yet meet the growing milk demand. Various dairy management strategies (DMS) have been introduced to improve milk yield (MY); yet, their efficacy to increase MY under prevailing husbandry conditions is unknown. Therefore, this study aimed at (1) identifying DMS presented in the literature for increasing MY of individual cows on smallholder farms in EA; and (2) quantifying the increase in MY that can be achieved by these DMS.

Twenty-five studies from EA, that investigated increments in MY of a total of 2280 dairy cows in response to various DMS, were identified via a quantitative literature review. Data on measured MY (i.e. response variable), together with applied DMS and biophysical variables (i.e. explanatory variables) were extracted and processed by curtailing the standard errors of the mean MY of individual cows. Then, different weighting strategies were applied to prevent overweighting of particularly precise studies. Four multivariate causal regression models each differing in the weighting strategy (i.e. no weighting, number of observations, inverse of standard error, and inverse of the mean of standard error) were then fitted to explain the changes in MY associated with the use of DMS under different husbandry conditions. The best model was selected using the Akaike information criterion.

Nine DMS were identified, of which only the use of improved cattle breeds' and enhanced cattle nutrition (i.e. improving feed intake and diet nutritional quality), jointly explained MY increases per cow by up to 4.9 kg $d^{-1}$ ($p < 0.05$). Other DMS (e.g. fodder crop use, watering regime, and parasite control) were not retained in the models. The model fitted without a weighting factor most accurately explained observed increments in MY by combining use of improved cattle breeds', enhanced cow nutrition when also accounting for trial length, and maximum ambient air temperature.

Use of improved cattle breeds and enhanced animal nutrition most effectively increase MY of smallholder dairy cattle in EA. These DMS should be combined to balance dairy cattle genetics, husbandry conditions, and cow nutrition to considerably improve cow performance.

**Keywords:** Dairy cows, dairy management strategies, East Africa, milk yield

**Contact Address:** Christian Bateki Adjogo, University of Hohenheim, Animal Nutrition and Rangeland Management in the Tropics and Subtropics, Früwirthstr 31, 70599, 70599 Stuttgart, Germany, e-mail: christian.bateki@uni-hohenheim.de