Urbanising Tropical Environments and the Production Gap –
The Case of Dairy Production in Bengaluru, India

Marion Reichenbach1, Ana Pinto2, Sven König3, Raghavendra Bhatta3, Eva Schlecht1

1 Animal Husbandry in the Tropics and Subtropics, University of Kassel and Georg-August-University Göttingen, Germany
2 Animal Breeding and Genetics, Justus Liebig University Giessen, Germany
3 National Institute of Animal Nutrition and Physiology, Bengaluru, India

Introduction
In West Africa and in Asia, cities are growing at a fast pace, putting pressure on agroecosystems to close the production gap.
The emerging megacity of Bengaluru, India, combines rapid urbanisation with a great demand for dairy products.
High-yielding exotic cattle breeds are a common sight all over Bengaluru but it is unknown how efficiently they produce in this urbanizing tropical context (Fig. 1).

Aim of the study
To quantify milk offtake (MO) and feed efficiency in dairy cattle of different genotypes, in dairy units across the urbanizing Rural-Urban Interface (RUI) of Bengaluru

Methodology
Selection of seven dairy units per production system for nutrition monitoring (Fig. 2 & 3).
Eight visits per dairy unit over one year to quantify feed intake and daily milk offtake for individual dairy cows, plus qualitative sampling of feedstuffs and milk (Fig. 4).

Results
Feeding practices
Various feeding strategies with or without reliance on self-cultivated forages and pasture.
Common feedstuffs: Napier grass, maize, finger millet straw, natural grasses, crop residues, concentrates; in urban areas market waste (fruits, vegetables).

Genotype and milk offtake (Fig. 5 & 6)
Exotic breeds:
Holstein Friesian (HF), Jersey (J)
MO = 10.6 l/day
Most productive in urban areas

(Multi-generation) Crossbreeds:
F1 = HF x J with MO = 10.2 l/day
F2+ = HF x J x local cattle or crossbreed with MO = 8.5 l/day
Most productive in peri-urban areas

Highlights
Interaction between genotypes and urbanization strata highlights untapped production potential & disparity in resource availability.

Only one cow out of four has an adequate supply of energy.
Reducing under- and oversupply will increase resource use efficiency.

Feeding efficiency
Dairy producers mostly under- or over supply their cattle in energy, without distinction between genotypes (Fig. 7).

Fig. 1 How efficient are dairy cows of different genotypes under tropical environments and how does urbanization affect the availability of resources for the farmer?

Fig. 2 Scheme depicting the research methodology

Fig. 3 Location of the 28 monitored dairy units in and around Bengaluru (urban, peri-urban, rural settlements)

Fig. 4 An urban cow’s diet (left) and milking of a Jersey cow (right)

Fig. 5 An Holstein Friesian (left) and a multi-generation crossbreed (right)

Fig. 6 Individual daily milk offtake per genotype and urbanization strata (Urban, peri-urban, rural; significant interaction p < 0.05)

Fig. 7 Percentage of dairy cattle per energy supply level calculated as the ratio between individual intake and requirement of metabolizable energy as proxy for feeding efficiency.

Marion Reichenbach
marion.reichenbach@uni-kassel.de
Research Unit FOR2432 – Project A03