Characteristics of Dairy Farms along the Rural-Urban Interface of the Emerging Megacity of Bangalore, India

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Aim of the study

To identify and characterize dairy production systems along the Rural-Urban Interface (RUI) of Bangalore

Background

In Africa and Asia, emerging megacities relying on (peri-)urban agriculture to supply their population, offer the opportunity to gain deeper understanding of transition processes in agriculture in context of a growing (urbanized) population and thus growing demand for agricultural products, such as milk, which is a highly-valuated product in India (Fig. 1).

Fig 1. How do growing demand for milk and stronger rural-urban dichotomy affect intensification level of dairy production systems in the Rural-Urban Interface of Bangalore?

Highlights

Along the RUI, various dairy production systems exist, varying in intensification level BUT:

i. Dairy farms exhibit similar socio-economic features, herd management, milking and marketing practices across the whole RUI.

ii. No dairy production system is exclusively limited to the inner-urban areas.

⟷ Dairy farms' homogeneity may be explained by the presence of a KMF's dairy, which is the main input and output channel for all farmers, in every settlement.

⟷ Along its development, Bangalore integrated originally rural dairy farmers into its urban landscape rather that creating new opportunities for dairy production.
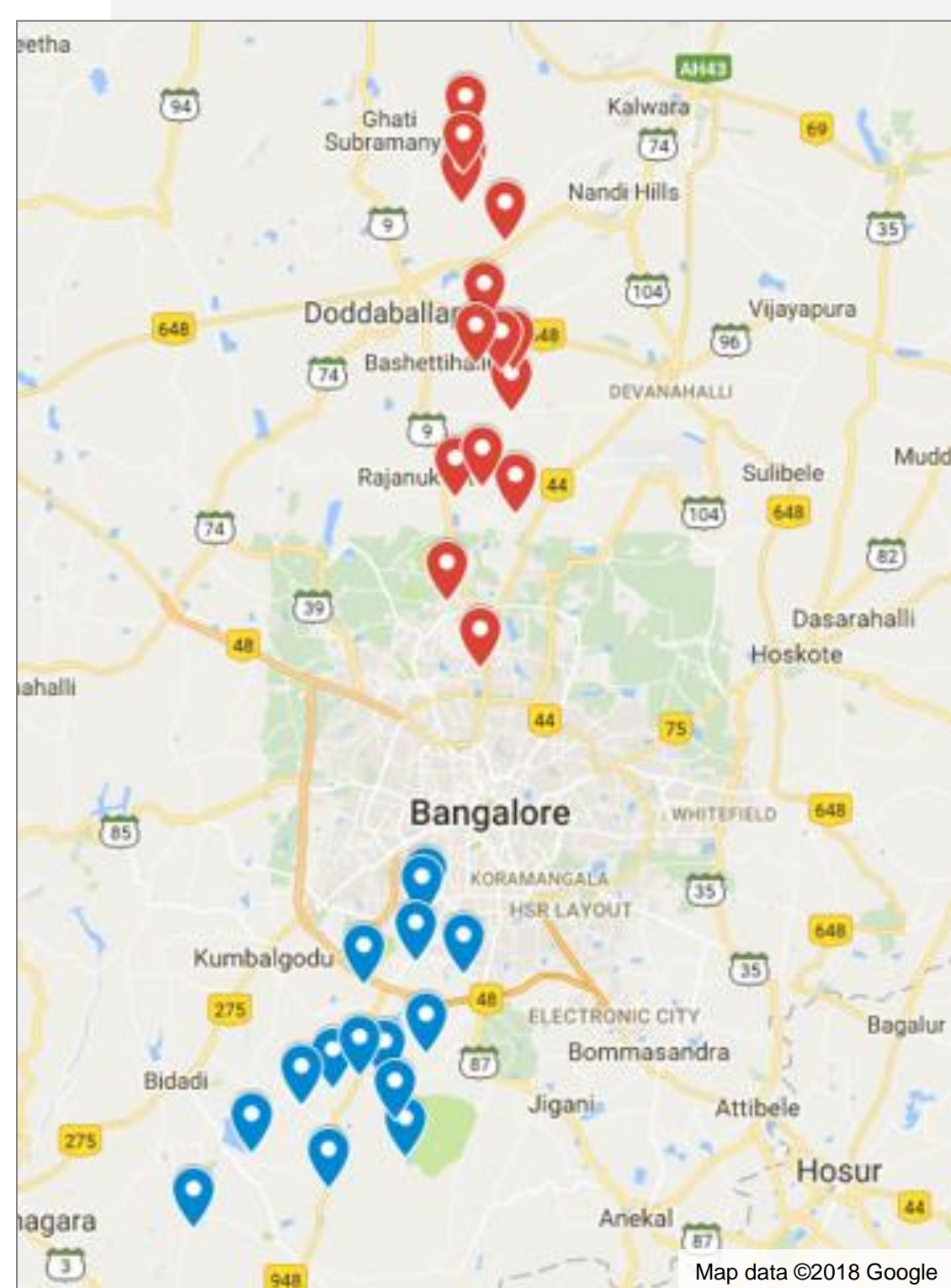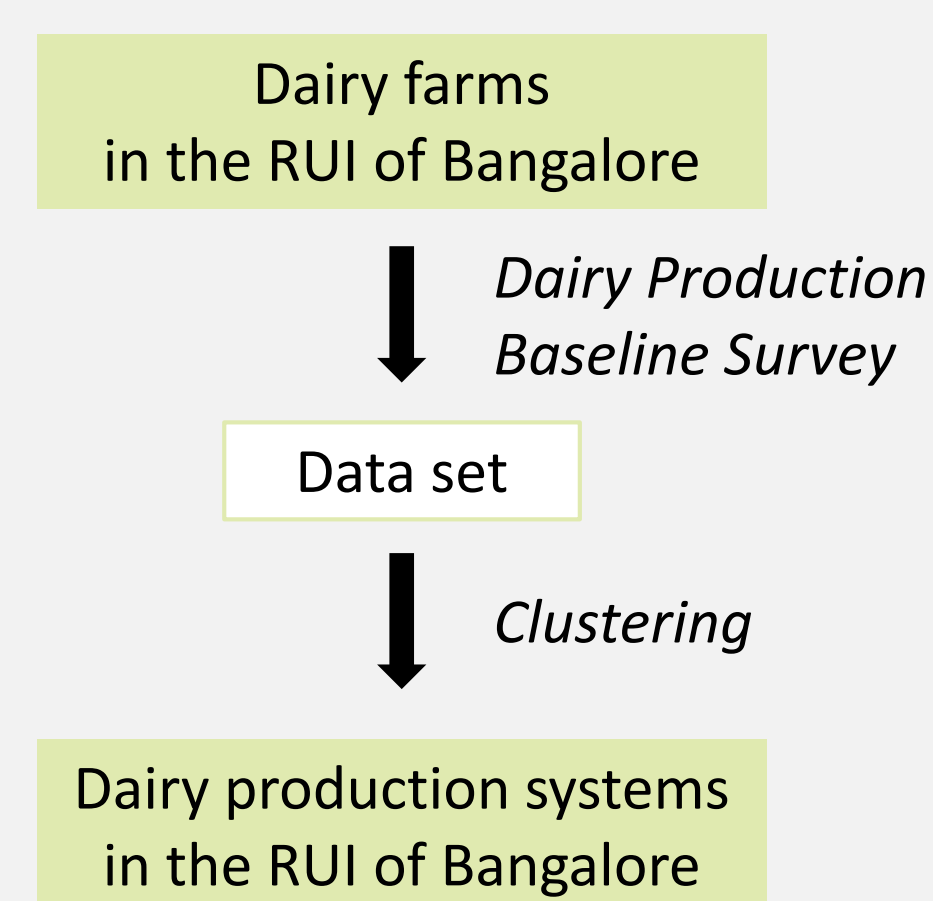
Methodology

Fig. 2 Map of the sampled settlements in and around Bangalore *(left)*

Fig. 3 Graphical abstract of the research's methodology *(below)*

Dairy farms in the RUI of Bangalore
↓ *Dairy Production Baseline Survey*
Data set
↓ *Clustering*
Dairy production systems in the RUI of Bangalore

Research Site
- Megacity of Bangalore, Karnataka, southern India
- 32 sampled settlements, classified on a scale from 1 = urban to 6 = rural (Fig. 2)
- 337 dairy farmers interviewed, proportionally to the total number of dairy farmers per settlement

Dairy Production Baseline Survey
- Qualitative and quantitative survey data on socio-economic status of the household, resources availability, dairy herd composition and management, and in- and output markets

Clustering – Dairy production systems
- SPSS two-step clustering applied to collected dataset to identify major dairy production systems (Fig. 3)

Results

Socio-economic profile of dairy households
- Household head is male, over 50 years old, married, in charge of the dairy activity and helped by one more household member.
- Dairy households hold land, produce agricultural goods and rear small livestock for their consumption. Often, at least one household member has an off-farm activity.

Dairy herd management
- In average: 2.6 cows per farm, 2.2 lactations and 8.2 litres per day and cow.
- Artificial insemination is used for almost all matings.
- Most common forages are maize, napier grass and roadside grass. Diets are completed with concentrates obtained at the dairy.

Milk marketing
- In rural and peri-urban settlements, dairies from the Karnataka Milk Federation (KMF) are the main milk marketing channel for dairy farmers. Milk is paid according to fat %.
- In urban areas, farmers mainly sell milk to neighbours and/or to middlemen.

Clustering – Dairy production systems
- Four major dairy production systems were identified based on five main predicators: spatial location within the RUI, proportion of exotic genotypes within the herd, cattle in- and outflow, use of pasture and reliance on own production of forage (Tab. 1).

	Description	Intensification	Salient features
Cluster 1	Rural dairy-focused production system with pasture and own forage production	Semi-intensive	Highly specialised herd, no animal flow
Cluster 2	Rural to urban dairy production system with high forage input	Semi-intensive	Rural to urban, no own production of forage
Cluster 3	Rural dairy production system with high animal flow	Semi-intensive	Animal in- and outflow
Cluster 4	Rural dairy-focused production system without pasture but own forage production	Intensive	Highly specialised herd, no pasture

Tab. 1 Overview of the four dairy production systems identified through clustering