

Methane emissions in dairy cattle in dependency of rural-urban gradients

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Introduction

- Dairy cows emit high levels of methane (CH₄) which contributes to climate change and is a loss of energy.
- Developing countries with high urbanization levels (India) are expected to increase CH₄ emission by 12% in the next 15 years.
- CH₄ measurements that account for location and farm management can improve:
 - the evaluation of the emission effects of urbanization
 - the viability of dairy farms along the rural-urban interface.

Metodology

- Field research: Jun. 2017-May 2018, Bangalore, India.
- Villages clasified in urban, peri-urban and rural (Fig.1).

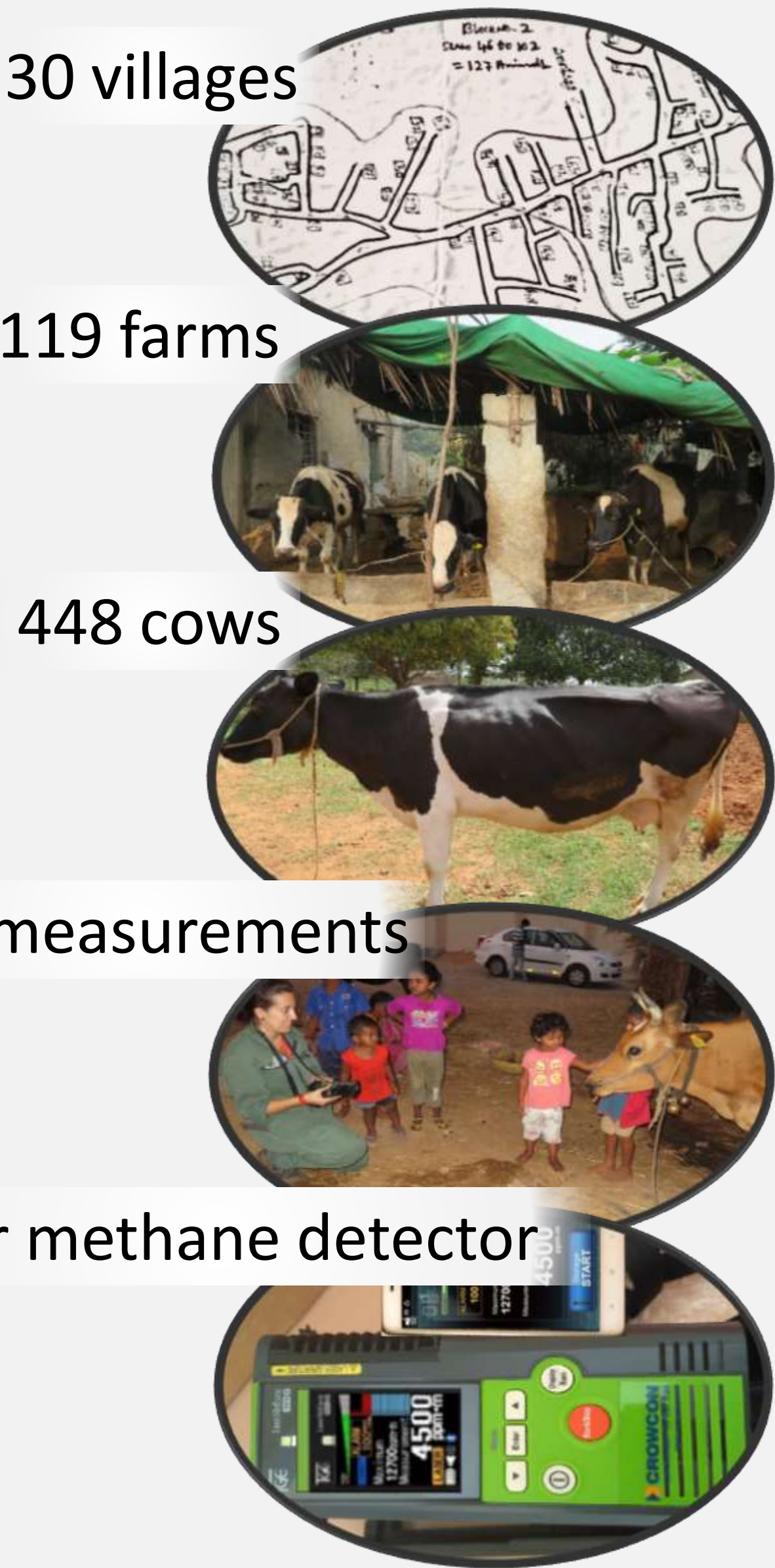
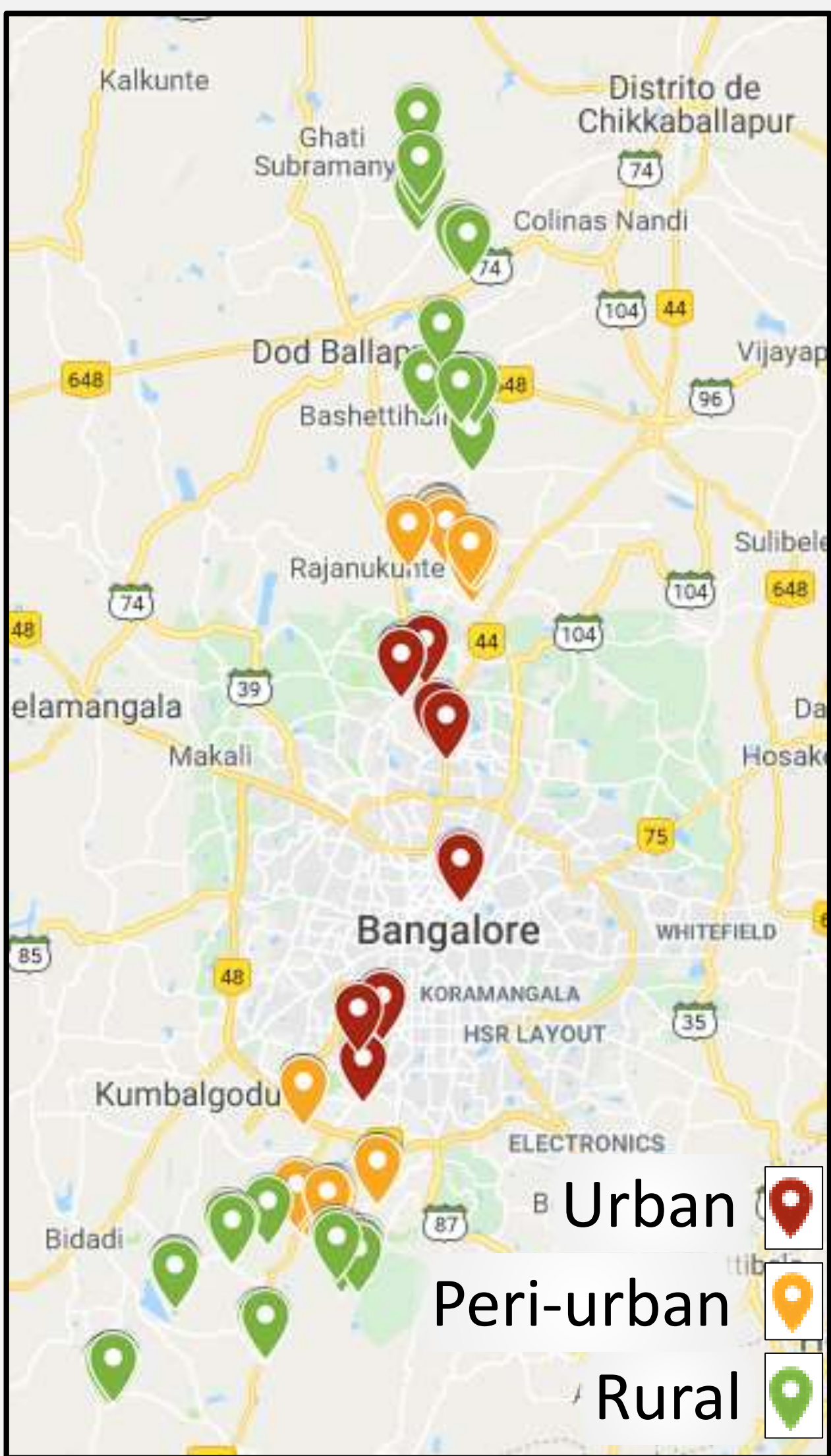


Fig.1 Sampled farms' map

- In CH₄ measurements, respiration and eructation were considered as independent measurements next to overall CH₄ (Fig.2).

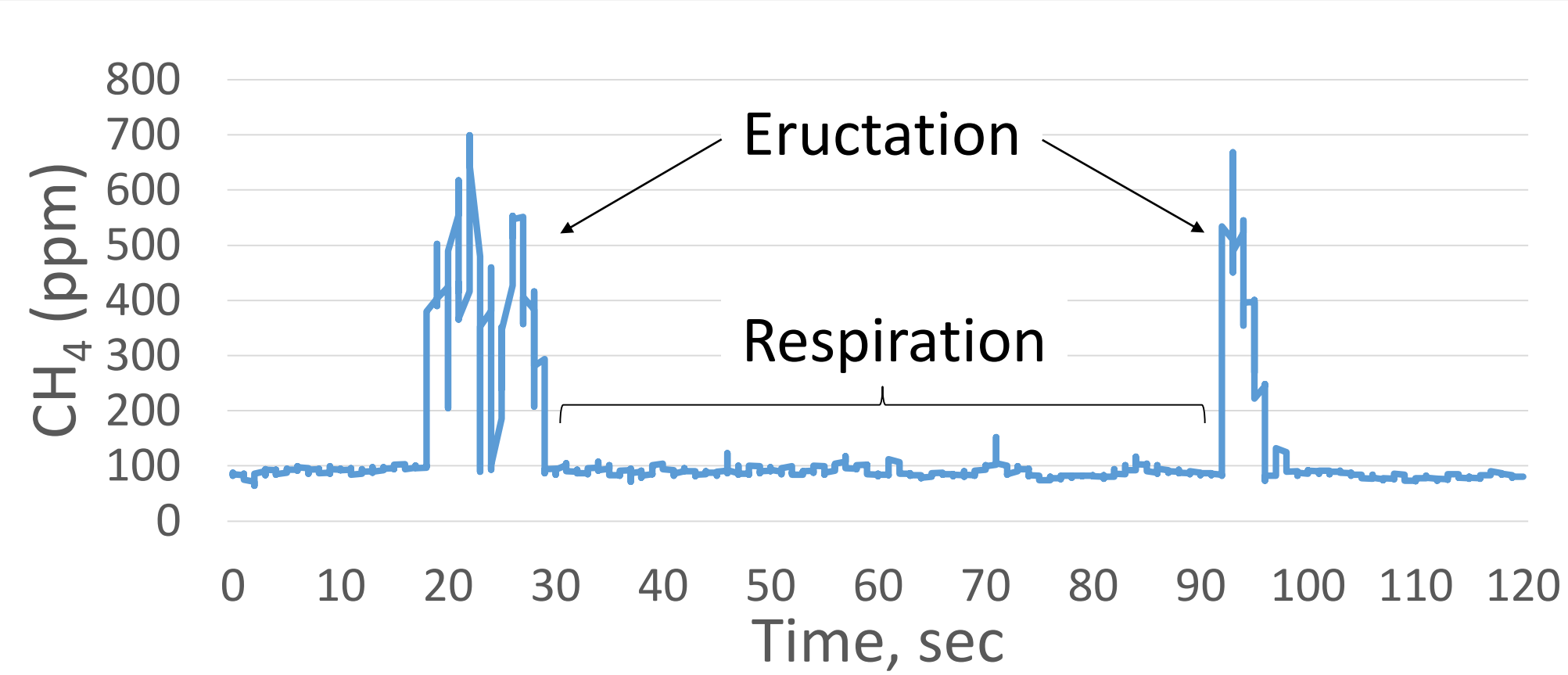


Fig.2 Typical CH₄ measurement output for one cow

Results

- Significantly higher least square means (LSMeans) determined in urban areas for all CH₄ emission variables (Fig.3).
- Higher CH₄ emission found for cows:
 - without access to pasture
 - with higher milk yield/body weight ratio
 - kept in indoor sheds

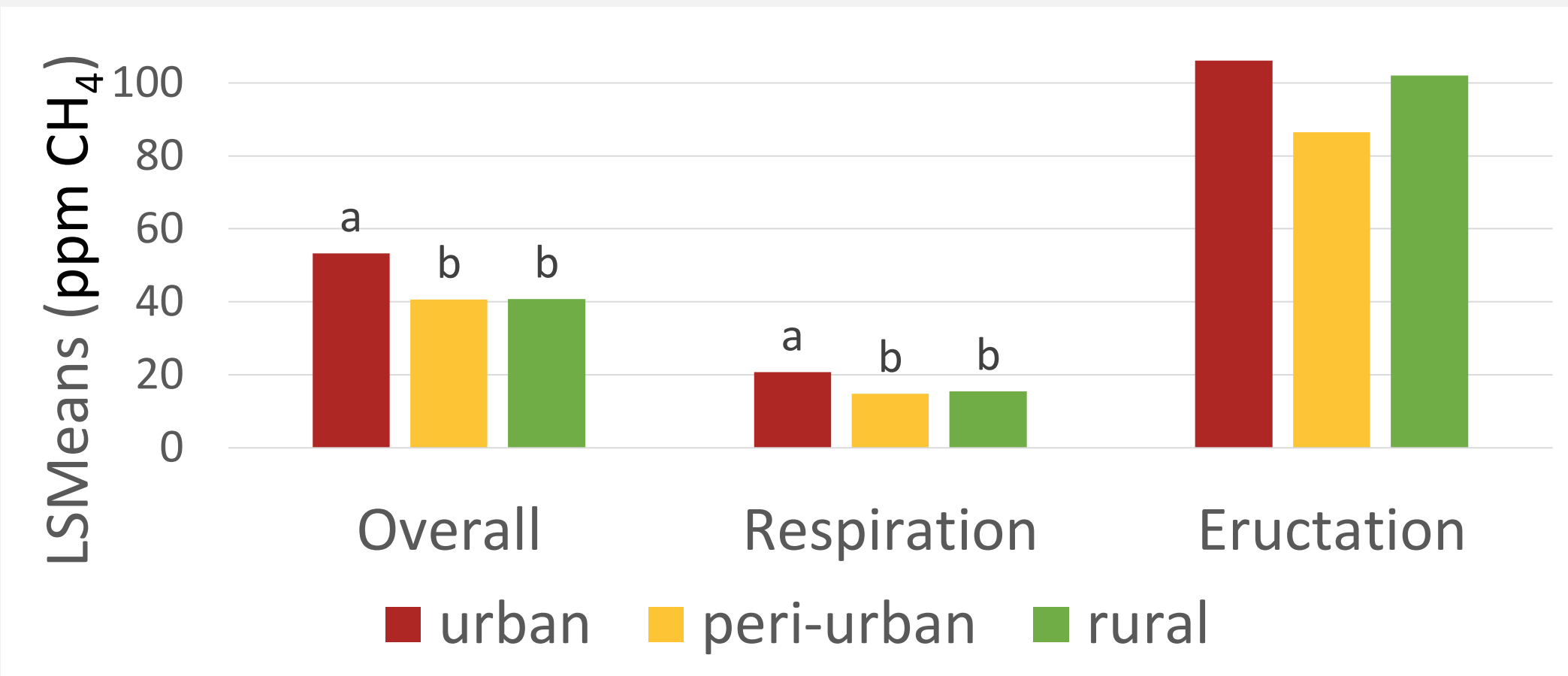


Fig.3 CH₄ emission depending on farm location

Tab.1 Farm characteristics by location that affect CH₄ emission

Farm location	Urban	Peri-urban	Rural
Milk production (liters per day)	11.5	10.5	10.4
Lactation number	3.4	3	2.6
Shed type (indoor/outdoor)	1.2	0.55	0.48
Farm temperature (°C)	25	25	29
Fibrous diet (g NDF/day)	3670	6319	6891
Pasture (% of farms)	70	65	37

Conclusions

- Enteric CH₄ emission from dairy cows in Bangalore depends on rural-urban gradients.
- This dependency is due to management aspects related to location, type of diet, pasture access, milk yield and type of shed.



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