Improving Milk Quality in Smallholder Dairy Systems: Realising Food Safety and Food Security in Kenya

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Objectives

- To identify the current state of raw milk quality and the implications on food safety and food security in Kenya.

- To assess the role of spatial differences in production, bulking and processing on milk quality in Kenya.

Background

➤ The Kenyan dairy sector makes an important contribution to GDP, employment and nutrition.

➤ Poor milk quality is a major constraint to processing and public health risk to consumers.

➤ There is growing interest to tackle public health risks stemming from the poor quality of raw milk produced, bulked and processed into milk and dairy products for distribution and marketing in Kenya.

➤ Although research has focused on public health food safety and food security, little is known about the influence of spatial differences on raw milk quality.
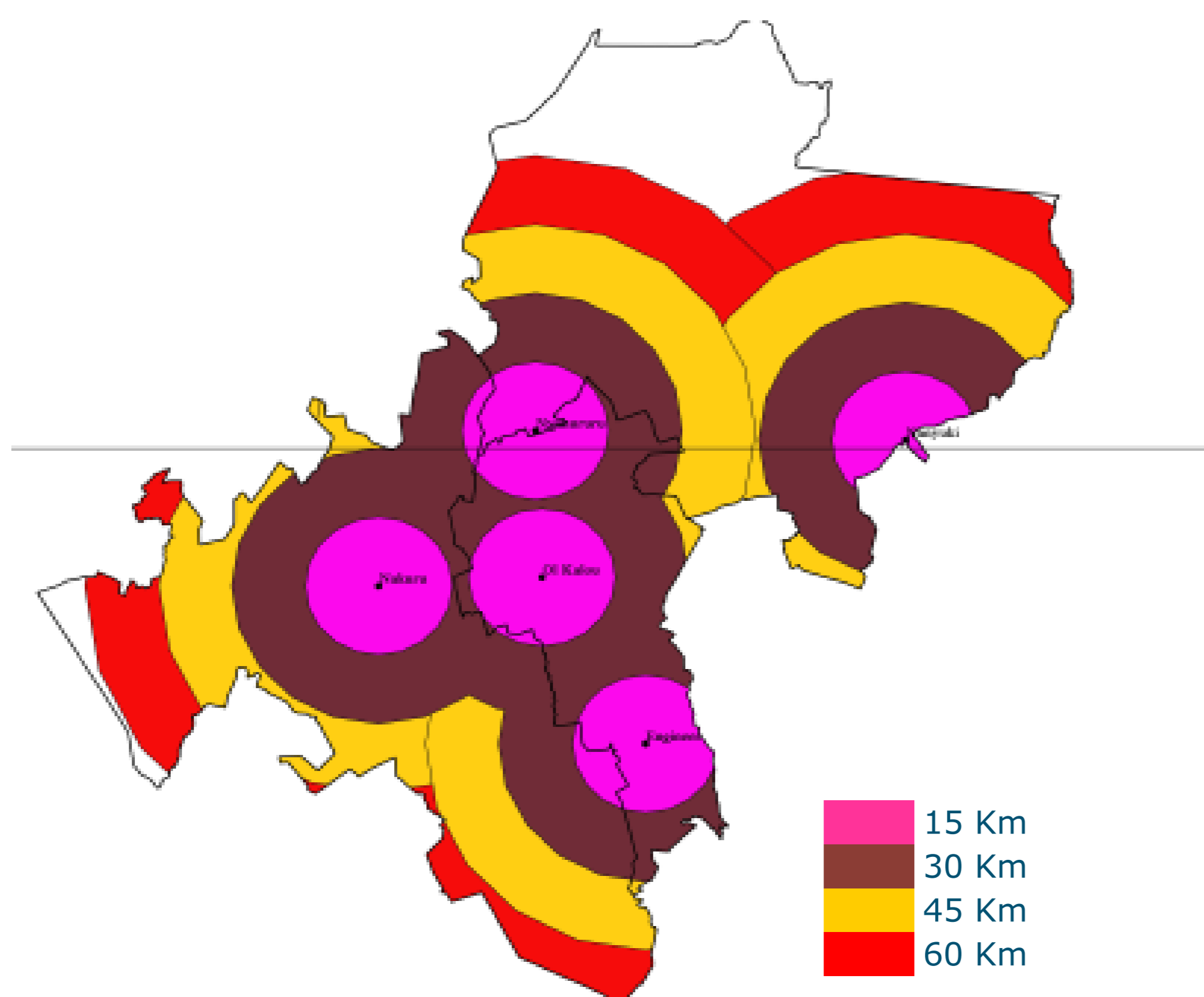
Results

Spatial framework for milk sampling
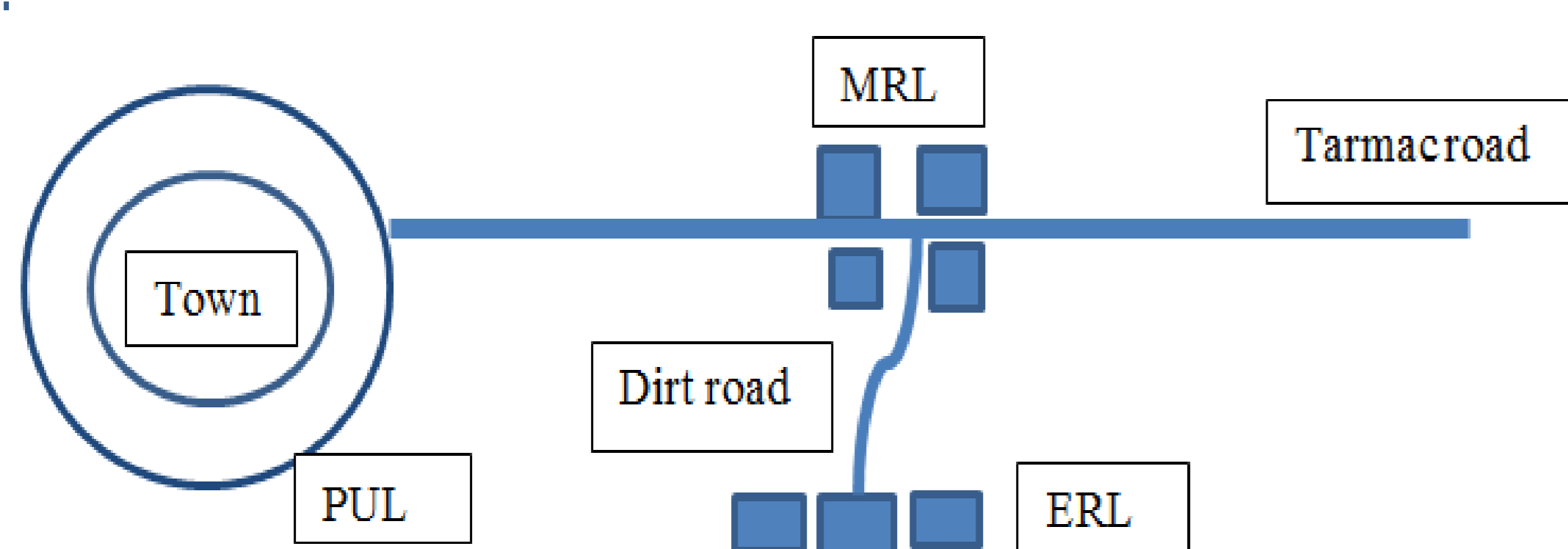
Classification of dairy systems according to distance from major town..
UL = Peri-urban location, MRL = Mid-rural location, ERL = extreme rural location. Source: (authors own)

	15 Km
	30 Km
	45 Km
	60 Km

Sampling framework developed using QGiS. Source: (authors own)

Conclusions

- Spatial differences in access to markets, infrastructure and information (good in PUL and MRL, poor in PUL).

- Poor handling and lack of incentives are constraints to improving milk quality.

Methods

➤ The study used a spatial framework to sample milk, with 493 milk samples collected between July - August 2017 in Laikipia, Nakuru and Nyandarua counties in Kenya.

➤ **Milk Composition analysis**
   - **Ekomilk M** : fat %, protein %, solids-not-fat (SNF) %, density, freezing point, added water.
   - **Ekomilk Scan**: somatic cell count (SCC)

➤ **Bacterial contamination analysis**
- MacConkey Agar and blood agar cultures
- Milk ring test (MRT) to detect Brucellosis.

Milk handling; Bulking; Transport

Milk composition and Bacterial contamination

	PUL		MRL		ERL	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Butter Fat (%)	3.82	1.24	3.54	1.46	3.52	0.83
Protein (%)	3.42*	0.33	3.66	2.31	3.47*	0.29
SNF (%)	9.06	0.89	9.24	0.92	9.22	0.79
Density (g/ml)	1.030	0.0042	1.031	0.0040	1.031	0.0030
Freezing Point (°C)	-0.588*	0.074	-0.603*	0.062	-0.650*	0.675

Microbial contamination and somatic cell counts

	PUL	MRL	ERL	Chi-Square
Added water (present)	25.2%	14.3 %	12.2%	0.005*
SCC > 300 000	9.4%	4.9 %	12.0%	0.068
E.coli (present)	39.7%	23.3 %	61.5%	<0.001*
Pseudomonas spp. (present)	56.0%	56.4%	34.1%	<0.001*
Staphylococcus spp. (present)	0.7%	9.2 %	0.0%	<0.001*
MRT (positive)	0.0%	7.4 %	1.1%	<0.001*

Kenyan milk standards: fat ≥ 3.25%, protein ≥3.50% , SNF ≥8.50%, density 1.028-1.036 g/ml, freezing point between -0.525 °C and -0.550 °C. PUL – peri-urban location, MRL – mid-rural location, ERL – extreme-rural location. * mean not according to standard

Milking; Milk handling practices