

AN ACTOR ORIENTED APPROACH TO IDENTIFY MILK POSTHARVEST-LOSSES IN SMALLHOLDER DAIRY PRODUCTION SYSTEMS IN NAKURU COUNTY, KENYA

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INTRODUCTION

- 6% of Milk is lost along Kenyan Dairy Value Chain (~ 60-95 mio US\$ p.a.)
 - ↳ 4,5% on-farm Milk Post-Harvest Losses (PHL)
(WANYOIKE ET AL., 2004; LORE, OMORE & STAAL, 2005; MURIUKI, 2011)



- Solutions are not oriented towards complex socio-ecological conditions and needs of smallholder production systems
(BIGGS, 2007; WELTZIEN & CHRISTINCK, 2009)

⇒ Adoption of a Systems Perspective

OBJECTIVE OF THE STUDY



Describe smallholder dairy farms as a purposeful human-activity system

- Develop understanding of farmers' definition of and perception towards Milk PHL
- Joint analysis of activities along milk production process, identification and explanation of associated sources of losses
- Collection of probable reduction strategies and necessary preconditions

CONCEPTUAL FRAMEWORK

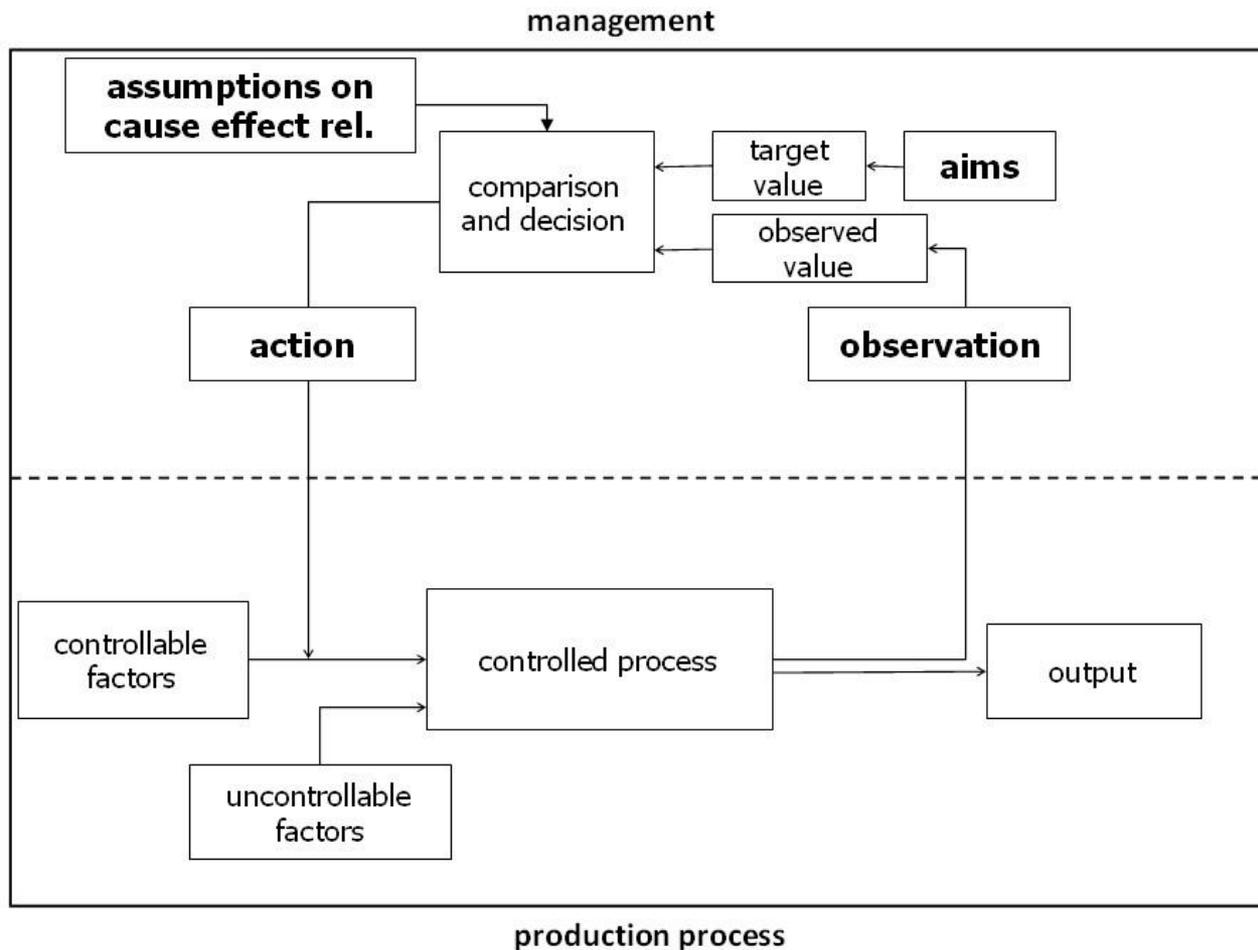
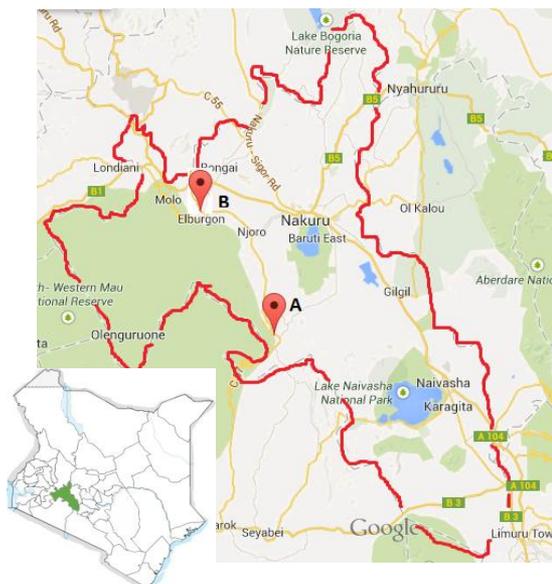


Figure 1. The Control Loop Model (taken from Kaufmann, 2012)

MATERIAL & METHODS



MATERIAL

ANALYSIS

SOURCE

MUKINDURI (A)

MUTAMAYIU (B)

Participatory Observation

n=10

n=7

Semi-Structured Interviews

n=27

n=20

Group Discussions

- Seasonal Calendar

♀5 ♂4

- Focus Group Discussion

♀6 ♂6

- SWOT- Analysis

♂♀5

Qualitative Content
Analysis, Second
Order Cybernetics

Quantitative Data Tables

Sep-March, n≈ 35

Nov-Dec/Jan, n=40
n=333

Descriptive Statistics

Comparative Milk Sample Analysis

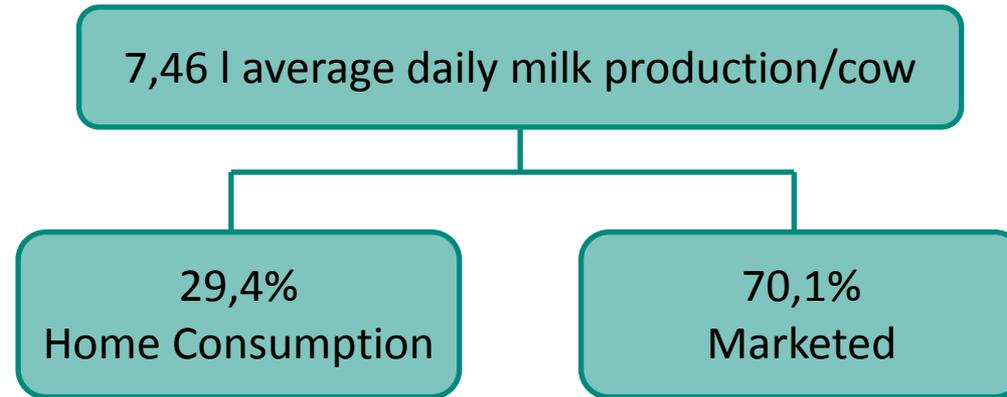
n=34

n=10

TVC, CF, chem comp.

RESULTS

SMALL-SCALE DAIRY PRODUCTION AND MILK LOSS PERCEPTION IN NAKURU



Milk Losses are...

- ... the difference between the potential and the actual milk yield
- ... the result of deficient markets for milk
- ... unbalanced input-output calculation
- ... spillage and spoilage



RESULTS

SOURCES OF MILK LOSSES

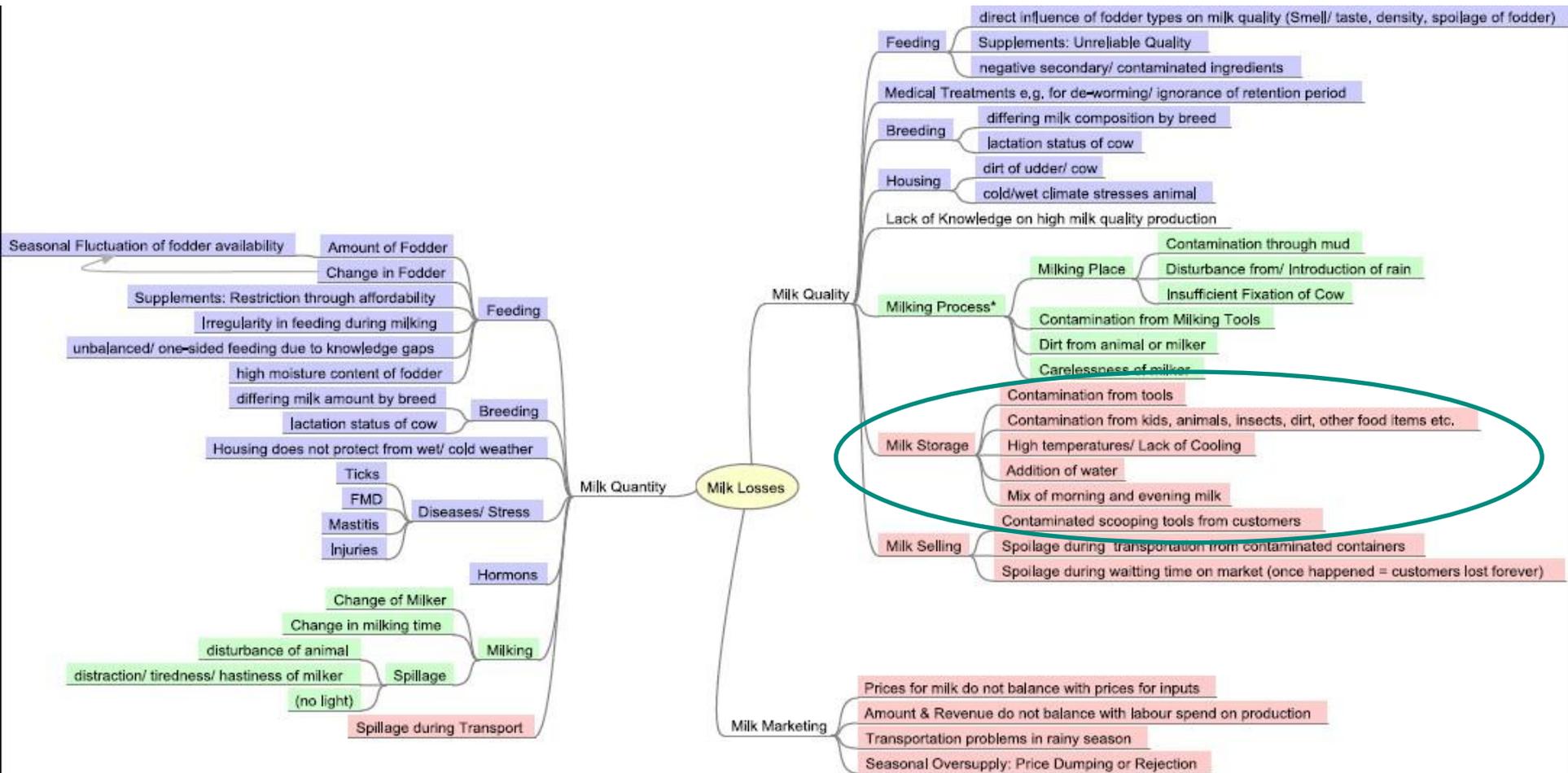


Figure 2. Sources of Milk Losses. Blue: Pre-Milking Activities, Green: Peri-Milking Activities, Red: Post-Milking Activities

RESULTS

STORAGE OF MILK I

MEASURE	REASONING
Not cover the bucket	Allow 'aeration' of the milk <i>"then she takes it to the kabati (cupboard in the living room). And the reason of doing that is to avoid any contamination. Because when it is open, anything, the dirt, the germs can go in"</i> (I.M1)
Keep in Cupboard	<i>"you should not cover the milk completely with a lid, for extraction of air. And also the milk should not be open to avoid maybe rats, cats or dust maybe interfering with the milk."</i> (I.E8)
Keep on Floor	<i>"Because this place is very cold during the night, the milk is placed on the floor and since the floor is made of cement, the temperature is very cold, so you find the milk is on perfect condition as you had milked."</i> (I.M19)
Water bath	<i>"submerging the milk vessel in cold water at the same water level as that of the milk."</i> (I.E1) <i>"it is like an refrigerator and in the morning the milk is in good quality"</i> (I.M6)



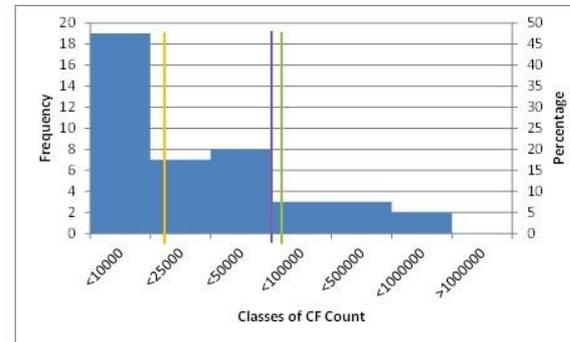
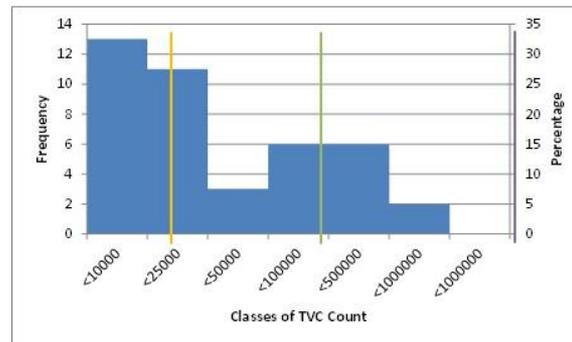
RESULTS

STORAGE OF MILK II

Good place for milk storage: clean, cool, well-aerated, unattainable for kids etc., exclusive

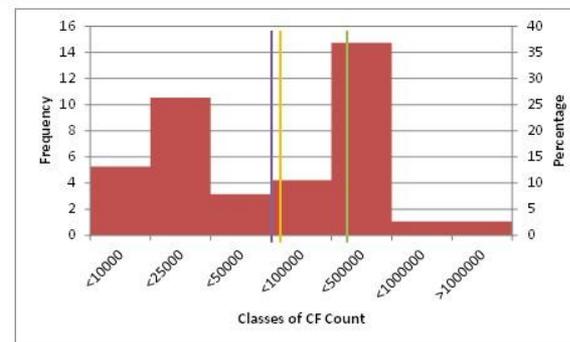
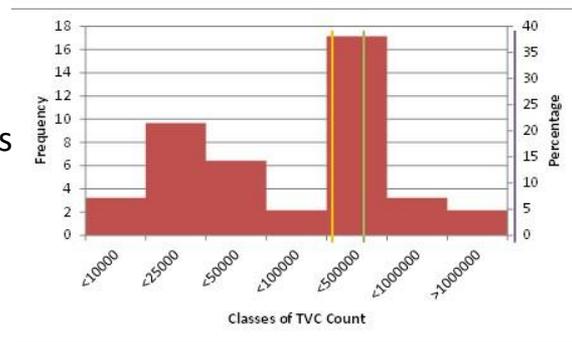
Good vessel for milk storage: clean and dry, exclusive, made from metal, allows aeration

Fresh Milk samples



- Mean
- Median
- Kenyan Bureau of Standards (KEBS) Standard

Stored Milk samples



CONCLUSIONS & OUTLOOK

Farmers have knowledge
on hygienic milk production, on Milk PHL, its
sources and reduction
→ Exchange with each other



Pre-Harvest then Post-Harvest Losses
→ Higher production, higher prices
→ Incentive to change

Collective Action
As help for self-help with given scarce resources

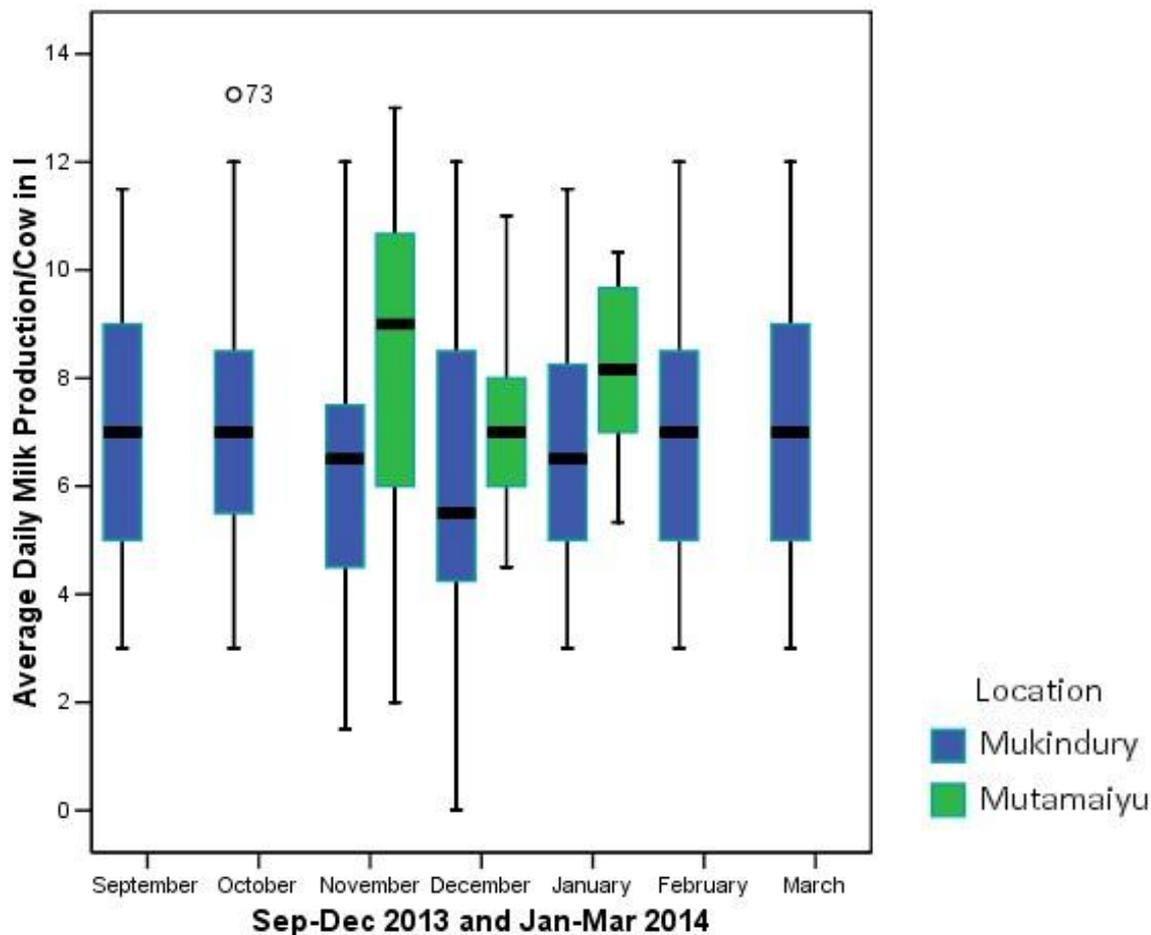


THANK YOU VERY MUCH FOR YOUR ATTENTION, COMMENTS AND QUESTIONS!



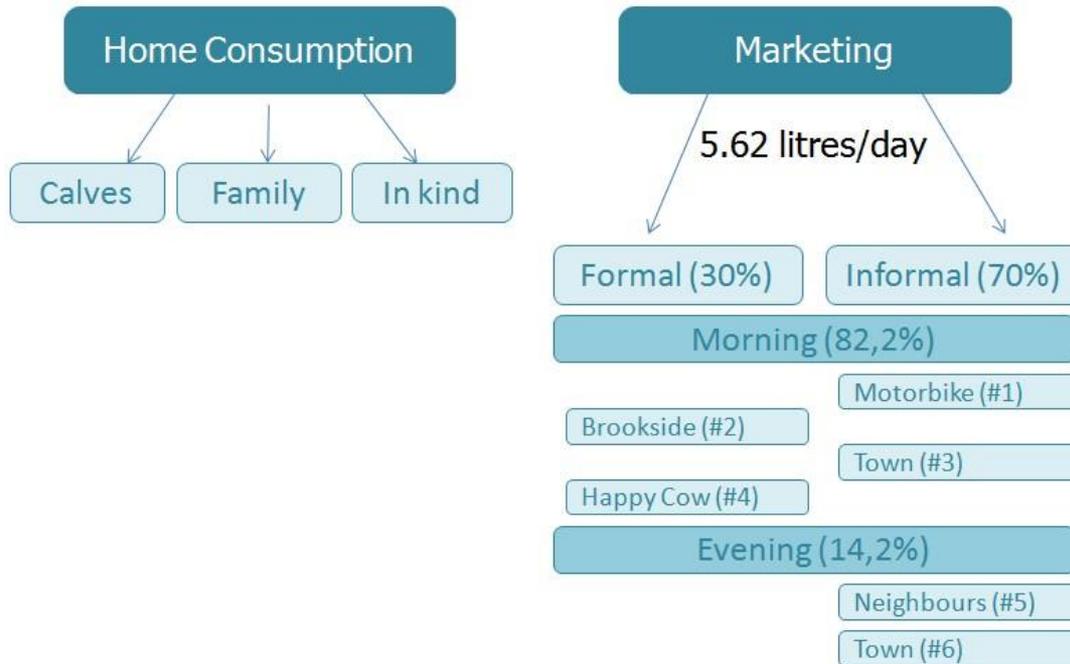
ANNEX: RESULTS

MILK PRODUCTION



ANNEX: RESULTS

MILK UTILISATION



ANNEX: RESULTS

STORAGE OF MILK I

ACTIVITY	PURPOSE	REASONING
Separation of milk in portions of different usage	Increase longevity of milk	<i>“So that to avoid all the time when the customer comes, you are collecting the milk from the same bucket because it [...] might put the milk to a risk of getting contaminated.[...] To avoid putting different cups for measuring especially if you have people that are buying from you. That can make milk go bad.” (I.M8)</i>
Pour through sieve into storing vessel	Remove particles that have entered the milk, e.g. hairs of cow	<ul style="list-style-type: none"> - Particles contaminate milk - Milk with visible particles cannot be sold
Boiling	<ul style="list-style-type: none"> - Increase longevity of milk - Control quality 	<ul style="list-style-type: none"> - Milk collector instructed to do so: <i>“Because the person that comes to collect the milk [...], in the morning. Because the milk will go to Elburgon. and then go to Nakuru. And because of that, that is why she has to boil it.”(I.E12)</i> - <i>“by boiling, she can tell you whether the quality is good.”(I.E16)</i>
Leave to cool	Avoid spoilage of milk	If the milk is closed and stored as warm as it was milked, it will <i>“ferment”</i> (O.E1), it will be spoiled