



Biosecurity measures in meat and milk value chains: A study in Bura sub-county, Kenya

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Why worry about zoonoses?

- **New emerging and re-emerging diseases**
- **Hinders achievement of Millennium Development Goals**
- **Threat of bio-terrorism**
- **Globalization of value chains**
- **Threaten livelihood of majority in LDCs**
- **Social and economic costs are very high**

(Abushama 2013; Akinwumi et al. 2009; Battelli 2008; Childs et al. 1998; Daszak et al. 2004; Magnusson 2009; McDermott & Grace 2011)

Recent diseases and associated cost

Period	Disease	County	Estimate (USA dollars)
1986-2009	Bovine spongiform Encephalopathy	United kingdom	15.5 billion
1994	Plague	India	2 billion
Sept 1998-April 1999	Nipah virus	Malaysia	671 million
Jan 1999-Dec 2008	West Nile virus	USA	400 million
Nov 2002-July 2003	Severe acute respiratory syndrome (SARS)	Asia	41.5 billion
2003-2007	Bovine spongiform Encephalopathy	USA	11 billion
Jan 2004 –Jan 2009	Highly pathogenic avian influenza	Asia	20 billion
Oct 2005-Jan 2009	Highly pathogenic avian influenza	Europe	500 million
November 2005- January 2009	Highly pathogenic avian influenza	Africa	
November 2006-May 2007	Rift valley fever	Tanzania, Kenya, Somalia	30 million

Costs of disease outbreaks (US\$ billion)

	Period	Costs (conservative estimates)	Annual average
Historical zoonoses	1998-2009	\$80.2 billion total	\$6.7 billion
Severe pandemic	Once a century	\$3 trillion	\$30 billion

Source: World Bank 2012

➤ **Cost of prevention: \$3.4 billion/year**

Why focus on informal value chains?

- **Majority of the world's poor rely on informal value chains**
 - ✓ **Accessible**
 - ✓ **Affordable**
 - ✓ **Employment**

- **Social arena for many people (information exchange)**

- **Informal markets have existed and will exist for a long time**

- **Local and cultural foods**

- **Difficult to regulate**

Challenges in informal value chains

- **Low knowledge of diseases, transmission and risks**
- **Diseases are endemic and often neglected**
- **Changing climate (unpredictable weather / seasons)**
- **New agricultural systems (e.g. irrigation schemes)**
- **Weak regulatory institutions**
- **Governance challenges like corruption**
- **Lack of market structures**
- **Low adoption of hygienic measures**

Why adopt biosecurity measures?

Prevention is better than cure!

“Biosecurity is the implementation of measures that reduce the risk of the introduction and spread of disease agents.”

(FAO, 2008)

- Involves isolation, quarantine, surveillance and prevention of disease transmission.

Biosecurity measures

- **Pro-active disease surveillance and management**
 - **Economical to implement**
 - **Influenced by policy incentives**

- **Reduce disease prevalence from farm to fork**

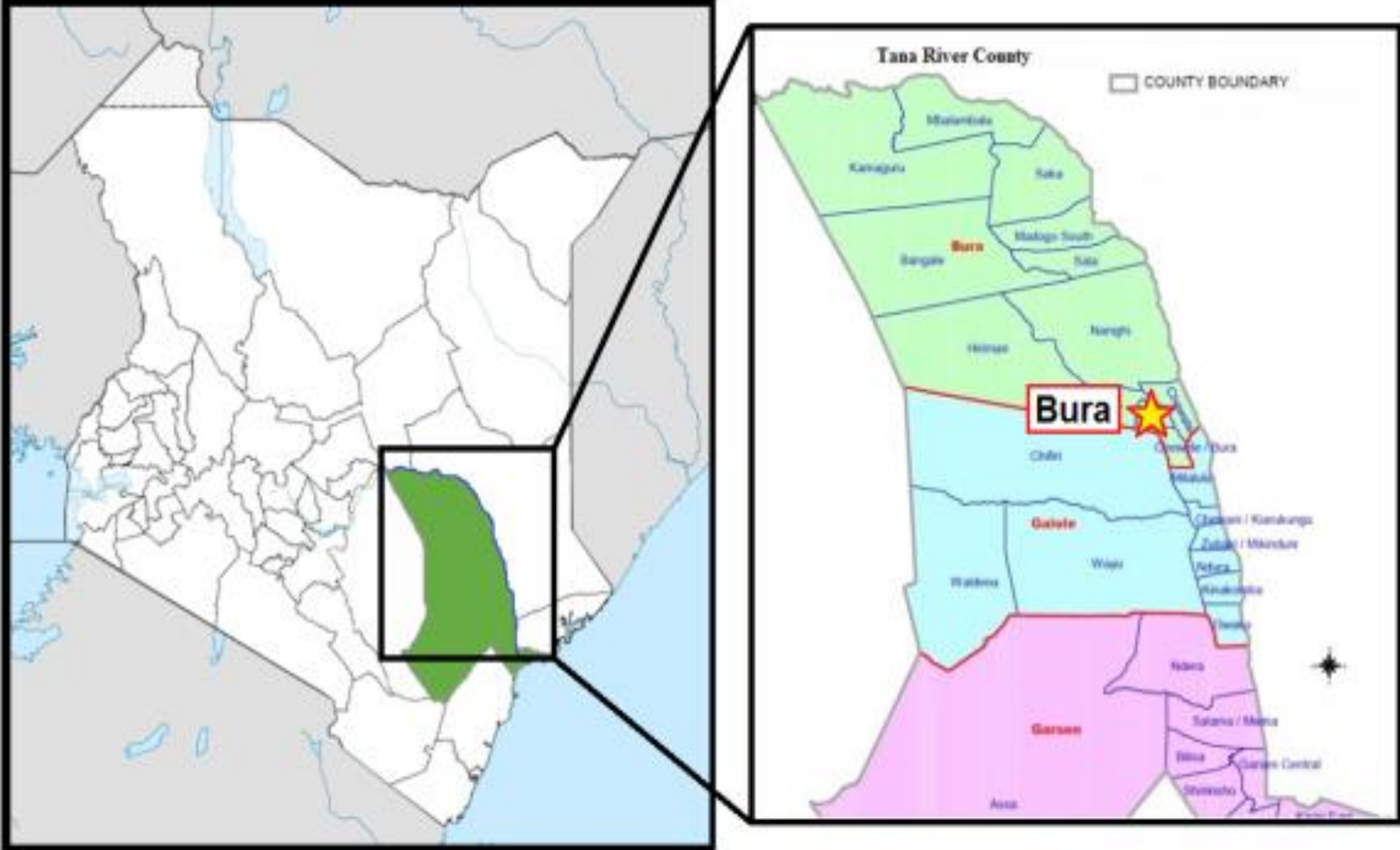
- **Facilitate access to new markets**

- **Reduce zoonoses burden on poor households**

- **Help achieve MDGs in LDCs**

Case study: Bura sub-county, Kenya

Bura Tana river county



Research objectives

- **To explore value chain actors' knowledge and understanding of zoonotic risks.**
- **To assess knowledge and perception of the significance of these identified zoonotic risks.**
- **To assess value chain actors' incorporation of biosecurity measures in their activities and workplaces.**
- **To identify the factors influencing adoption of biosecurity measures among different value chain actors.**

Methodology

- **Mixed method approach**
- **In-depth Interviews with actors**
- **Informal discussions**
- **Participatory mapping of value chains and risk assessment**
- **Observations**
- **Knowledge Attitude Practices survey (Questionnaire)**

Results: Composition of Sample

		Traders	Butchers	Transporters	Slaughter house workers	Milk vendors
Sample size		43	9	35	10	57
Gender (%)	Male	95.3	88.9	97.1	100	7
	Female	4.7	1	1	-	93
Mean age		42.86	38.56	32.17	38.20	32.11

Results: Level of training among actors

	Traders (%)	Butchers (%)	Transporter (%)	Slaughter house workers (%)	Milk vendors (%)
Formal	2.3	-	-	10	1.8
On job training	16.3	44.44	28.6	70	7.0
No training	81.4	55.6	71.4	20	91.2

Results: Level of knowledge

	Traders n=43 (%)	Butchers n=9 (%)	Transporters n=35 (%)	Slaughterhouse workers n=10 (%)	Milk vendors n=57 (%)
Heard zoonoses	72.1	77.8	65.7	90	47.4
Know biosecurity measures	55.8	44.4	48.6	90	36.8
Biosecurity important	58.1	44.4	48.6	90	36.8
Can get infected from livestock or products	72.1	66.7	60.0	90	36.8

Results: Level of personal biosecurity

	Trader n=57 (%)	Butchers n=9 (%)	Milk vendors n=57 (%)	Slaughterhouse workers n=10 (%)	Transporters n=35 (%)
Use protective gear (PPE)	9.3	88.9	3.5	90	25.7
Medical exams	14	100	17.5	90	28.6

Results: Non-use of PPE



Results: Food biosecurity

Milk Test carried out	Percentage (n=57)
Clot on boiling	12.3
Colour	17.54
Tasting (taking a sip)	77.19
Butter content	10.53
Clot on boiling	19.3

Method of milk storage	Percent (n=57)
Kept boiled	73.68
In closed container	59.65
In open container	3.5

- No microbial test
- Risky milk test
- Unhygienic handling
- Dirty containers
- Unhygienic packaging
- Dirty processing places

Results: Food biosecurity



Poor handling of milk containers and unhygienic milk bulking places

Results: Animal health biosecurity

- **No isolation grounds**
- **Movement certificate not enforced sometimes**
- **No inspection observed**

Traders biosecurity practices	
Traders n=43	Percent (%)
Are sprayed	86.0
Are inspected	53.5
Are isolated	55.8
Are quarantined	39.5
Report dead	34.9

Environmental biosecurity

- **Low uptake of latrines**
- **Open dumping of wastes**
- **Lack of sewerage facilities**

What traders do when an animal dies	
Traders n=43	Percentage (%)
Burn	25.6
Bury	16.3
Report to vet	2.3
Slaughter	9.3
Dispose of	46.5

Slaughterhouse visits



Mixing intestines and carcass



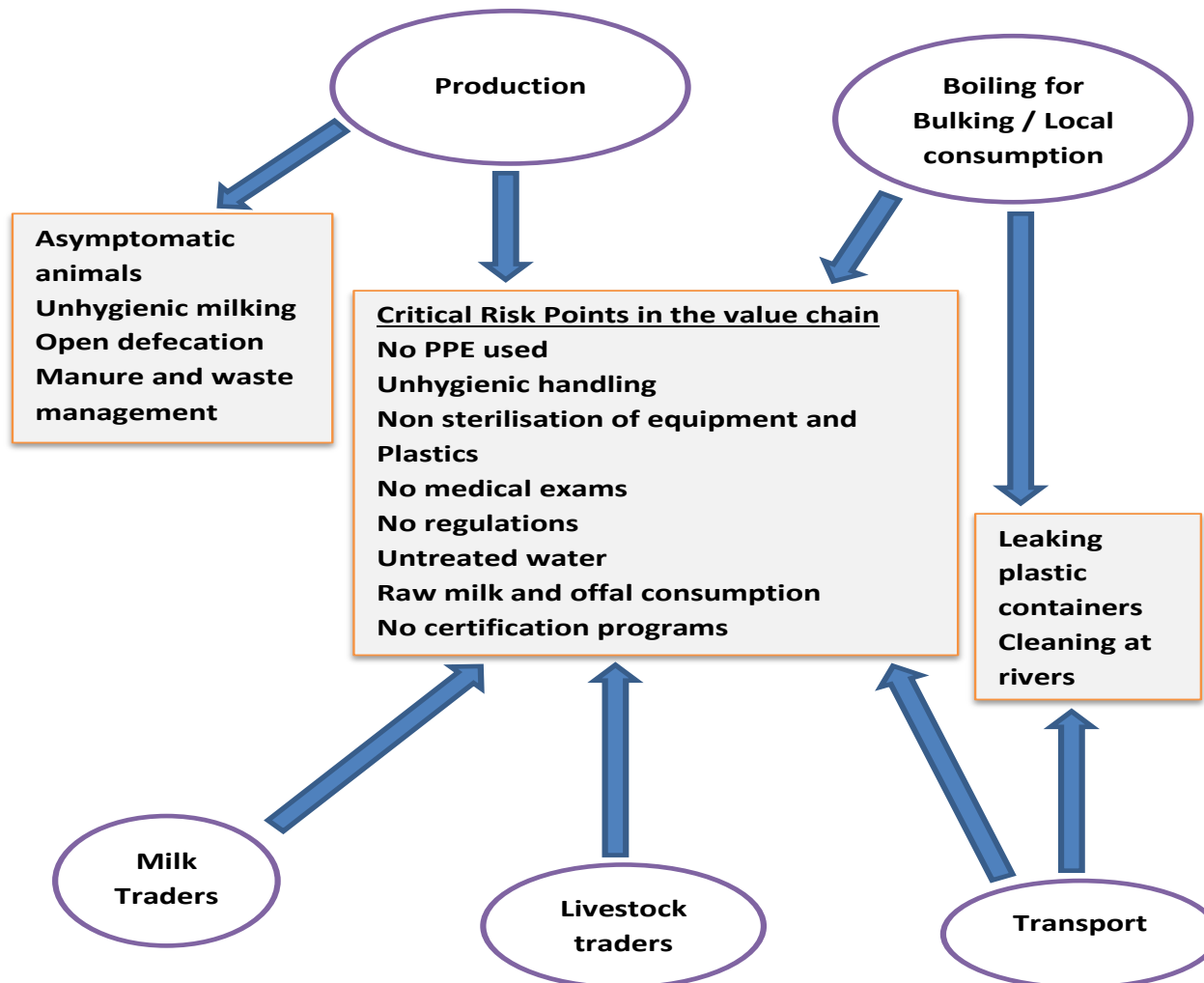
Dirty water and intestine cleaning containers

Slaughterhouse visits



Slaughtering on the ground and non-use of PPE

Qualitative risk analysis



**What can
we do
about the
future????**





Matrix of Biosecurity:

Costs

vs.

Ease of Implementation

Ease of Implementation

Cost	Easy - Expensive	Somehow Easy - Expensive	Difficult – Expensive
	Testing for diseases Isolation of animals Quarantine facilities Public education	Vaccinations Cooling facilities Pasteurization Sterilization of milk (in bottle) UHT (ultra-high-temperature) treatment institutional capacity Certification	Sewer systems Testing labs Good infrastructure Good governance and Laws and policies Competent body of inspectors (veterinarians, meat inspectors) Testing and culling
	Easy - Medium Cost	Somehow Easy – Medium Cost	Difficult - Medium Cost
	Protective clothing Meat inspection Refrigeration	Toilets Public education Food testing Aluminium milk containers	New food laws Testing equipment Animals tracing
Easy - Cheap	Somehow Easy - Cheap	Difficult – Cheap	
Washing hands Disinfection Water treatment Sanitation use Premises inspections	Medical check ups Licencing Ante mortem inspection post-mortem examination	Manure disposals Low cost packaging	

Looking ahead to the future.....

- **More multidisciplinary research approach**
- **Environmental conservation**
- **Traceability of animal and animal source products**
- **Compensation schemes when culling**
- **Better regional and international policies**
- **Proactive disease surveillance and research**
- **Adaptation and climate change mitigation**
- **One health approach and resource sharing**

The benefits and costs of sharing biosecurity resources in zoonoses control



	Annual benefit	Annual cost	Confidence in investment
Sharing resources	4 billion	1 billion	++
Controllable zoonoses	85 billion	21 billion	+++
Timely response	6 billion	3.4 billion	++
Averting pandemics	30 billion		+
Generating insights	?	?	+++
Bottom line	125 billion	25 billion	+++

(Grace 2014)



Thank you for your attention

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