Food safety in the domestic markets of developing countries

EatSafe – Evidence and Action toward Safe, Nutritious Food
Webinar 2: Food Safety in informal markets
August 19, 2020

Delia Grace Randolph
Professor Food Safety Systems, Natural Resources Institute, UK
Contributing scientist, International Livestock Research Institute, Kenya
FOOD SAFETY IN DEVELOPING COUNTRIES: AN OVERVIEW

A learning resource for DFID Livelihoods Advisers

Delfa Grace, October 2015

EVIDENCE ON DEMAND
INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

Aflatoxins
Finding Solutions for Improved Food Safety

EDITED BY
Laurian Unnevehr and Delia Grace

FOOD SAFETY AND INFORMAL MARKETS
Animal Products in Sub-Saharan Africa

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Review

Food Safety in Low and Middle Income Countries

Delfa Grace
Program Leader Food Safety and Zoonoses, International Livestock Research Institute, P.O. Box 30709,
Nairobi 00100, Kenya; E-Mail: d.grace@cgiar.org; Tel.: +254-20-422-3460; Fax: +254-20-422-3001
Academic Editors: Mieke Uyttendaele, Eelco Franz and Oliver Schlüter

Edited by
Kristina Roesel and Delia Grace
The influence of livestock-derived foods on the nutrition of mothers and infants during the first 1,000 days of a child’s life

Accelerating Progress in Low- and Middle-Income Countries

Steven Jaffee, Spencer Henson, Laurian Unnevehr, Delia Grace, and Emilie Cassou
Overview

1. Impact of FBD in developing countries

2. Foodborne disease: sources, foods implicated, trends

3. Managing FBD
Foodborne disease matters for development

- Developing country consumers show high concern over FBD
- The huge health burden of FBD is borne mainly by developing countries
- FBD has high economic costs: health, agriculture & economy-wide
- FBD limits access of poor farmers to export markets and threatens access to domestic markets
- FBD discriminates: the YOMPI are most at risk
Why food safety matters

31 hazards
- 600 mio illnesses
- 420,000 deaths
- 33 million DALYs

Havelaar et al., 2015

USA – 1 in 6
Greece 1 in 3
Africa 1 in 10??

4 heavy metals
- 1 mio illnesses
- 56,000 deaths
- 9 million DALYs

Gibb et al., 2019
The COI and domestic economic costs of unsafe food may be 20 times the trade-related costs for developing countries.

"Productivity Loss" = Foodborne Disease DALYs x Per Capita GNI

Based on WHO/FERG & WDI Indicators Database

Cost estimates 2016 (US$ billion)

- Productivity loss: 95
- Illness treatment: 15
- Trade loss or cost: 5 to 7

Illness treatment = US$27 x # of Estimated foodborne illnesses

Trade loss or costs = 2% of developing country high value food exports

Jaffee et al., 2019
## Food safety & livelihoods

*Grace et al., 2015*

<table>
<thead>
<tr>
<th>Product</th>
<th>Production</th>
<th>Processing</th>
<th>Marketing</th>
<th>Consumed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk (cow)</td>
<td>men (x Nairobi)</td>
<td>women</td>
<td>women (x Abidjan)</td>
<td>both</td>
</tr>
<tr>
<td>Milk (goat)</td>
<td>men (w milk)</td>
<td>women</td>
<td>women</td>
<td>both</td>
</tr>
<tr>
<td>Beef/goat</td>
<td>men (w assist)</td>
<td>men</td>
<td>men (butcher, pub)</td>
<td>both</td>
</tr>
<tr>
<td>Poultry</td>
<td>women</td>
<td>women</td>
<td>women</td>
<td>both</td>
</tr>
<tr>
<td>Pigs</td>
<td>women</td>
<td>men</td>
<td>men</td>
<td>both</td>
</tr>
<tr>
<td>Fish, crabs</td>
<td>men</td>
<td>women</td>
<td>women (x)</td>
<td>both</td>
</tr>
</tbody>
</table>
Food safety & nutrition

➢ Diarrhoea a risk factor for stunting – perhaps 10-20%?
➢ Ingestion of faecal material on food or in the environment may contribute to environmental enteric dysfunction
➢ Associations between aflatoxins and stunting
➢ Regulations aimed to improve food safety may decrease the availability and accessibility of foods
➢ Food scares decrease consumption

Grace et al., 2018
Food safety & market access

- Food safety standards often exclude small firms and farms from export markets
  - Kenya and Uganda saw major declines (60% and 40%) in small farmers participating in export of fruit and vegetables to Europe under Global GAP

- Farmers supplying supermarkets are richer, better educated, more likely to be male and located near cities
- When markets differentiate by quality, substandard food is targeted to the poor

But

- Quality-demanding markets still a small share
- With support smallholders can participate in demanding markets
- Benefits to those who do and (some) evidence of spillover to their own farms
Overview

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Risk misperceptions abound: What you worry about and what makes you sick and kills you are not the same

- Pork value chain Vietnam
- 366 kidney, liver and pork samples were pooled into 18 samples analysed for antibiotic residues, β-agonists, and heavy metals
- ~1% over MRL with minor implications for human health

- Quantitative microbial risk assessment for salmonellosis acquired from pork
- Annual incidence rate estimated to be 12.6% (90% CI: 0.5 – 42.6).
- Driven by cross-contamination in households followed by prevalence in pork sold in the central market.

*Thinh et al., 2020*
Experts are also wrong

WB, forthcoming
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Foods implicated in FBD

- Painter et al., 2013, Sudershan et al., 2014, Mangan et al., 2014; Tam et al., 2014; Sang et al., 2014; ILRI, 2016
### 2006 to 2016

**TB** -23%

**HIV** -44%

**Malaria** -27%

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**FBD bucking the trend**

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Change Compared with 2006-2008</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Campylobacter</em></td>
<td>↑ 9%</td>
</tr>
<tr>
<td><em>E. coli O157</em></td>
<td>↓ 30%</td>
</tr>
<tr>
<td><em>Listeria</em></td>
<td>No change</td>
</tr>
<tr>
<td><em>Salmonella</em></td>
<td>No change</td>
</tr>
<tr>
<td><em>Vibrio</em></td>
<td>↑ 34%</td>
</tr>
<tr>
<td><em>Yersinia</em></td>
<td>No change</td>
</tr>
</tbody>
</table>

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**2015 Food Safety Report**

*Per 100,000 population

Culture-confirmed infections per 100,000 population

2006-2008 were the baseline years used to establish Healthy People 2020 targets

*Shiga toxin-producing *Escherichia coli* O157

For more information, visit [www.cdc.gov/foodnet](http://www.cdc.gov/foodnet)
Overview

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Can we regulate our way to food safety?

- **100%** of milk in Assam doesn’t meet standards
- **98%** of beef in Ibadan, **52%** pork in Ha Noi, unacceptable bacteria counts
- **92%** of Addis milk and **46%** of Nairobi milk had aflatoxins over EU standards
- **36%** of farmed fish from Kafrelsheikh exceed one or more MPL
- **30%** of chicken from commercial broilers in Pretoria unacceptable for *S. aureus*
- **24%** of boiled milk in Abidjan unacceptable *S. aureus*

*Various ILRI studies*
Can we modernise our way to food safety?

➢ Supermarketisation is slower than thought.
➢ Formal sector food is risker than thought.
➢ Modern business models have often run into problems
  - Co-ops, abattoirs, market upgrades
Compliance: Formal often worse than informal
Can good practices get us to food safety?

- Many actors are well intentioned but ill informed
- Small scale pilots show short term improvements
- Smallholders have been successfully integrated into export chains
- But domestic GAP has limited effect
  - In 4 years VietGAP reached 0.06%
  - In Thailand GAP farmers have no better pesticide use than non-GAP

No behaviour change without change in incentives or choice architecture!

Lapar et al., 2017
Effective interventions

- Methodological: prioritisation, risk based approaches, HACCP
- Appropriate Technology: milk cans, boilers, disinfectants
- Novel Technology: Aflasafe
- Programmatic: street traders, T&C
- Zoonoses: control in reservoir hosts
- Policies: enabling environment
- Market based solutions - WTP

Grace et al., 2018
Towards impact at scale

- Branding & certification of milk vendors in Kenya & Guwahti, Assam led to improved milk safety.
- It benefited the national economy by $33 million per year in Kenyan and $6 million in Assam.
- 70% of traders in Assam and 24% in Kenya are currently registered.
- 6 million consumers in Kenya and 1.5 million in Assam are benefiting from safer milk.

Kaitibie et al., 2010; Lapar et al., 2014; Lindahl et al., 2014; Mellin 2015
Technological interventions coupled with training of value chain actors

savings on firewood / month
= 900,000 UGX (260 US$) + >100 trees

Reach:
50% of all pork butchers and their 300,000 customers in Kampala

Roesel, 2018
Gumboots (6US$)
Tippy tap (1US$)
Bar of soap (0.50US$)
250mL bleach (0.70US$)
Laminated poster and certificate (6 US$)
= ca. 15 US$ per kit

Roesel, 2018
Three legged stool

**Pull approach** (demand for safe food)

- Consumers recognize & demand safer food
- Consumer campaign for empowered consumers

**Push approach** (supply of safe food)

- VC actors respond to demand & incentives
- Inform, monitor & legitimize VC actors

**ENABLING ENVIRONMENT**

- Build capacity & motivation of regulators
- Consumer campaign for empowered consumers
Take home messages

➢ FBD is important for health and development

➢ Huge health burden: most is due to microbes & worms in fresh foods sold in wet markets

➢ Hazards in informal markets are usually high but risks are sometimes low, and perception is a poor guide to risk

➢ FBD is probably increasing

➢ Currently no proven approaches for mass markets in LMIC that are scalable and sustainable

➢ Control & command approaches don’t work but solutions based on incentives & working with the informal sector more promising
END

COMMENTS AND OR QUESTIONS