



# FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

# 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

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# FOOD SAFETY IN DEVELOPING COUNTRIES: AN OVERVIEW

A learning resource for DFID Livelihoods Advisers



Delia Grace, October 2015



## 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



Edited by Kristina Roesel and Delia Grace

*Int. J. Environ. Res. Public Health* **2015**, *12*, 10490-10507; doi:10.3390/ijerph120910490

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Review

### Food Safety in Low and Middle Income Countries

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Academic Editors: Mieke Uyttendaele, Eelco Franz and Oliver Schlüter

White Paper

Food safety in developing countries: research gaps and implications

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The influence of livestock-derived foods on the nutrition of mothers and infants during the first 1,000 days of a child's life

# The Safe Food Imperative

*Accelerating Progress in Low- and Middle-Income Countries*





# Overview

1. Impact of FBD in developing countries
2. Foodborne disease: sources, foods implicated, trends
3. Managing FBD



# Foodborne disease matters for development

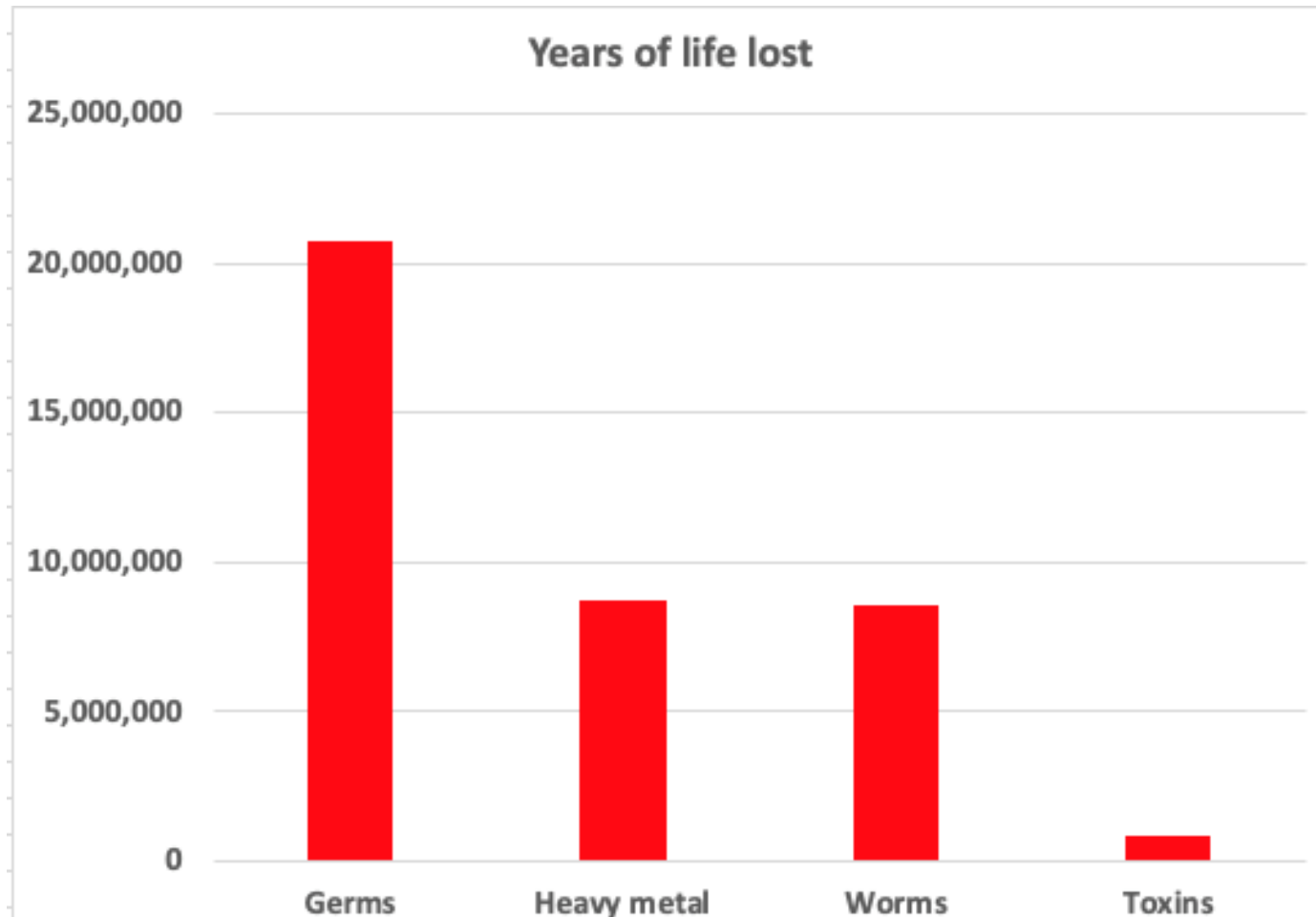
- Developing country consumers show high concern over FBD
- The huge health burden of FBD is borne mainly by developing countries
- FBD has high economic costs: health, agriculture & economy-wide
- FBD limits access of poor farmers to export markets and threatens access to domestic markets
- FBD discriminates: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

# Why food safety matters

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

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

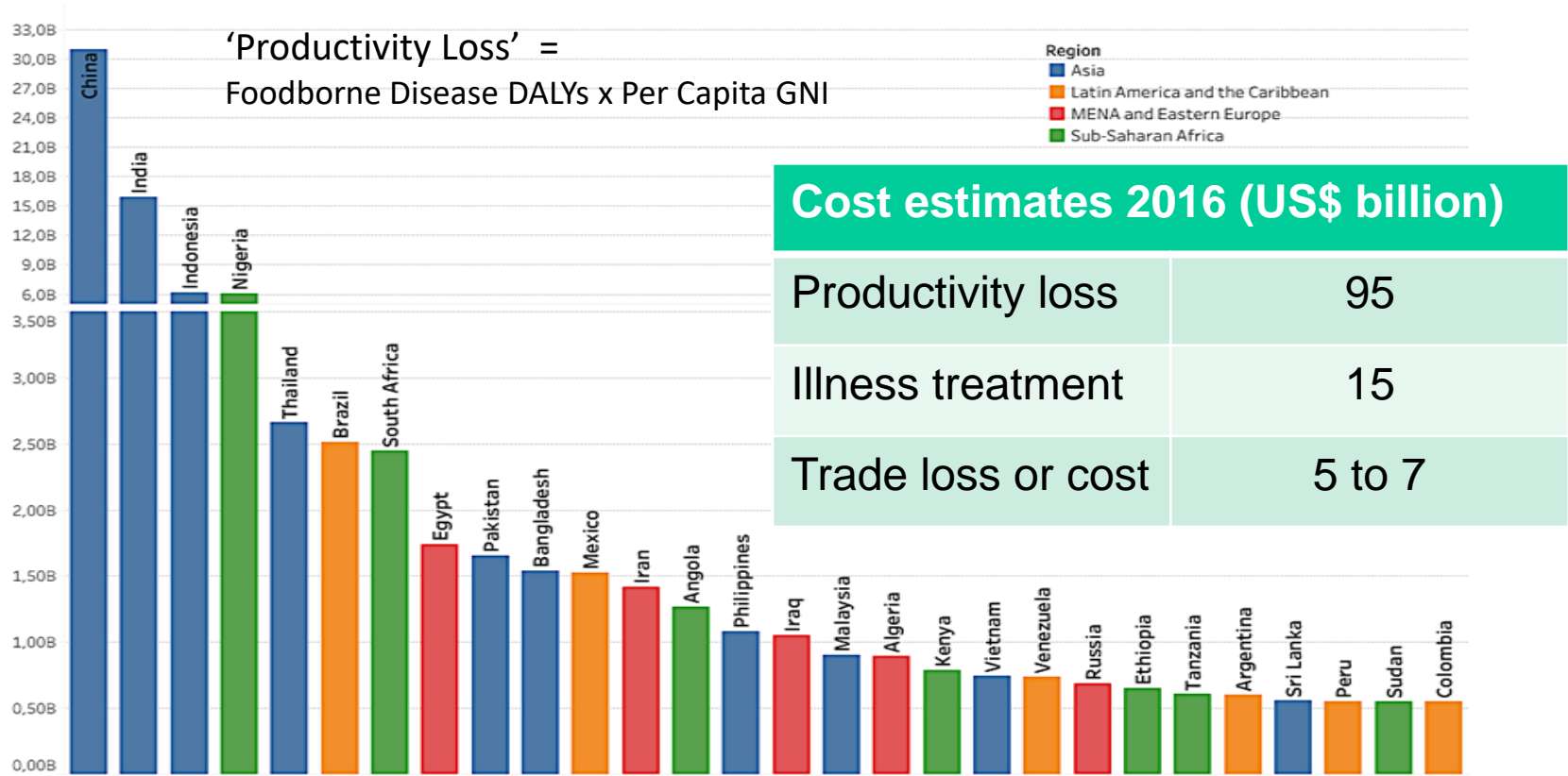
*Havelaar et al., 2015*



- 4 heavy metals
- 1mio illnesses
  - 56,00 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



Based on WHO/FERG & WDI Indicators Database

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



## Milk (cow)

Production: men (x Nairobi)

Processing: women

Marketing: women (x Abidjan)

Consumed: both

## Milk (goat)

Production: men (w milk)

Processing: women

Marketing: women

Consumed: both

## Beef/goat

Production: men (w assist)

Processing: men

Marketing: men (butcher, pub)

Consumed: both

## Poultry

Production: women

Processing: women

Marketing: women

Consumed: both

## Pigs

Production: women

Processing: men

Marketing: men

Consumed: both

## Fish, crabs

Fishing: men

Processing: women

Marketing: women)

Consumed: both



# Food safety & nutrition

*Grace et al., 2018*

- 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



# 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

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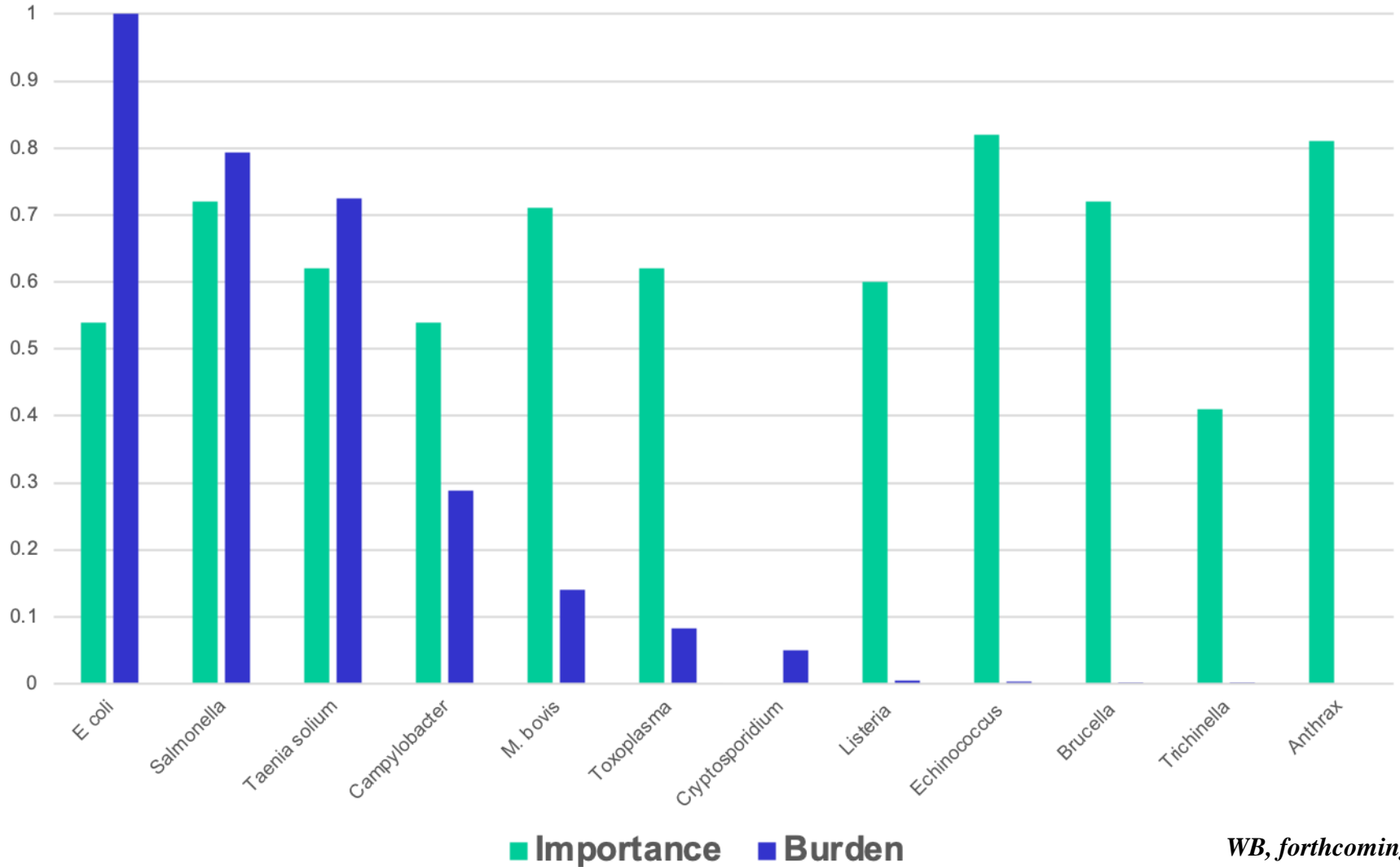
# Risk misperceptions abound: What you worry about and what makes you sick and kills you are not the same

*Thinh et al., 2020*

- Pork value chain Vietnam
- 366 kidney, liver and pork samples were pooled into 18 samples analysed for antibiotic residues,  $\beta$ -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.



# Experts are also wrong



*WB, forthcoming*

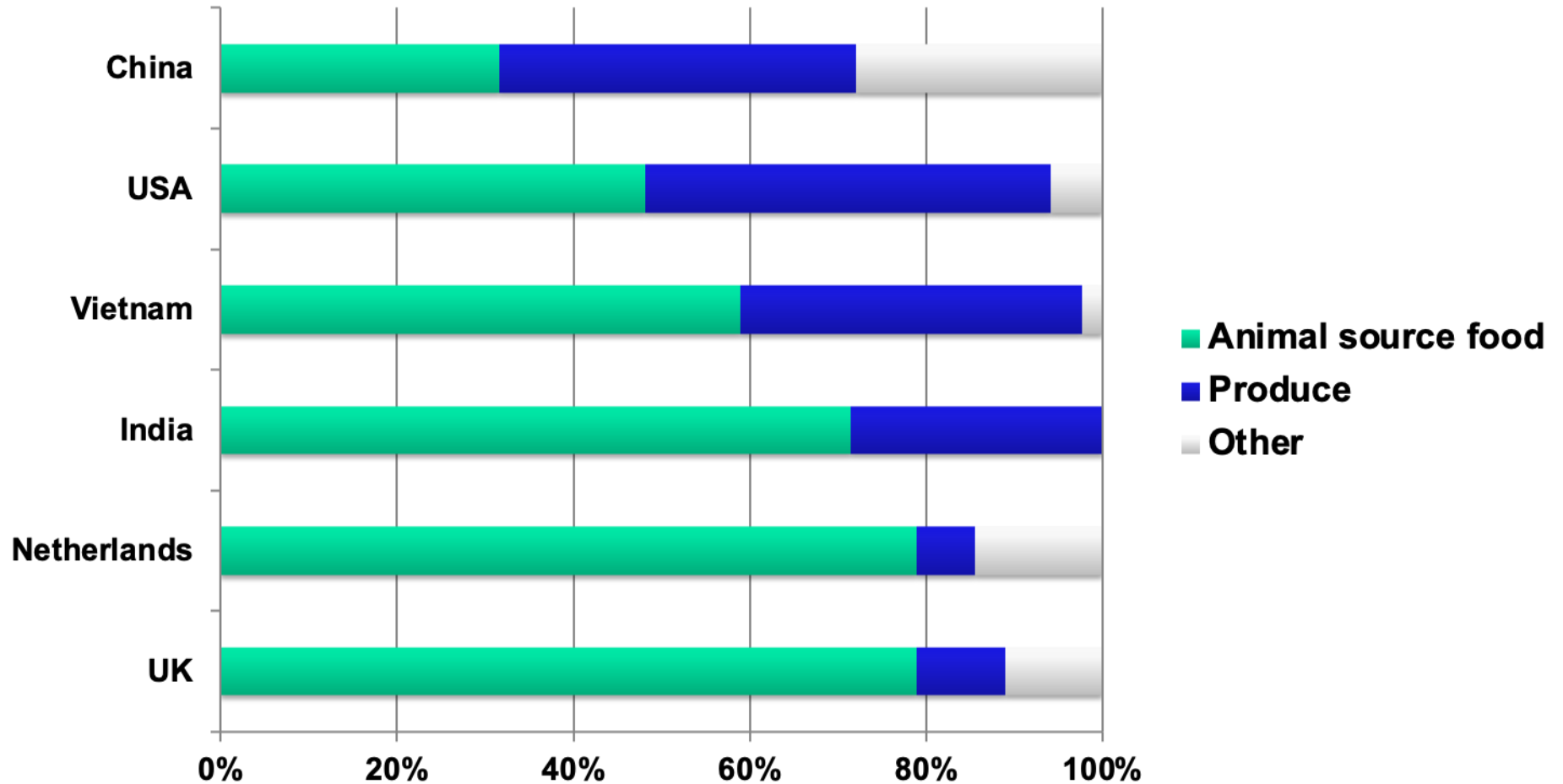


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# Foods implicated in FBD



Painter et al., 2013, Sudershan et al., 2014, Mangan et al., 2014; Tam et al., 2014;  
Sang et al., 2014 ; ILRI, 2016







# FBD bucking the trend

2006 to 2016

TB -23%

HIV -44%

Malaria -27%

Pathogen	2015 Food Safety Report Change Compared with 2006-2008 <sup>§</sup>	
<i>Campylobacter</i>	↑ 9%	
<i>E. coli</i> O157 <sup>¶</sup>	↓ 30%	
<i>Listeria</i>	No change	
<i>Salmonella</i>	No change	
<i>Vibrio</i>	↑ 34%	
<i>Yersinia</i>	No change	



U.S. Dept.  
Health &  
Centers for  
Disease Control &  
Prevention

CS264717-A

April 20

<sup>¶</sup>Per 100,000 population  
<sup>†</sup>Culture-confirmed infections per 100,000 population  
<sup>§</sup>2006-2008 were the baseline years used to establish Healthy People 2020 targets  
<sup>¶</sup>Shiga toxin-producing *Escherichia coli* O157

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

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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*

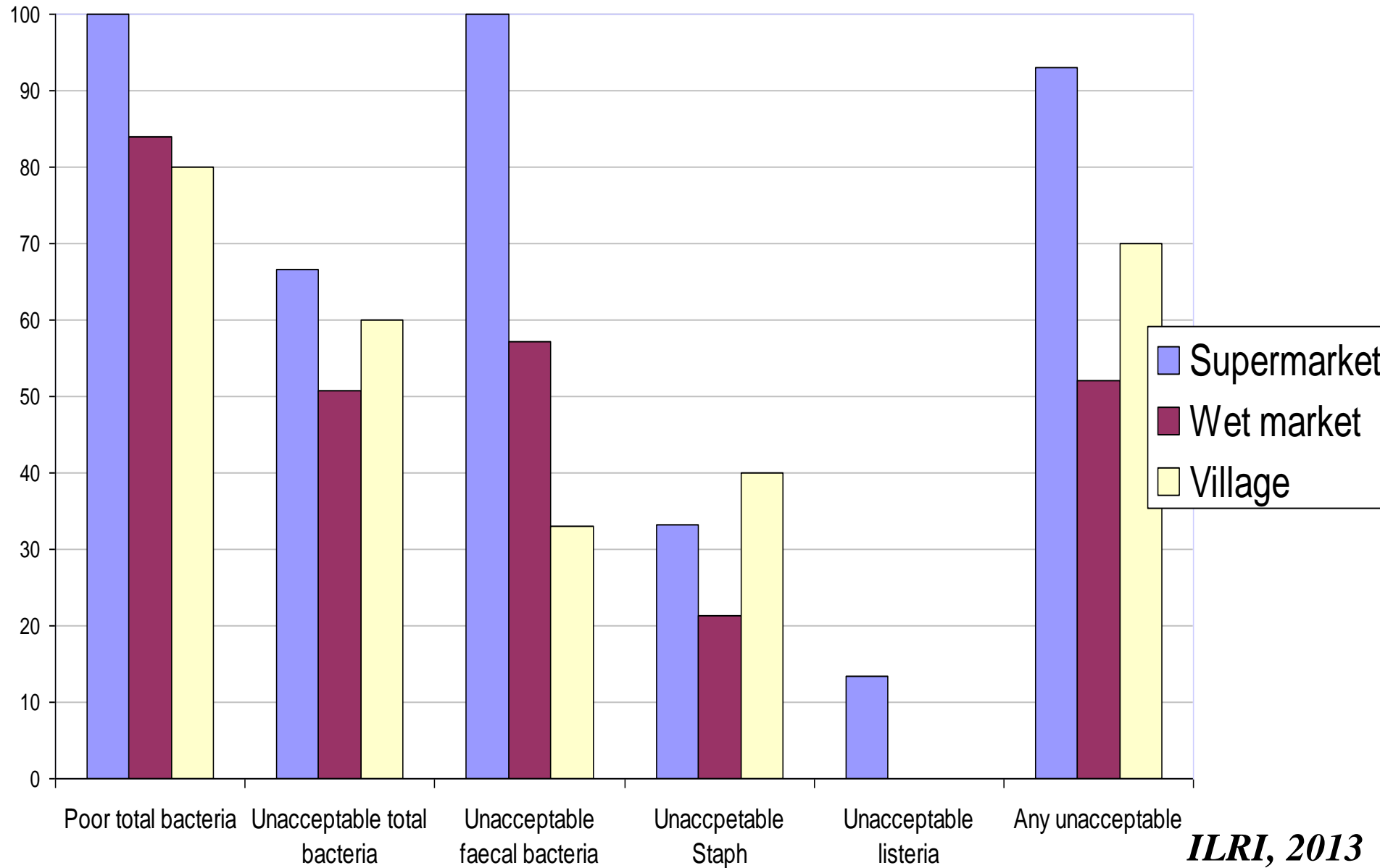


# Can we modernise our way to food safety?

- Supermarketisation is slower than thought.
- Formal sector food is riskier 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



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

Roesel, 2018



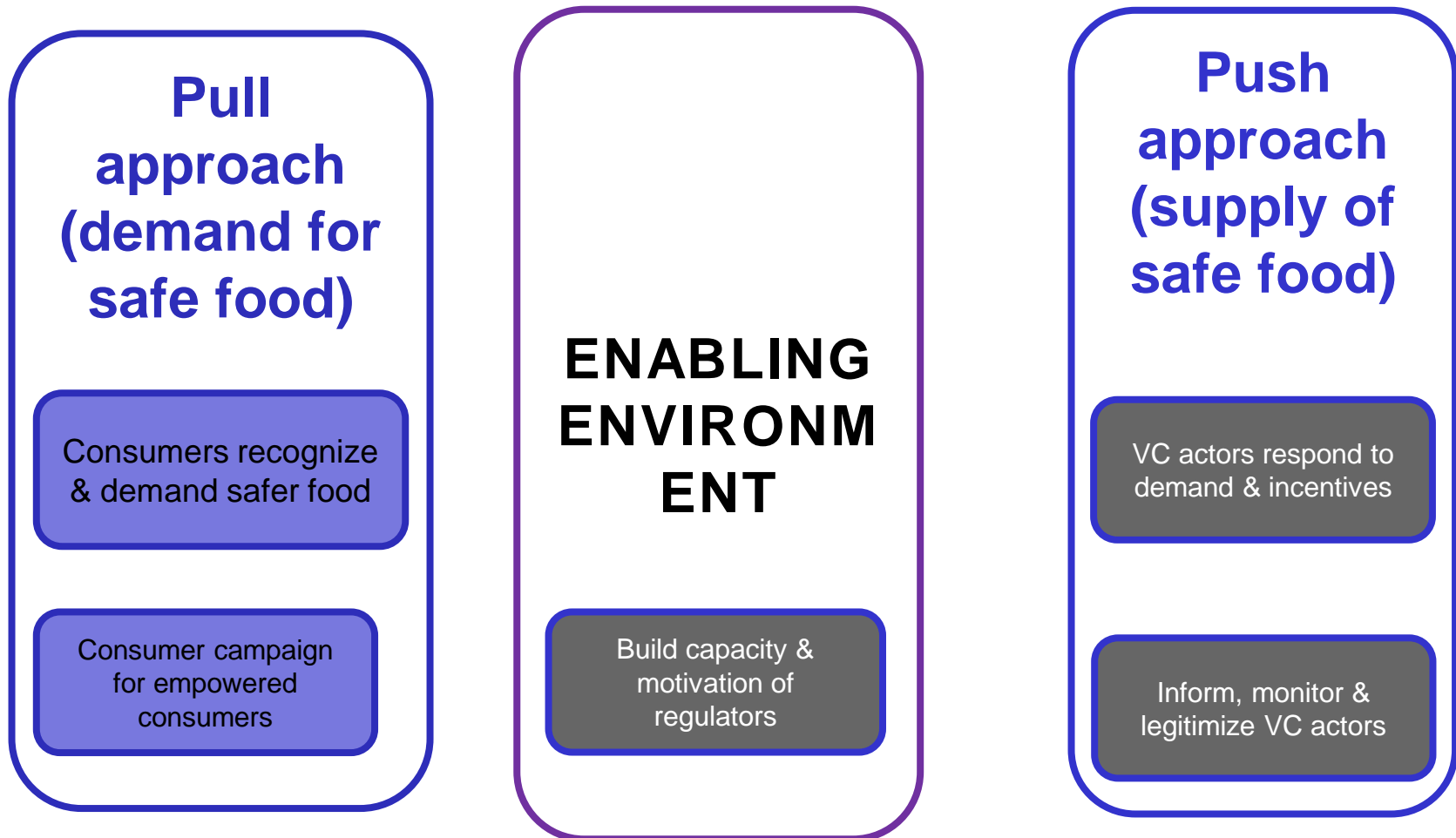
savings on firewood / month  
= 900,000 UGX (260 US\$) + >100 trees







# Three legged stool



# 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



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END

COMMENTS AND OR QUESTIONS