Changing Disease Landscapes
World Livestock 2013

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# Global ranking of food and agriculture commodities in value terms (2010)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Commodity</th>
<th>Production value ($ billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rice, paddy</td>
<td>180</td>
</tr>
<tr>
<td>2</td>
<td>Cow milk, whole, fresh</td>
<td>180</td>
</tr>
<tr>
<td>3</td>
<td>Indigenous Cattle Meat</td>
<td>172</td>
</tr>
<tr>
<td>4</td>
<td>Indigenous Pig meat</td>
<td>168</td>
</tr>
<tr>
<td>5</td>
<td>Indigenous Chicken Meat</td>
<td>122</td>
</tr>
<tr>
<td>6</td>
<td>Wheat</td>
<td>81</td>
</tr>
<tr>
<td>7</td>
<td>Soybeans</td>
<td>66</td>
</tr>
<tr>
<td>8</td>
<td>Tomatoes</td>
<td>55</td>
</tr>
<tr>
<td>9</td>
<td>Sugar cane</td>
<td>54</td>
</tr>
<tr>
<td>10</td>
<td>Maize</td>
<td>54</td>
</tr>
</tbody>
</table>

Source: FAOSTAT
Rural vs urban populations
1950-2030

Urbanização em aceleração

Billion people

UN, World Population Assessment 2002
Per caput consumption of major food items in developing countries – kg per caput per year (index numbers 1961=100)

Source: FAO-SOFA 2009
Meat production is growing

Source: FAO-SOFA 2009
Megacities 2013
World Population

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Human Poverty

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Public Health Spending

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FIGURE 1: Economic Impact of Selected Infectious Diseases: Recent Livestock Disease Outbreaks and SARS

- SARS
  - China, Hong Kong, Singapore, Canada
  - $30-50 bn

- Foot & Mouth
  - UK
  - $25-30 bn

- Avian Flu, Asia
  - $10-15 bn

- BSE, US
  - $3.5 bn

- BSE, Canada
  - $1.5 bn

- BSE, Japan
  - $1.5 bn

- HPAI, Italy
  - $400 m

- Avian flu, NL
  - $500 m

- Classical Swine Fever
  - Netherlands, $2.3 bn

- Foot & Mouth Taiwan, $5-8 bn

- Nipah, Malaysia
  - $350-400 m

- Figures are estimates and are presented as relative size.

- BSE, UK
  - $10-13 bn
Tackling the disease at source
Four Drivers

Four distinct driver-disease complexes
1. The poverty-related endemic disease burdens in humans and livestock.
2. The biosafety challenges posed by globalization and climate change.
3. The food and agriculture-related (veterinary) public health threats.
LBM Networks in Guangxi, Yunnan and Hunan

Source: V. Martin et al. (2011)
4. Risks in species jumps of disease agents from wildlife to livestock and humans.
Drivers and locations of emergence events for zoonotic infectious diseases in humans 1940–2005

Strategic Changes

- **Paradigm shift** in risk assessment
- **Health-in-development** approach
- Whole of *society*
- Analysis of these drivers to define **preventive** and **sustainable policies**
Disease Burdens

Developing countries

- High burdens of disease in humans and animals
- Tropical diseases are prominent
- In livestock, the high disease burden goes hand-in-hand with low productivity levels, poverty
  - Sick animals are less productive
  - No not express their genetic potential
  - Early death is wasteful
  - Rejection is waste
Disease Shocks

In Transition / Developed Countries

- Disease spread—Monocultures/less biodiversity
- Counter-epizootic measures
  - Culling, compensation
  - Closure or markets (international and local)
  - Prices
- Peri-urban instabilities
- Loss of genetic resources
- Early death is wasteful
- Ethics
Disease outbreak timeline

Incubation $\rightarrow$ emergence $\rightarrow$ spread $\rightarrow$ persistence $\rightarrow$ (and recrudescence)

“Shift to the left”

- Early Detection/Warning and Early Response (EW/ER)
- Tackling disease drivers of emergence, persistence and spread (upstream policies / upstream interventions)
Response to the State + 1

Response to the State + 2
If we do not shift

- Disease increase
- Spillover to other species
- Higher losses
- Decreased consumer confidence
**Pressure-State-Response** analysis framework

**Health in Development**

Changing landscapes, encroachment of natural ecosystems, globalization, climate change, land pressure and marginalization of the poor, altering host environments and the host availability to existing pathogens.

Diminished agro-ecological and social resilience to disease emergence, spread and persistence, affecting humans, animals and ecosystems.

Health protection policies and strategies integral to Sustainable Development.
Tackling drivers of persistence

- Tackle the drivers
- Reduce vulnerability
- Enhance resilience

Disease drivers:
- Disease emergence, spread and persistence

Response:
- Disrupt disease transmission
- Strengthen health systems
• Adopting a health in-development perspective, with emphasis on self-help safety practices at the grass-root level
• Addressing health, food, and income security in conjunction with the other Sustainable Development Goals

Clinics, vaccinations, parasiticides, etc.
Tackling drivers of persistence

- Develop policies and strategies aiming at mitigating health and biosecurity risks associated with travel, trade and traffic
- Mitigate GHG emissions through healthier and more productive livestock

Globalization and climate change

- Global redistribution of pathogens, vectors and hosts evolution of new forms of disease
- Global impact most visible in the countries in the northern hemisphere that are relatively disease free

International collaboration to establish a virtual observatory on microbial dynamics and hazards at the human-animal-ecosystem interface
Tackling drivers of emergence and spread

Pressure

State

Response

Definition of preventative measures in food and agriculture, and in the interface with human living environment and natural ecosystems

Unsustainable food & agriculture
Rapid livestock development

- Major livestock epidemics, food safety hazards, antimicrobial resistance, zoonoses, pathogen spill-over and pandemic threats (influenza A viruses in poultry and swine)
- Global health and socio-economic impacts

- Strengthening and renovation of animal health and veterinary public health systems
- Establish risk factors and critical control points for pathogen

Strengthening and renovation of animal health and veterinary public health systems

Response to unsustainability in food and agriculture

Drivers of emergence and spread of pathogens

- Unsustainable food & agriculture
- Rapid livestock development
Enhanced spillover of wildlife origin pathogens to humans translating into species jumps

Risk of severe pandemics

Collaboration among ecohealth, animal health and public health professionals to establish risk factors and critical control points linking spillover to change in wildlife ecology and behavior

Discontinue unsustainable wild meat practices
Reduce risks through natural resource management
Reduce risks resulting from exploitative agriculture

Pressure on ecosystems, natural resource base, deforestation resulting from agricultural encroachment biodiversity loss and wild meat related practices

Enhanced spillover of wildlife origin pathogens to humans translating into species jumps
Risk of severe pandemics

Discontinue unsustainable wild meat practices
Reduce risks through natural resource management
Reduce risks resulting from exploitative agriculture

Pressure

State

Response

Collaboration among ecohealth, animal health and public health professionals to establish risk factors and critical control points linking spillover to change in wildlife ecology and behavior
Four streams of work:

- Tackling the poverty driven endemic disease burdens in humans and livestock
- Biological threats driven by globalization and climate change
- Creating a safer food & agriculture, starting with livestock
- Preventing specific jumps from wildlife

Mitigation

Building social and agro-ecological resilience

Adaptation

Strengthening and renovating health systems

Response

State

Pressure

Public-Private Partnerships
Take home messages for the AAVMC

• Animal health and human health links
• ... zoonoses, nutrition, safeguarding of the food chain, protection, welfare/wellbeing
• ... environmental health
• Reach out; ..... further out
• Shift to the left
• Prepare the future generation with a global perspective (... and act locally, nationally, or global)
• Sound livestock policies for sustainable growth
FAO in One Health
2004 - 2014
GLOBAL AGENDA OF ACTION
IN SUPPORT OF SUSTAINABLE LIVESTOCK SECTOR DEVELOPMENT

www.livestockdialogue.org

Agriculture and Consumer Protection
Fisheries and Aquaculture
Forestry

Natural Resources and Environment
We are all connected

Thank you