

# Impact of zoonotic diseases on small-scale producers in developing countries

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# Outline

- Motivation
- Overview of impacts of animal diseases
  - Economic impacts
  - Poverty and livelihood impacts
- Challenges for market access
- Conclusions

# Motivation

- Animal diseases are taking increased prominence and awareness on the global stage
  - Rise in globalization: more trade, more potential for the introduction of pathogens (particularly from LDCs)
  - Rise in high-value commodity agriculture, including meat (“livestock revolution”): With increased incomes comes greater demand for meat and food safety; with increased demand arises new opportunities for alternative suppliers, including the poor
  - Rise in perceptions and fear: emergence of new diseases or virulent strains of old diseases with potentially dangerous impacts on human health (think avian flu)

# Motivation

- The stakes involved with the introduction of animal diseases have also increased:
  - Losses attributed to FMD in UK (2001): US\$13 billion.
    - Ekboir (1999): potential for over \$8 billion in losses in CA alone
  - The discovery of one cow in USA with BSE: 80% drop in exports.
  - Avian flu outbreaks in 2003-04 cost Vietnam and Thailand 1% of GDP (control efforts, losses in agricultural/non-agricultural income)

# Motivation

- On the flip side, globalization and increased demand for meat provides opportunities for smallholder producers (and other actors in the livestock marketing chain) in developing countries as a pathway out of poverty...
- ... *provided they can meet international food safety and SPS standards (including control of animal diseases)*
  - These standards are often a “moving target”



# Motivation

- To what extent do animal diseases impact developing countries in terms of poverty and market access (domestic and international)?
- What are the costs, benefits, and challenges associated with improved market access?



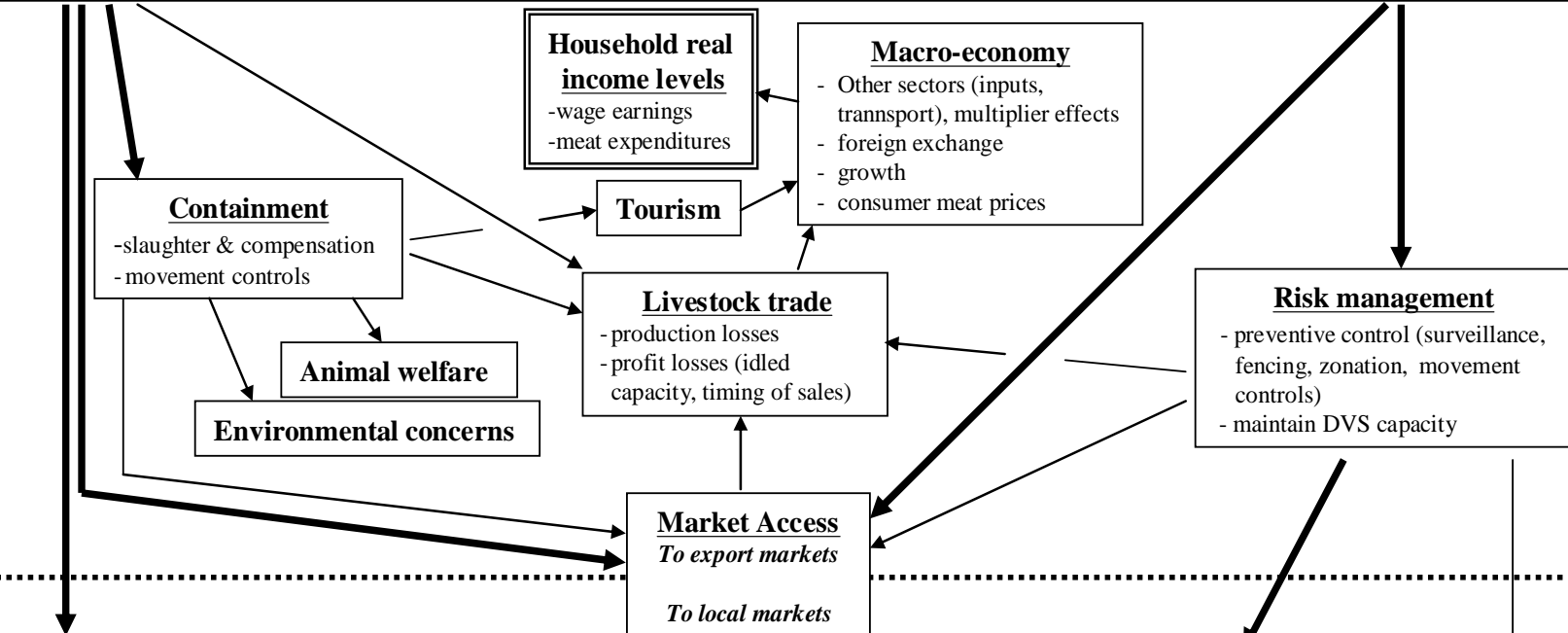
# Impacts of animal diseases

- What are the potential economic impacts of an animal disease?
- While many of these are disease-specific, there are some commonalities
- Example: FMD (based on Perry and Randolph, 2003)

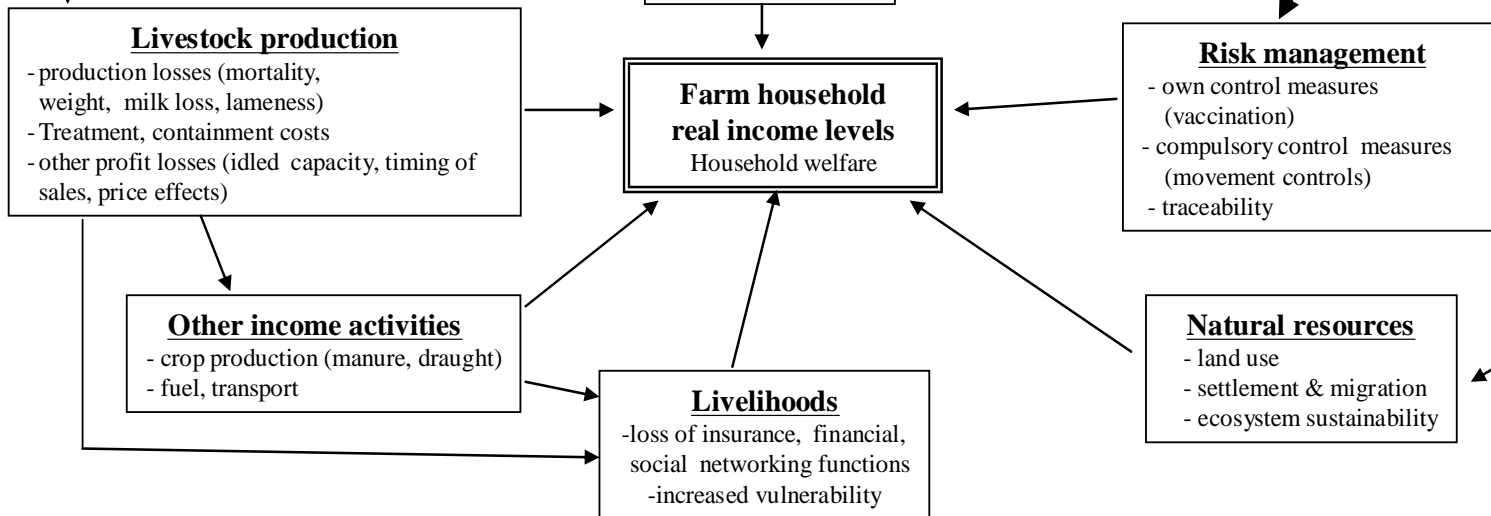
**FMD**

**Overt disease** ← **FMD** → **Disease risk**

**National and Sectoral**



**Farm-level**



# Impacts of animal diseases

- Impacts on animal productivity
  - Temporary or permanent morbidity
  - Abortions or death of young stock (implications on future stock)
  - Death of mature animals
- Market impacts
  - Reduction in prices (quarantine zones, movement bans, reduced demand) vs. localized price spikes (shortages of meat)
  - Domestic markets: difficulties in animal sales (pastoral settings)
  - International trade impacts (import bans, loss of international markets) can lead to a shift in trade and/or shift in products traded – e.g., FMD, AI in Thailand

# Impacts of animal diseases

- These impacts are dynamic: there may be both short-run and long-run impacts that should be considered.
  - How long a disease occurs matters
  - When (what season) a disease occurs matters
  - Implications on choice of control strategy (e.g., FMD in S. America)

# Impacts of animal diseases

## ■ Impacts on farm productivity

- Use of animals as draught labor for plowing  
e.g.: animal disease during harvest can affect crop productivity (example of Laos in Perry et al. 2002)
- Reduced availability of livestock byproducts:  
e.g., milk, manure

# Impacts of animal diseases

## ■ Costs of control

- Culling of animals (and potential compensation to be paid)
- Vaccination and testing of animals (equipment, personnel, logistical support): during/post outbreak
- Medications/dips (acaricides) for tick-borne diseases
- “Lobbying” or PR costs: costs of public relations to assure public and trading partners disease is being controlled
- Maintenance costs: costs of certification post-outbreak

# Impacts of animal diseases

- Animal disease impacts are not confined to farm-level impacts:
  - Impacts on domestic trade (lost revenue by transporters, brokers, etc.)
  - Impacts on processing and slaughterhouses: lost/idled employment
  - Impacts on retailers (butchers, etc.): lost sales
  - Impacts on related agricultural sectors: reduced feed demand e.g.
  - Impacts on non-agricultural industries: think things like tourism in the event of an avian flu outbreak

# Impacts of animal diseases

- There may also be externalities in other sectors from control measures themselves (e.g., application of acaricides for tick-borne diseases)
  - Environmental consequences of residues
  - Possible market access constraints on nearby downstream suppliers of other agricultural products.

# Impacts of animal diseases

- A recent qualitative assessment of Rift Valley Fever in Kenya illustrated some of the negative impacts of the outbreak along the marketing chain
- The “when” mattered for producers: outbreak took place during period of best market prices
- Traders
  - Most idled during the outbreak and forced to draw down savings to stay solvent
  - Result was the inability to resume operations post-outbreak (10 of 22 traders in cattle and 150 of 200 traders in goats in study site in NE Kenya)

# Impacts of animal diseases

## ■ Slaughterhouses

- Kill rates plunged during outbreak, with large impacts on employment, particularly casual day laborers
- For those remaining employed, incomes fell by two-thirds during outbreak, as pay linked to output (i.e., how much product handled)

## ■ Butchers

- Similar effects to slaughterhouses due to sharply reduced demand (140 kg sold/day to 3-5 kg/day)
- Inability of butchers to resume operations post-outbreak (lack of working capital)

# Impacts of animal diseases

- Multi-sectoral models have provided insights into the depths of losses caused in downstream markets and in aggregate from animal diseases:
  - RVF (Kenya): estimated national losses of US\$32 million (ILRI 2008)
  - RVF (Somali region of Ethiopia): loss of \$132 million in value added due to RVF-related trade bans
  - FMD (Zimbabwe): declines in income and employment in processing sectors from no control scenarios (Perry et al. 2003)
  - FMD (S. America): regional spillovers from FMD when intra- and inter-regional trade are accounted for (Rich and Winter-Nelson 2007)

# Impacts of animal diseases

- If we look specifically at impacts on the poor in developing countries, these can be severe:
  - Loss of livelihoods (pastoral settings, emerging semi-commercial farmers)
  - Loss of employment, particularly for downstream industries – lack of alternative opportunities
- Some impacts can be difficult to measure
  - Cultural significance to keeping animals (e.g. poultry in Indonesia)



# Challenges for market access

- Certainly, animal diseases (including zoonotics) impose a multitude of costs on the livestock sector.
- What are the associated benefits that could be gained from disease control in terms of market access?
- And what are some of the marginal costs and challenges associated with those?

# Challenges for market access

- A common denominator for market access: the role of incentives
- Poor stakeholders in developing countries are often resource-constrained: benefits to disease control may be low relative to their costs
  - What are benefits in terms of market access?
  - Can these benefits be raised (or costs lowered)?



# Challenges for market access

- Avenues for increased market access:
  - Change in international trading standards
    - Commodity-based trade
    - Compartments
  - Private sector led development
    - New markets
    - New value chains
    - Improved capacity

# Challenges for market access

- Improving the benefits to stakeholders may necessitate a rethink on issues such as trading standards
  - Commodity-based approaches to trade
  - Compartmentalization
- In a commodity-based world, the final product is what matters, not disease-free zones.
- As long as the final product can be proven to be safe and free of diseases of trade (e.g., FMD), commodity-based trade would theoretically enhance market access for any supplier that can meet these standards
  - Many growth markets, including Middle East & developing world



# Challenges for market access

- Compartments are integrated disease-free zones that ensure disease freedom throughout the livestock value chain, but do not necessarily require a contiguous geographical area.
- In theory, compartments could reduce the costs of maintaining disease freedom.

# Challenges for market access

## ■ Idea:

- Try to lower costs of compliance while minimizing the risk to consumers
- Could improve market access for producers, stimulate improved production practices

## ■ Challenges:

- Costs of compliance: will SPS standards be too expensive and/or involve high transactions costs?
- Competitiveness in CBT world
- Will the poor benefit and how?

# Challenges for market access

- Recent work from Ethiopia illustrates the challenges with SPS compliance.
- In this study, funded by USAID, a two-phase quarantine-feedlot system has been proposed to produce certified, disease-free, grain-fed meat that can be exported to high-value markets.
- Despite relatively low labor costs and the largest cattle herd in Africa, the economic feasibility of such a system is questionable due to high feed costs in Ethiopia
  - High-quality feed needed to raise meat quality to appropriate export standards.
- Same time, poor could benefit if supply chain can be developed
  - Downstream industries
  - Ancillary markets (e.g., feed)

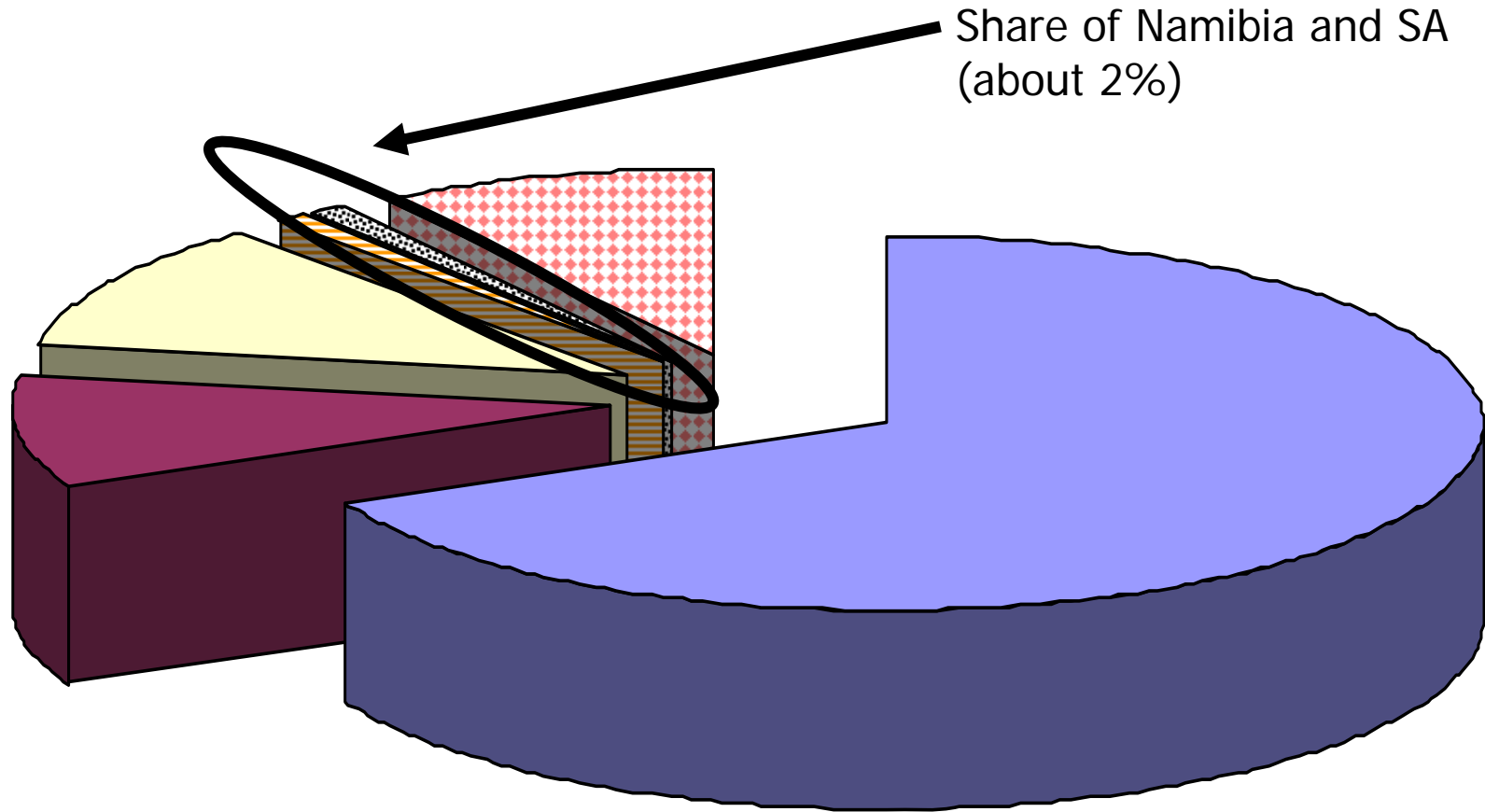
# Challenges for market access

- A challenge in a CBT world is whether targeted beneficiaries (e.g., Africa) can compete on price, scale, etc.
- Competitiveness is currently a big issue for African suppliers and under a truly “free” market, it is not clear whether they can compete
  - For example, Brazil and India currently land meat into Africa at prices US\$2,000-3,000/ton lower than those from Southern Africa.
  - Reasons: scale and diversity of markets that allows Brazil significant flexibility in marketing; low labor and input costs in India

# Current suppliers of beef to selected African countries:

Country	Product (value)	Main supplier	Market share
Algeria	Frozen beef (US\$158m)	Brazil	69%
Egypt	Frozen beef (US\$277m)	Brazil	90%
Mauritius	Frozen beef (US\$9m)	India	69%
Senegal	Frozen beef (US\$8m)	India	84%
South Africa	Frozen beef (US\$29m)	Brazil	45%

# Imports of beef by Angola and DRC, 2006

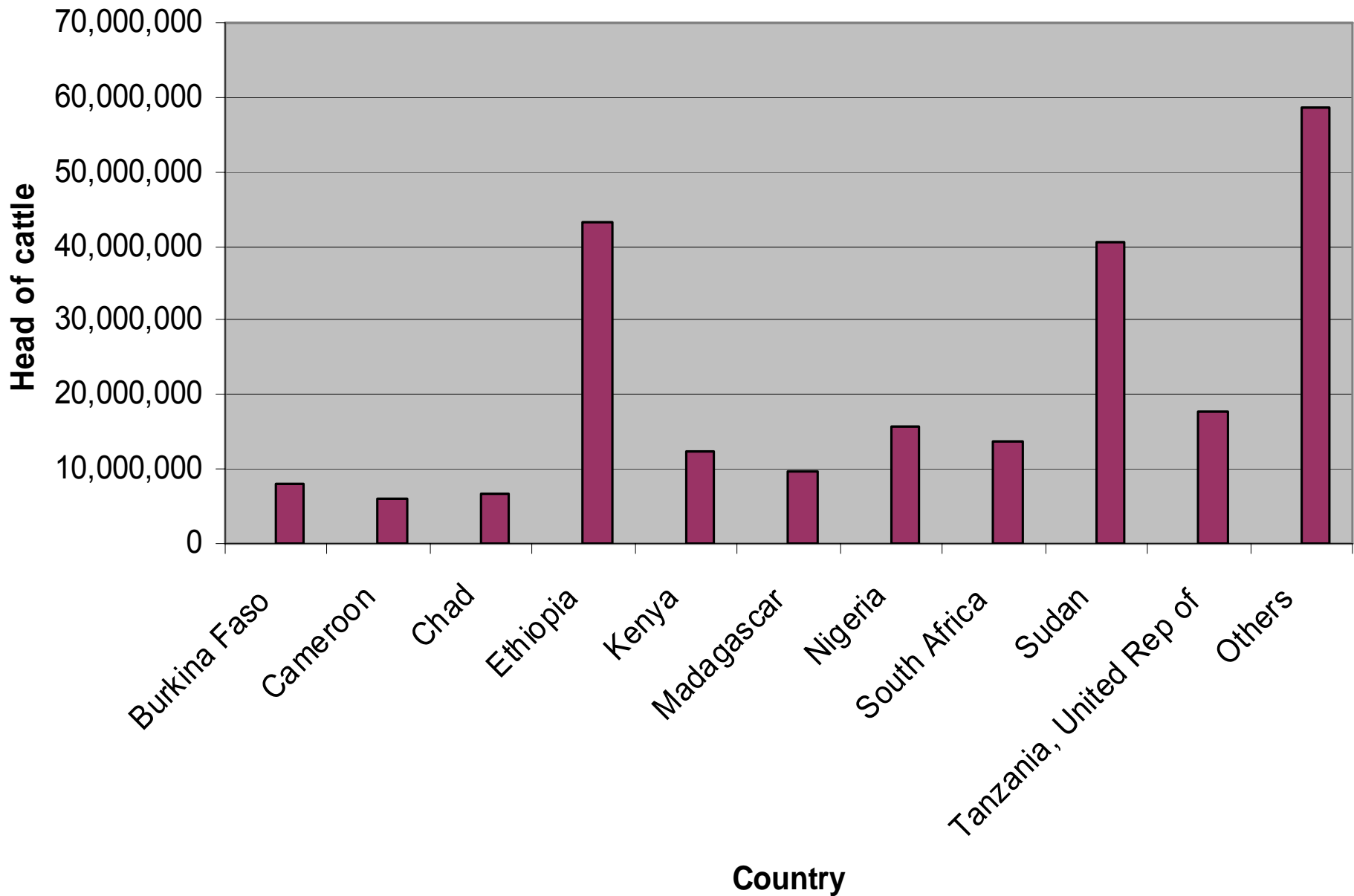


■ India ■ Paraguay ■ Brazil ■ Namibia ■ South Africa ■ Others

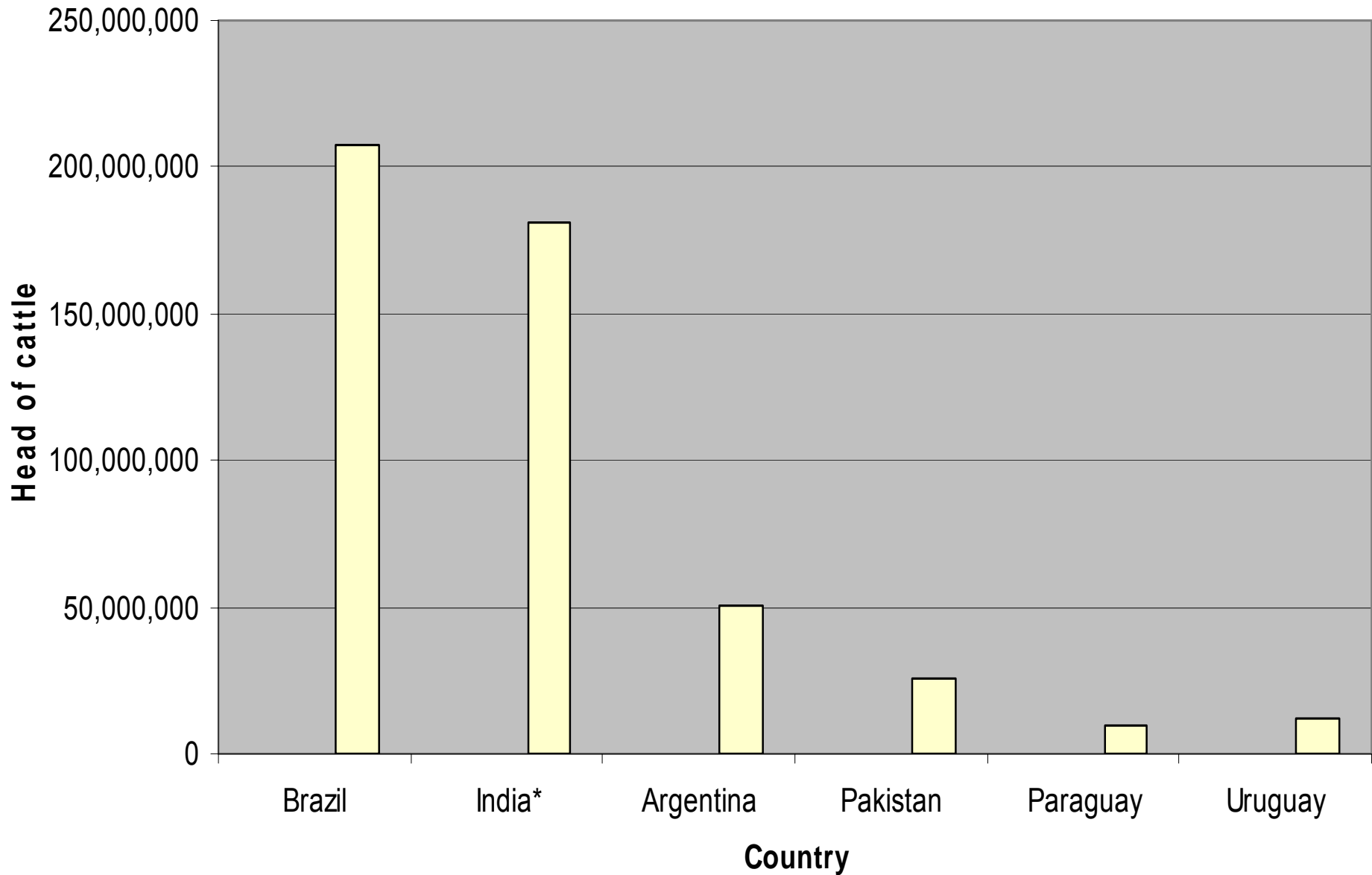
## Export unit values of main beef suppliers to Angola and DRC, 2006

<i>Market</i>	<i>Fresh carcasses</i>	<i>Fresh bone-in beef</i>	<i>Fresh boneless meat</i>	<i>Frozen carcasses</i>	<i>Frozen bone-in beef</i>	<i>Frozen boneless meat</i>
<b>India</b>			<b>\$1,544</b>		<b>\$1,407</b>	<b>\$1,427</b>
Paraguay			\$3,525		\$1,779	\$3,048
<b>Brazil</b>		<b>\$1,821</b>	<b>\$2,788</b>		<b>\$1,642</b>	<b>\$2,360</b>
Namibia		\$25,669	\$5,548		\$3,764	
South Africa	\$4,830	\$5,347	\$6,062	\$4,758	\$3,553	\$7,060

# Stocks of cattle from selected African countries, 2006



# The competition: Asia and Latin America (2006)



# Challenges for market access

- What about private sector driven initiatives?
- Research by Perry et al. (2003) showed some of the positive employment impacts of meat processing in Zimbabwe: stronger value chains → more opportunities for the poor
- Perry et al. (2005) examined some case studies of successful companies and sectors that had engaged with smallholder farmers
  - Poultry in Thailand (CP: integration with smallholders)
  - Pigs in Philippines and Viet Nam (domestic markets)
  - Farmers Choice (Kenya)
  - Kalahari Kid (South Africa): joint venture with private sector and NERPO; role of other associations
  - FAN-Namibia (beef exports to EU/South Africa)



# Challenges for market access

- Critical success factors:
  - Strong private sector participation
  - Focus on value-added products rather than live animals
  - Development of brand identities associated with quality and safety (+ systems to ensure)
  - Vertical integration
  - Limited public sector support, particularly from veterinary authorities



# Challenges for market access

- Challenges of private sector models
  - Inclusion: who benefits and how can the poor really directly benefit?
  - Which markets?
    - Are niche markets sustainable?
    - Over-reliance on protected markets: will such preferences last?

# Research needs

- Looking at the totality of impacts from a disease: need for more integrated analyses of control options and their *ex-ante* impacts
  - Farm impacts
  - Downstream impacts
  - Distributional impacts
  - Epidemiology in a systems or chain setting
- Can you identify the “weak link” in the chain?
- Current approaches (and policy): too focused on the farm level, but downstream players can both be equally (more) impacted and an important risk factor for disease spread.
- Role of bottom-up interventions (e.g., PDS in Indonesia)
- How to *prioritize* public investment (domestic and international)

# Research needs

- Greater focus on the process of livestock value chain development
  - How can value chains be developed?
  - What interventions required at a *chain-level* to improve the chain and participation of the poor (qualitative and quantitative analysis)