

Animal Research

Addressing the needs of the coming 50 years

*National Research Council Considerations for
The Future of Animal Research*

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Animal agriculture to 2050: TRENDS

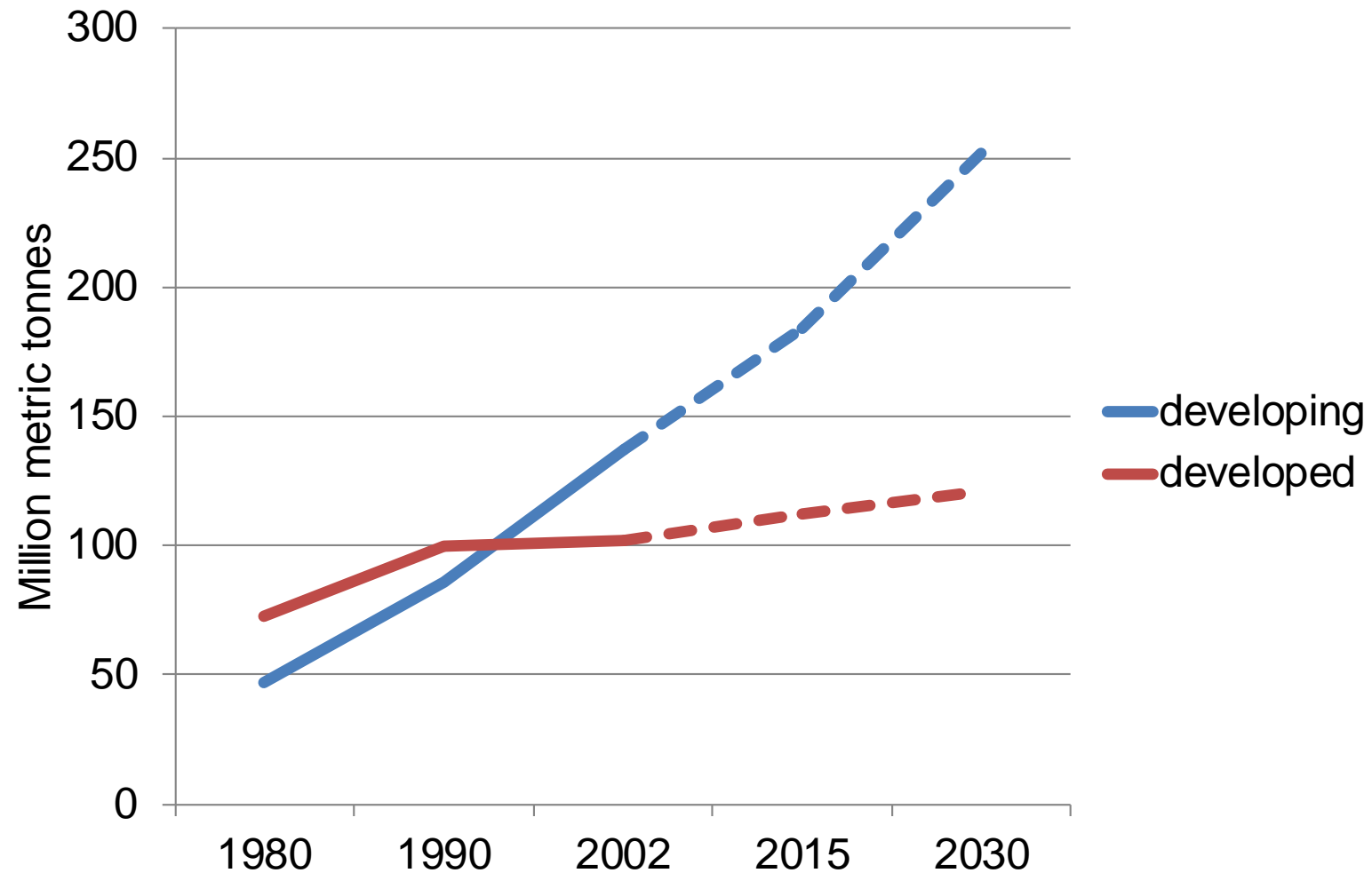
GLOBAL TRENDS:

Livestock demand and production are increasing rapidly in developing countries

- Unprecedented rising demand for livestock commodities will continue over the coming 5 decades
- Where and how most livestock commodities are produced, sold and consumed is changing significantly



Gains in meat consumption in developing countries are outpacing those of developed countries



By 2050 we'll need huge amounts of cereals, dairy and meat . . .

1bn tons more
cereals *to 2050*



1bn tons
dairy *each year*



460m tons
meat *each year*



Trajectories of growth

- **‘Strong growth’**
 - Intensifying and increasingly market oriented often transforming smallholder systems
- **‘Fragile growth’**
 - Where remoteness, marginal land resources or agro climatic vulnerability restrict intensification
- **‘High growth with externalities’ (industrial)**
 - Intensified livestock systems with diverse challenges including the environment and human health



Distinguishing opportunities

Trajectory	Sector	Issues	Opportunities
'Strong growth'	<ul style="list-style-type: none"> – Ruminant meat and milk, esp. in SSA, India – Poultry and pig in some regions 	<ul style="list-style-type: none"> – Market access and food safety – Endemic disease impacts – Zoonotic outbreaks 	<ul style="list-style-type: none"> – New opportunities for novel approaches from the animal health sector
'Fragile growth'	<ul style="list-style-type: none"> – Some smallholder and pastoral systems; little part in the production response 	<ul style="list-style-type: none"> – Multiple endemic diseases – Zoonoses – Source of disease – Movement controls 	<ul style="list-style-type: none"> – Mostly public sector interventions
'High growth with externalities'	<ul style="list-style-type: none"> – Mostly monogastric – China for all sectors 	<ul style="list-style-type: none"> – Drug resistance – Climate impacts on new vector and pathogen dynamics – Disease scares 	<ul style="list-style-type: none"> – New animal health products to respond – Modalities of operation established

Animal disease is a key constraint in Africa

- Animal disease is a key constraint:
Remove it and animal productivity increases greatly
- As livestock systems intensify in developing countries, diseases may increase



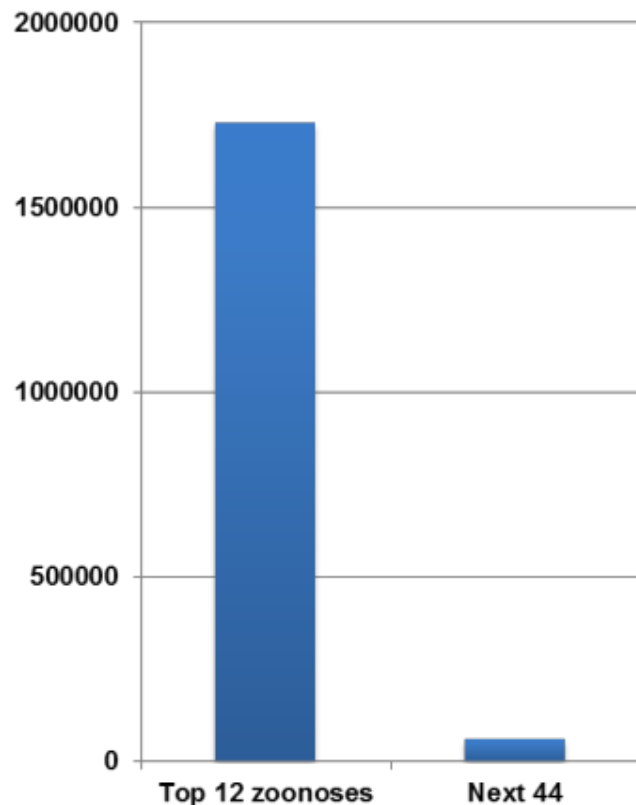
Annual mortality of African livestock

(About half due to preventable or curable diseases)

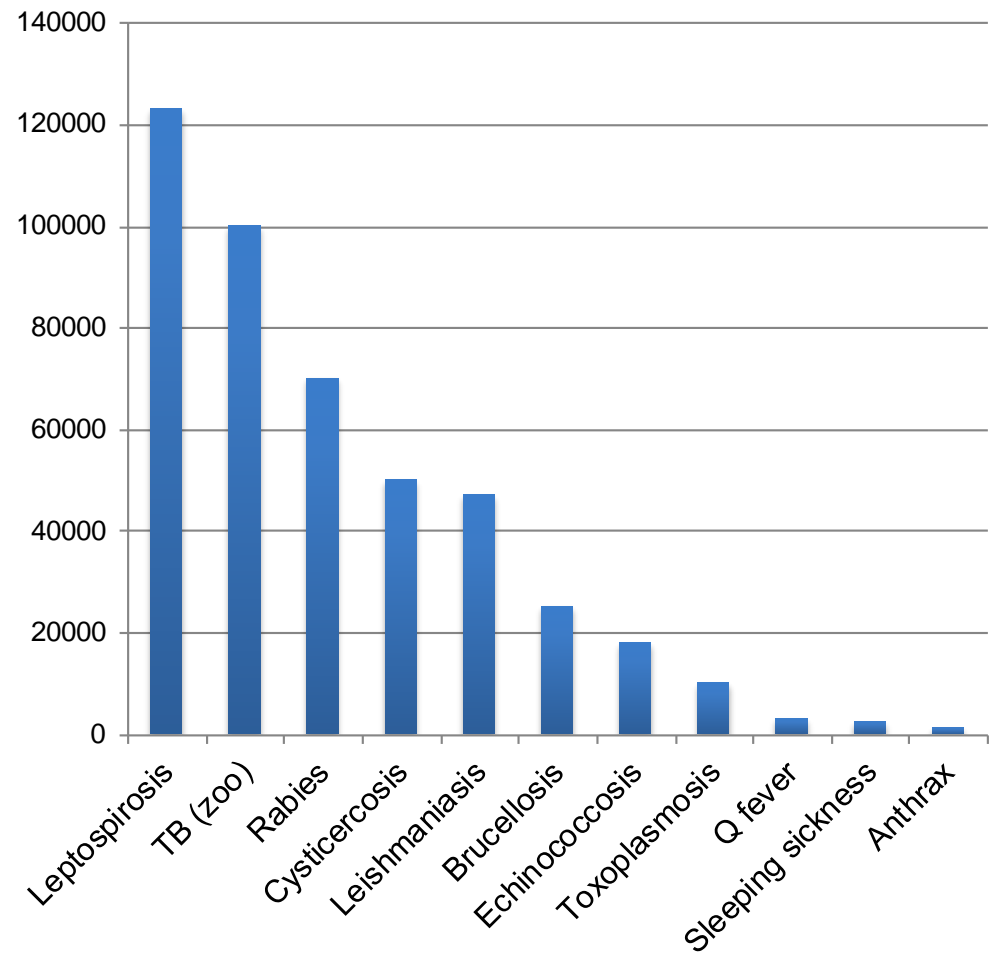
	Young	Adult
Cattle	22%	6%
Sheep /goat	28%	11%
Poultry	70%	30%

A deadly dozen zoonotic diseases each year kill 2.2 million people and sicken 2.4 billion

Annual deaths from *all* zoonoses



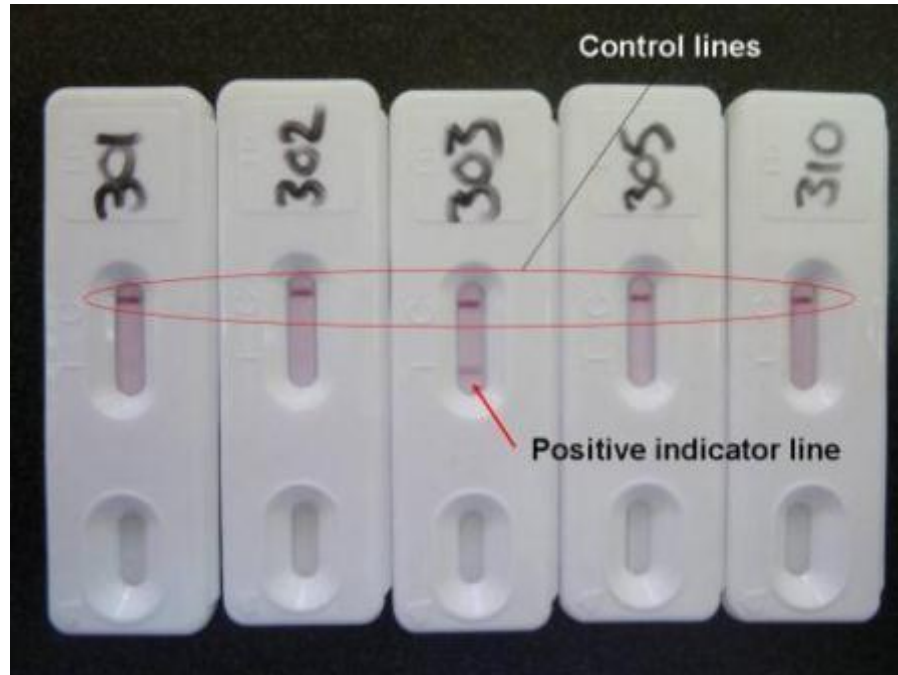
Annual deaths from *single-agent* zoonoses



Almost all losses are in developing countries

Innovations, incentives and institutions for addressing food safety

- Develop, test technologies
- Train, brand, certify informal actors including women
- Development local capacity

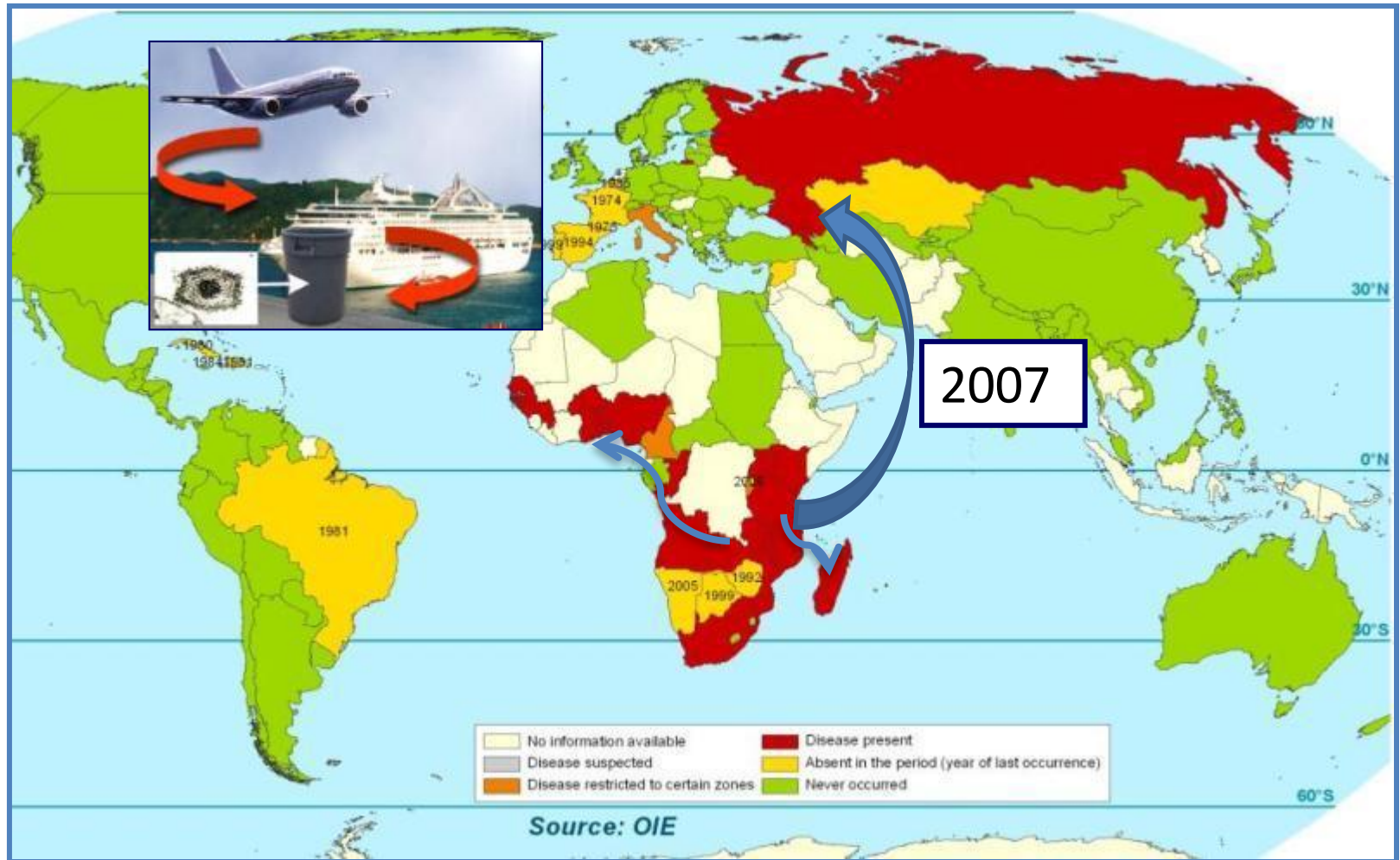


Novel lateral flow assays for cysticercosis



Women butchers sell safer meat than men

African swine fever threatens US\$150-billion global pig industry



Recent reports indicate ASF has moved into Belarus, Poland and Lithuania

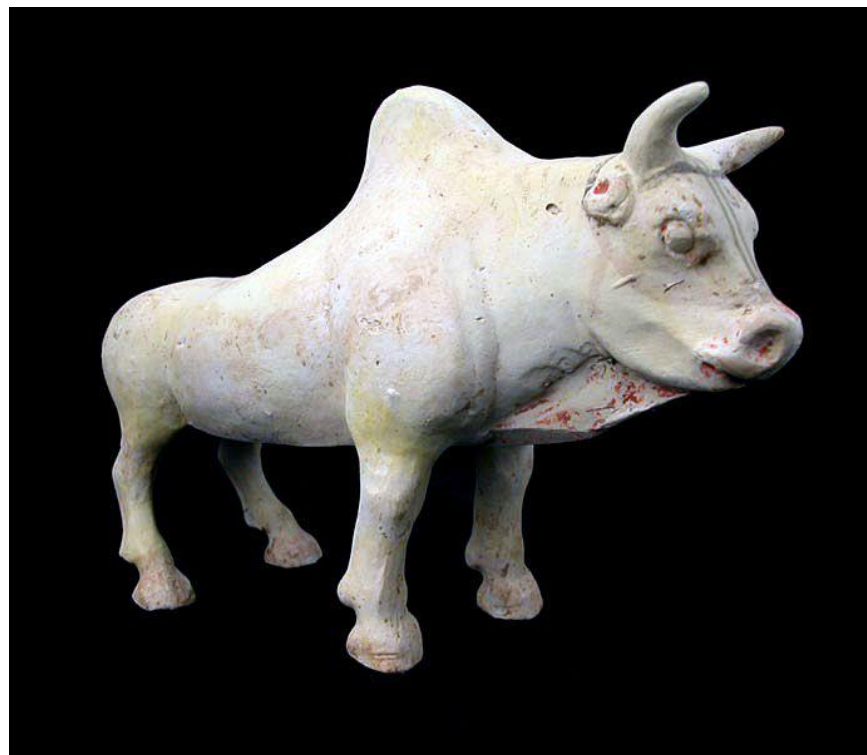
Animal feed markets: Opportunities in developing countries

- Feed technology
 - Food-feed crops
 - Ration formulation; processing and storage
 - Forage seed production and marketing
- Institutional and market issues
- Feed regulatory policies
- Animal numbers and productivity



Livestock scenario: Climate catastrophe

- With broad acceptance that a $+2^{\circ}\text{C}$ climate increase has occurred, drastic policies are put in place to prevent a further rise to $+4^{\circ}\text{C}$
 - The livestock sector is heavily taxed for its contributions to GHG emissions
 - Prices for livestock commodities skyrocket
 - Livestock production, sales and consumption all plummet, leading to increased poverty, hunger and malnutrition



Thank you



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