Impact of neglected diseases on animal productivity and public health in Africa

21st conference of the OIE regional commission for Africa,
16-20 February 2015, Rabat, Morocco

Delia Grace, Mwansa Songe and Theo Knight-Jones

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INTERNATIONAL LIVESTOCK RESEARCH INSTITUTE

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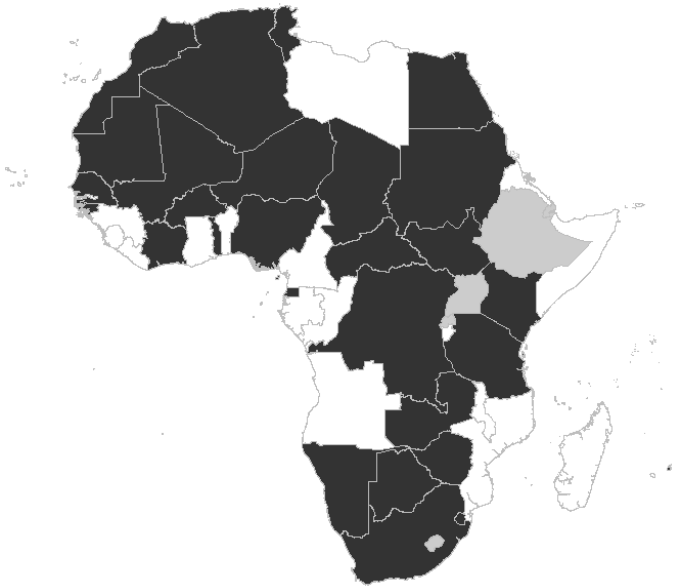
Survey methodology

- Survey commissioned and supported by OIE

- Sent to 54 Member Countries
  - 34 responded in time for inclusion:
    - 63% response rate
    - Covers 87% of ruminant, 82% poultry, 64% pig population in Africa



- December 2014-January 2015

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Survey Content

1 DISEASE PRIORITIES

2 MULTIPLE IMPACTS

3 DISEASE PREVALENCE AND CONTROL

4 TRENDS, DRIVERS AND CHANGE

5 COSTS

6 OPPORTUNITIES

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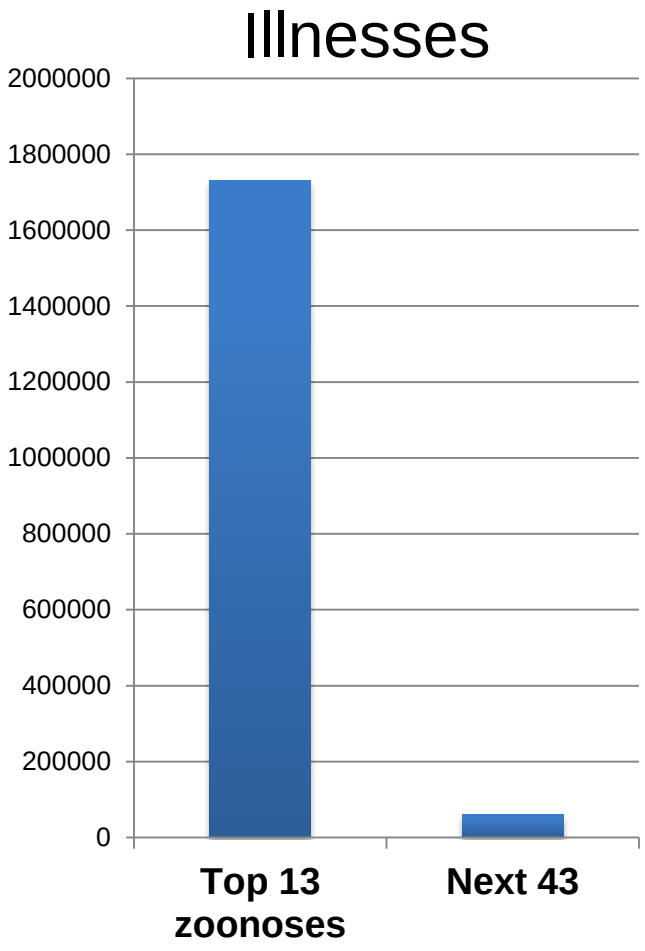
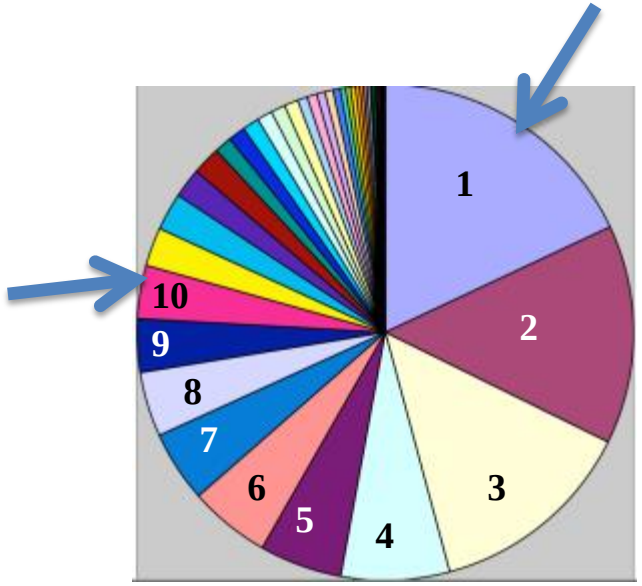
1. Disease priorities

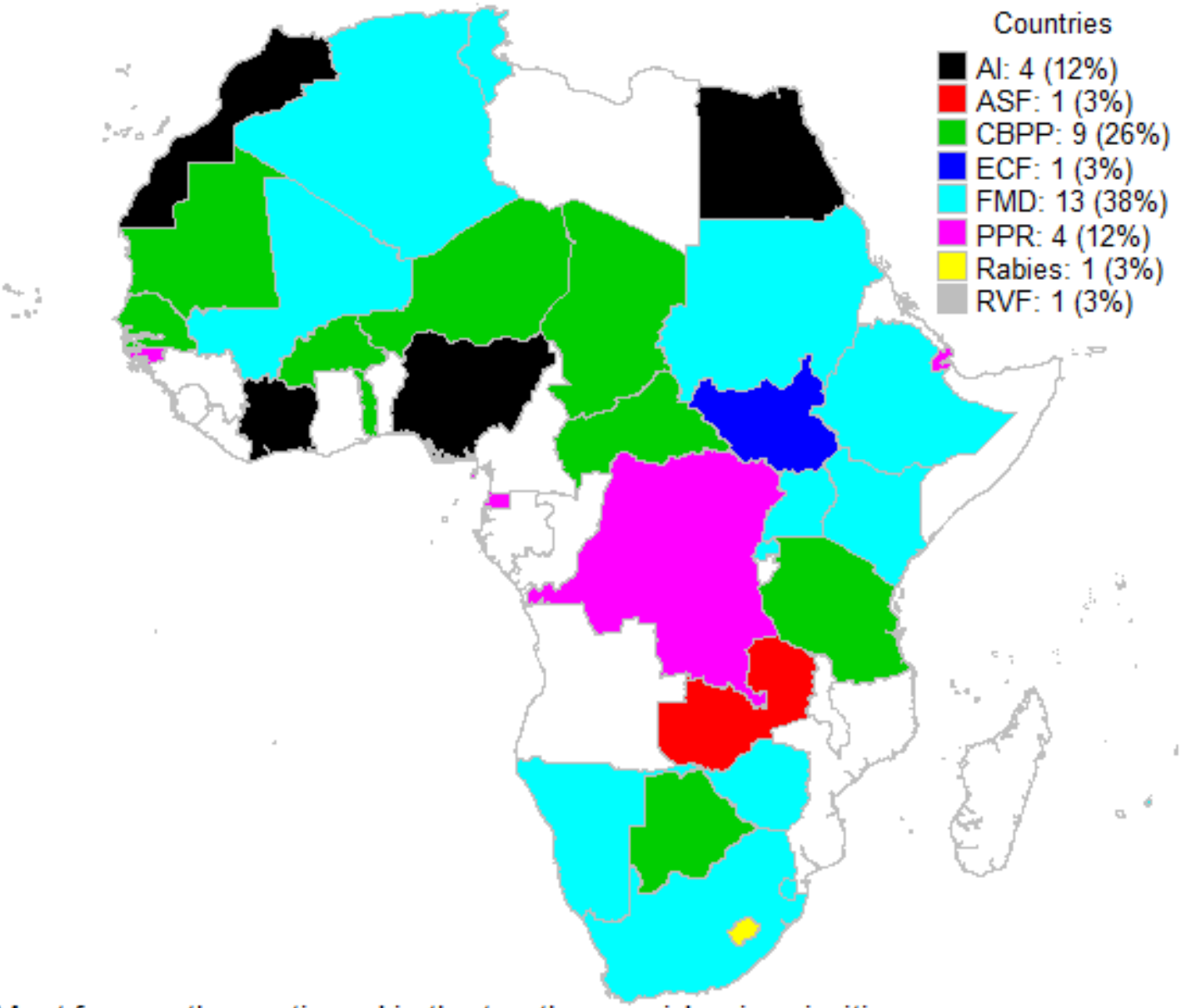
Pareto principle: the vital few & trivial many





GBD: top 10 human disease cause 90% burden

1st priority epidemic disease



Most frequently mentioned in the top three epidemic priorities
FMD: 24 (24%) - PPR: 20 (20%) - CBPP: 17 (17%) - AI: 7 (7%)

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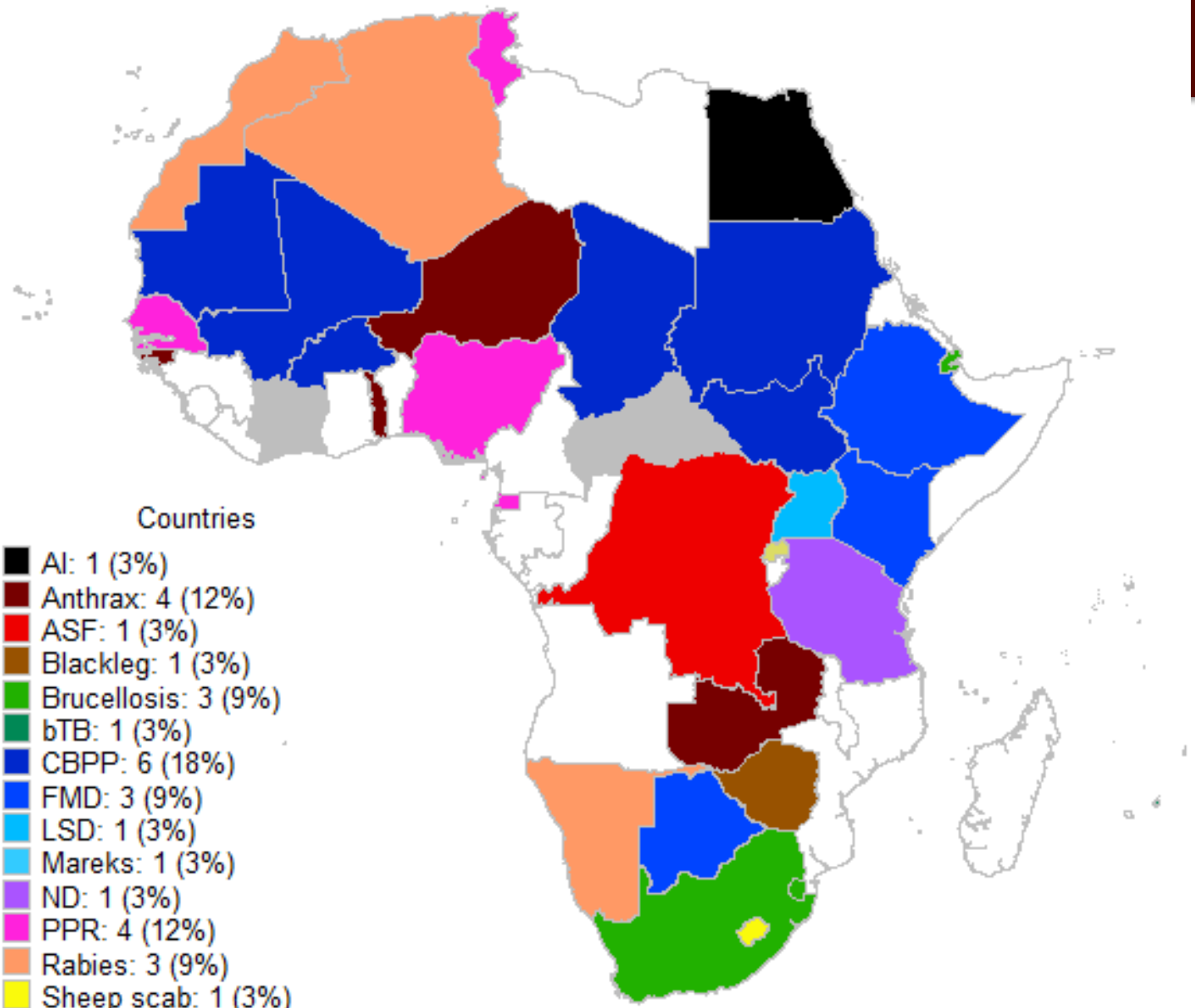
1st priority endemic disease



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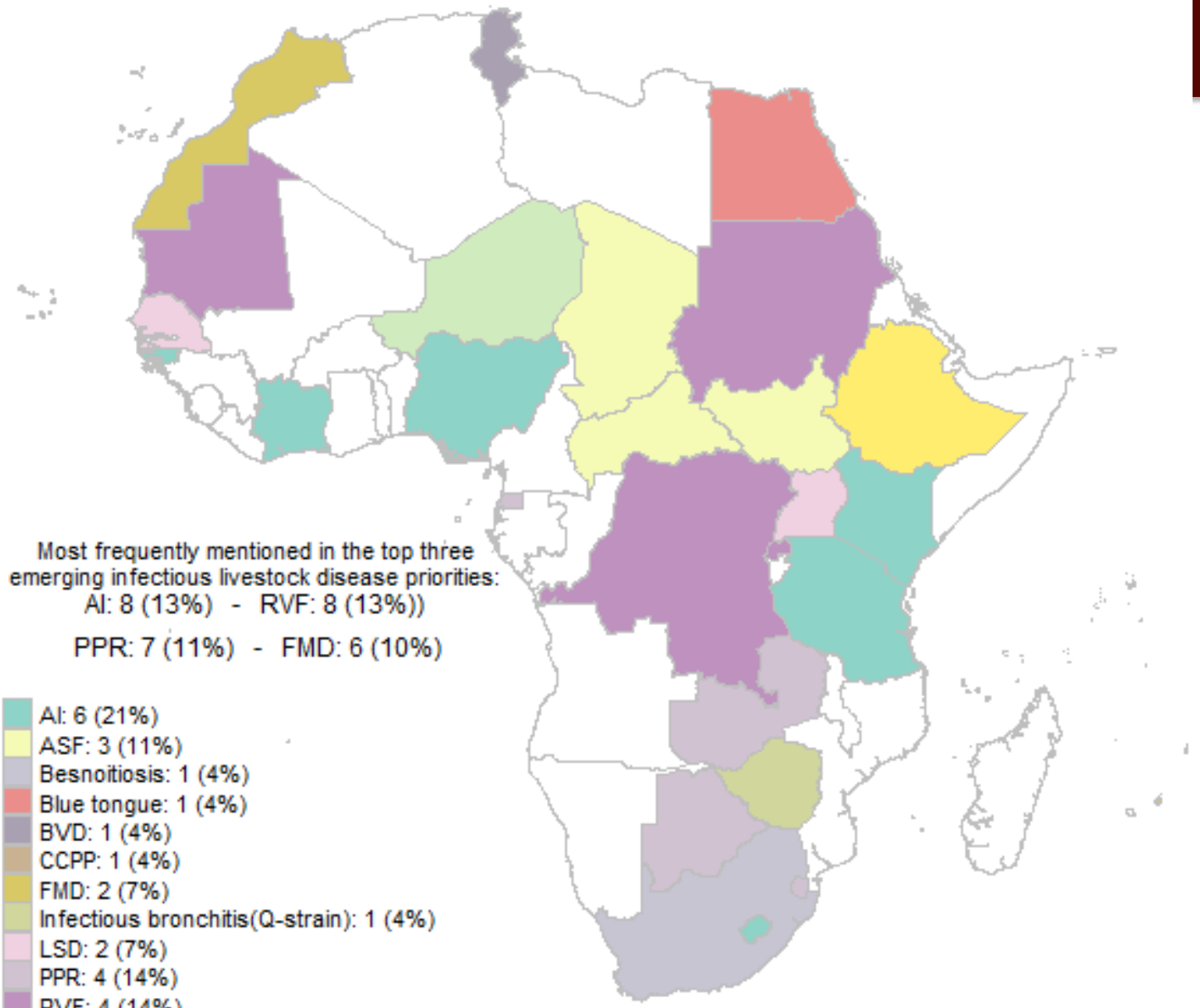
1st priority Emerging infectious livestock disease



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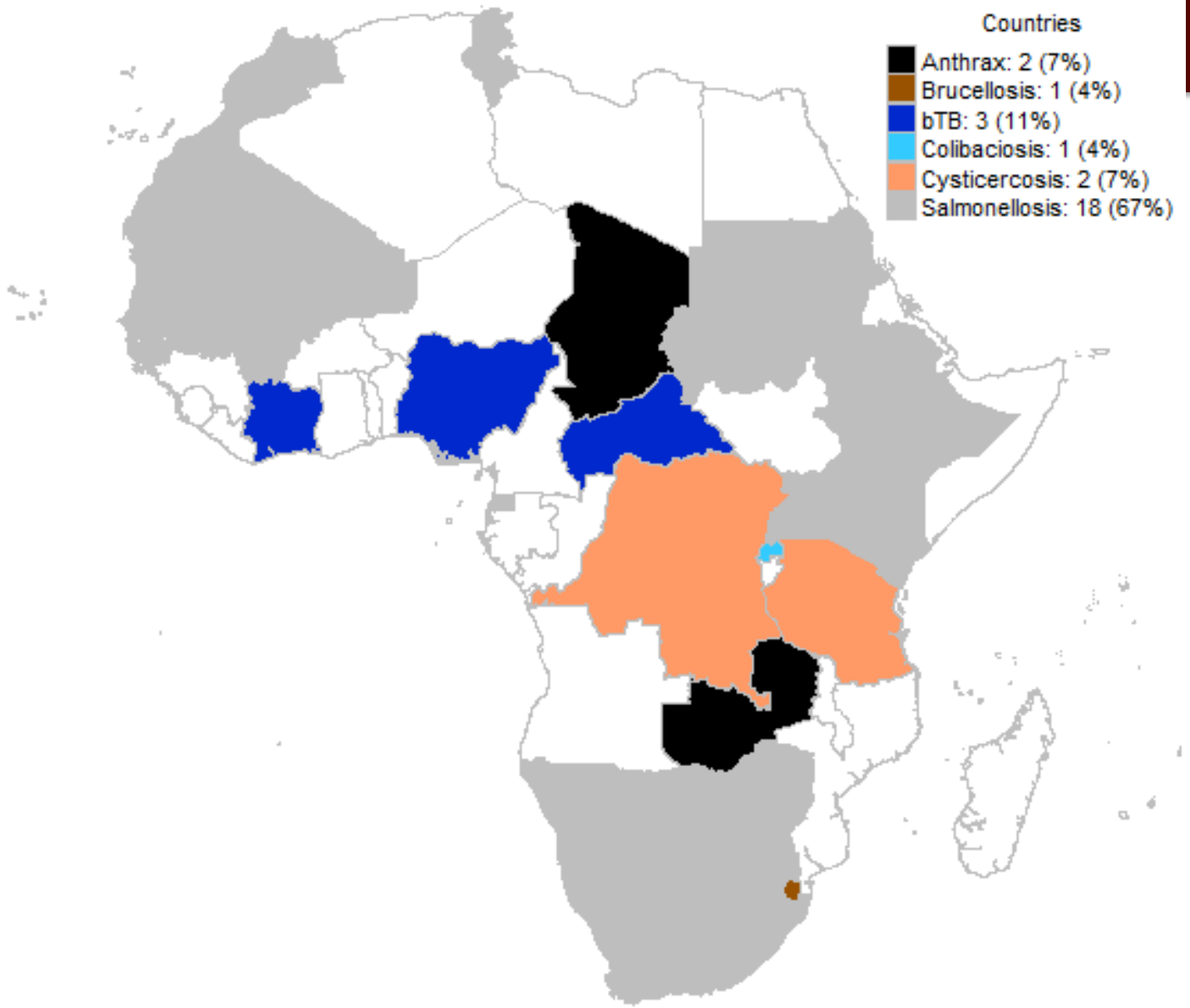
1st priority foodborne disease



Most frequently mentioned in the top three foodborne disease priorities

Salmonellosis: 24 (32%) - Colibaciosis: 10 (14%) - Cysticercosis: 6 (8%) - bTB: 5 (7%)

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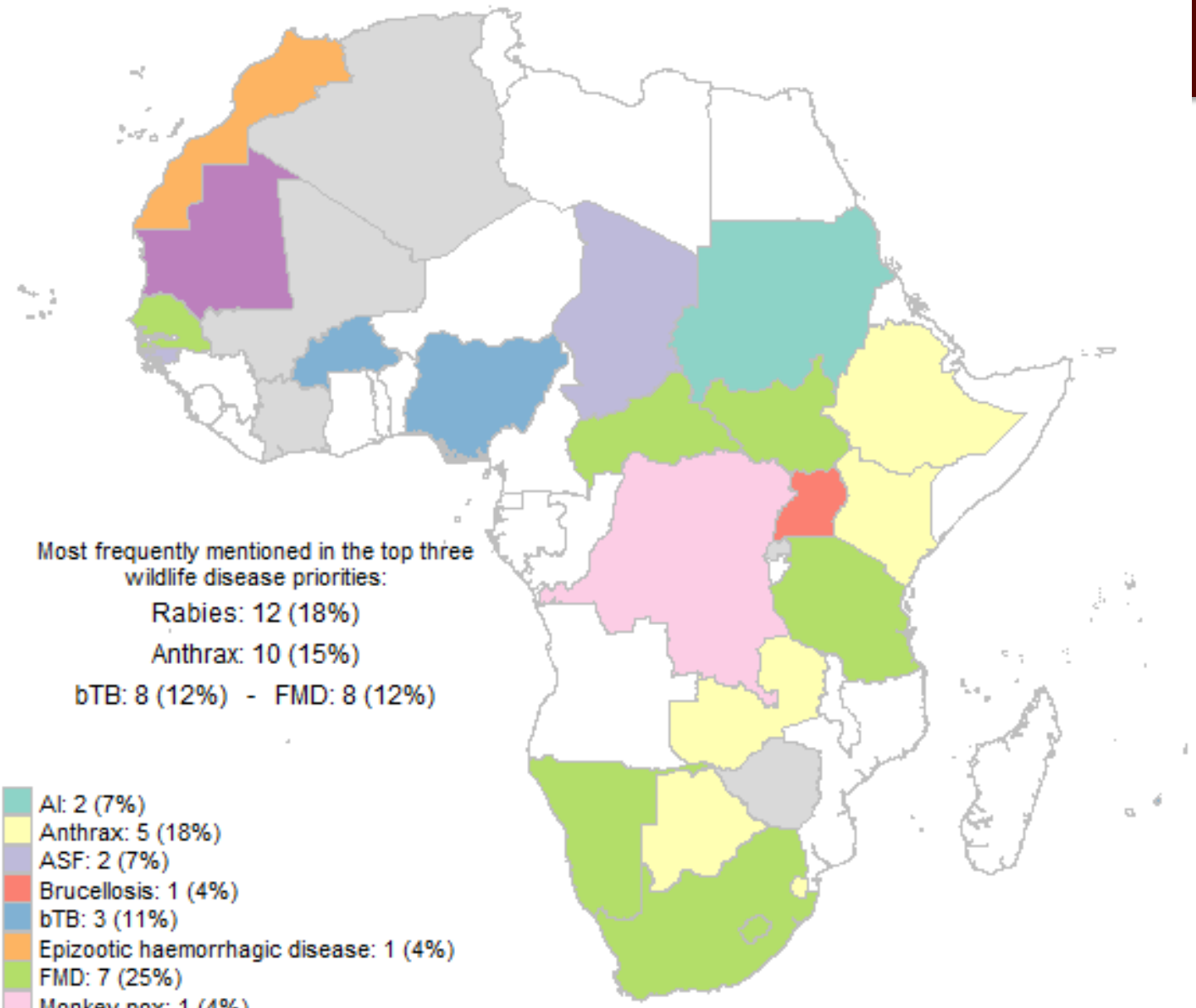
1st priority wildlife disease



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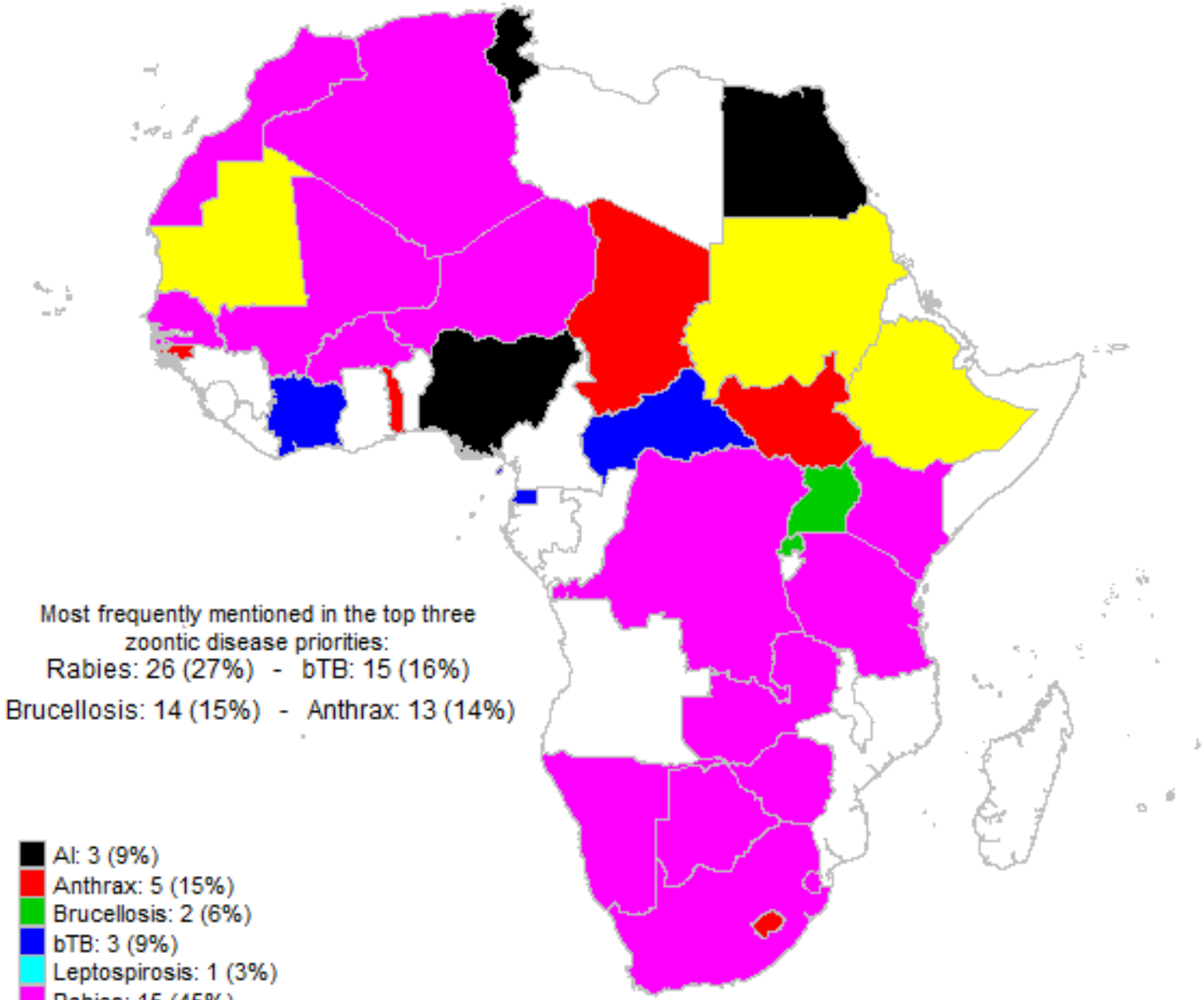
1st priority zoonotic disease



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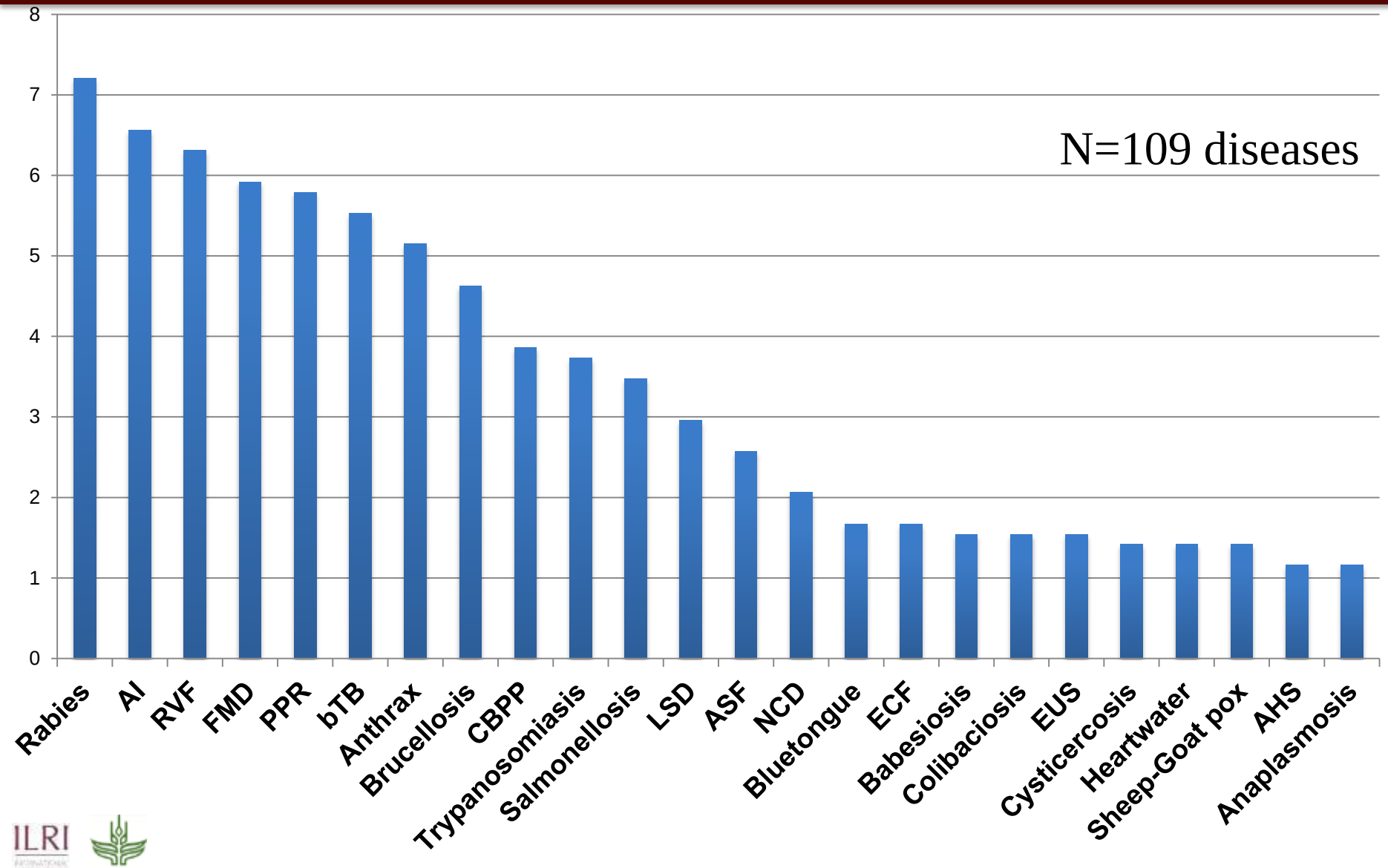
Most commonly cited priority diseases



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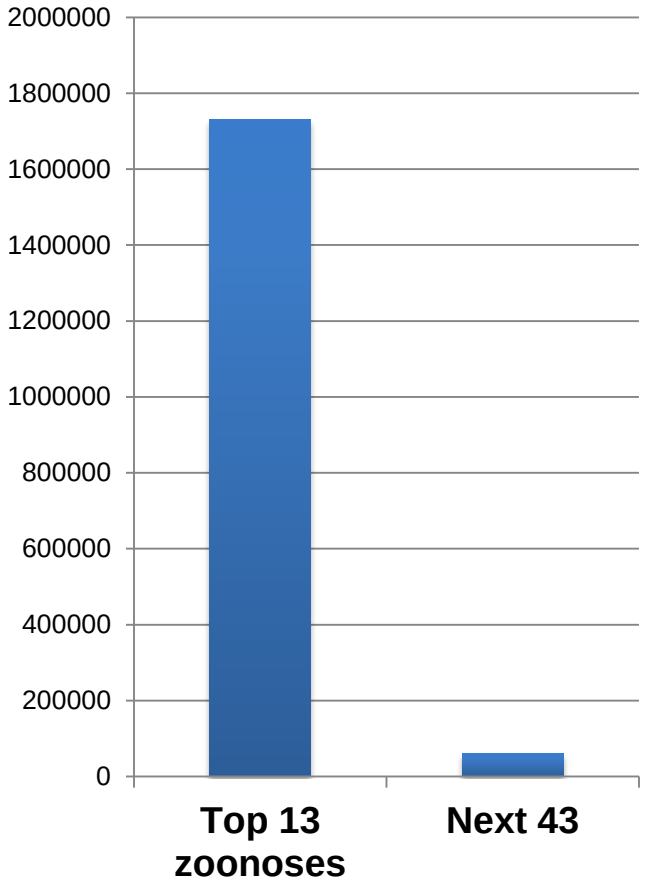
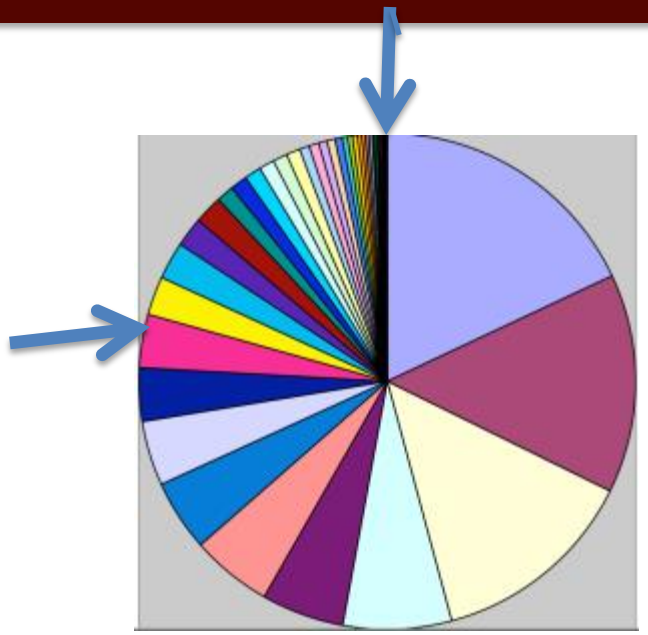
Pareto principle: the vital few & trivial many



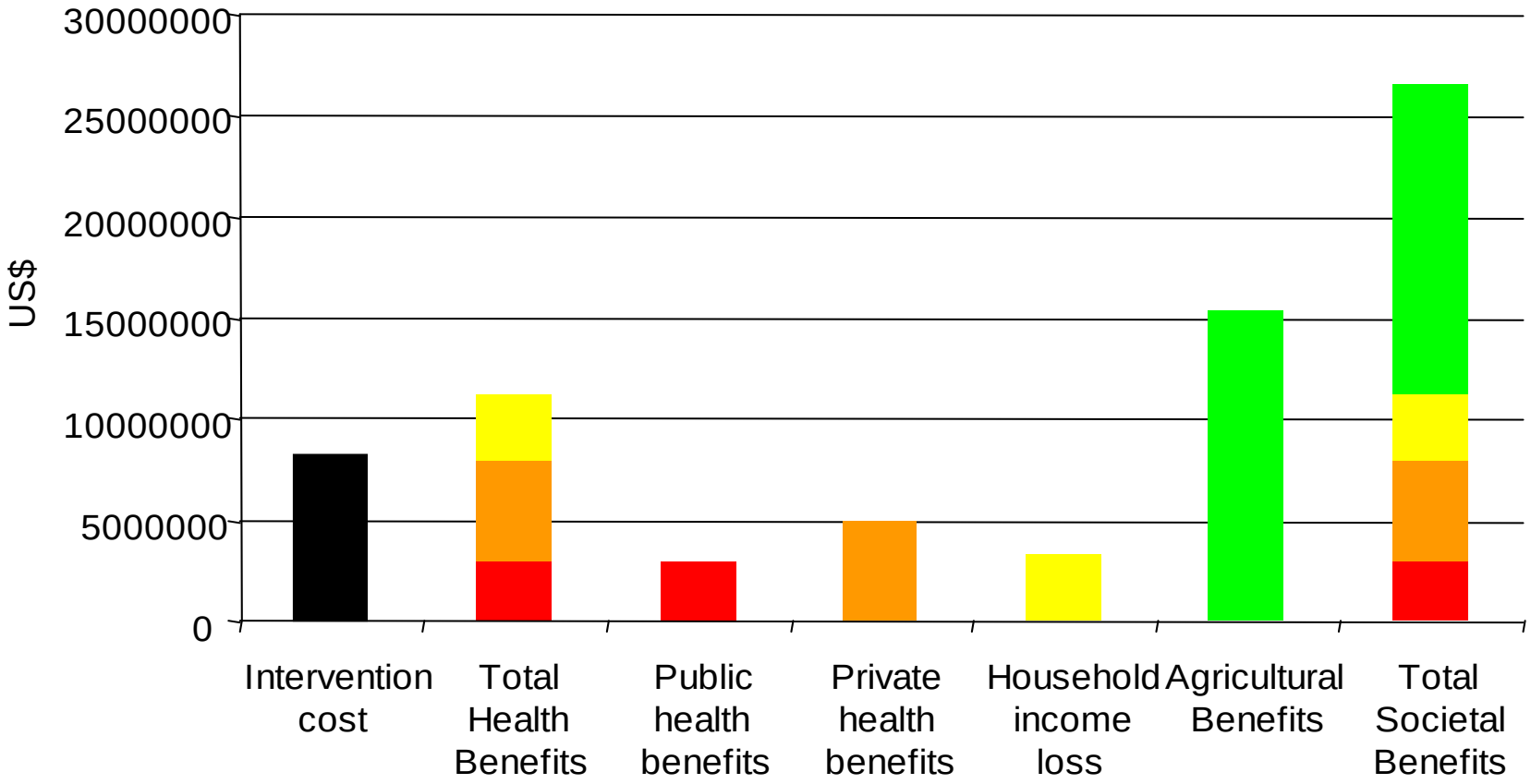


GBD: top 10 human disease cause 90% burden

This survey: 20% of diseases got 78% of cites

2. Multiple impacts

Synoptic view of benefits and costs of animal brucellosis mass vaccination in Mongolia



'Combining the total societal benefits, the intervention in the animal sector saves cost, provides the economic argument and thus opens new approaches for the control of zoonoses in developing countries through cost contributions from multiple sectors.'

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Roth et al. 2003, Bulletin WHO

A business case for One Health

	Annual benefit	Annual cost	Confidence in investment
Sharing resources	4 billion	1 billion	++
Controllable zoonoses	60 billion	20 billion	+++
Timely response	6 billion	3.4 billion	++
Averting pandemics	30 billion		+
Bottom line	**100 billion**	**25 billion**	**+++**

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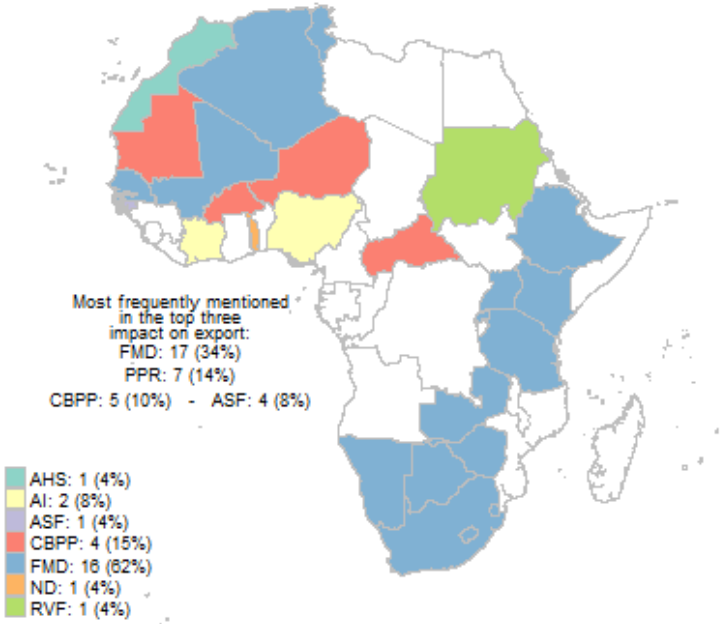
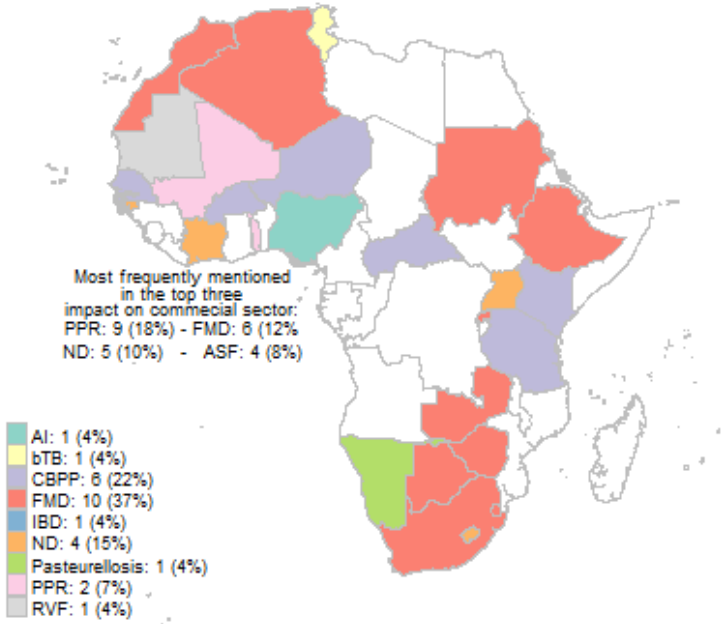
Disease impacts

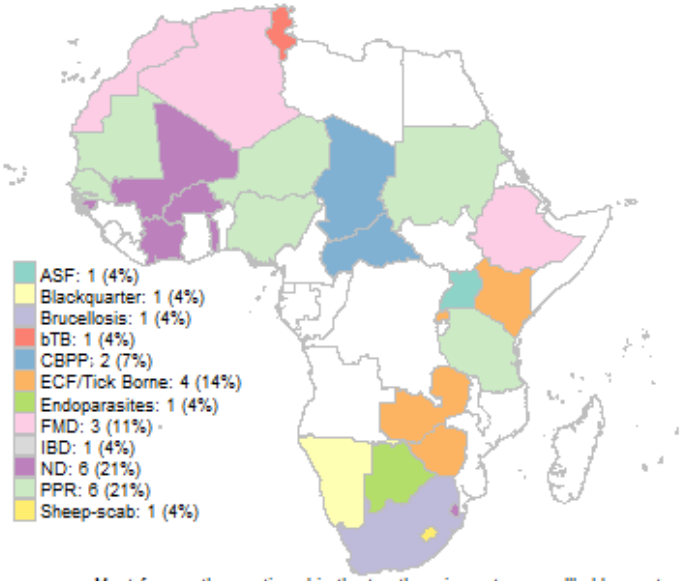
Greatest impact on export



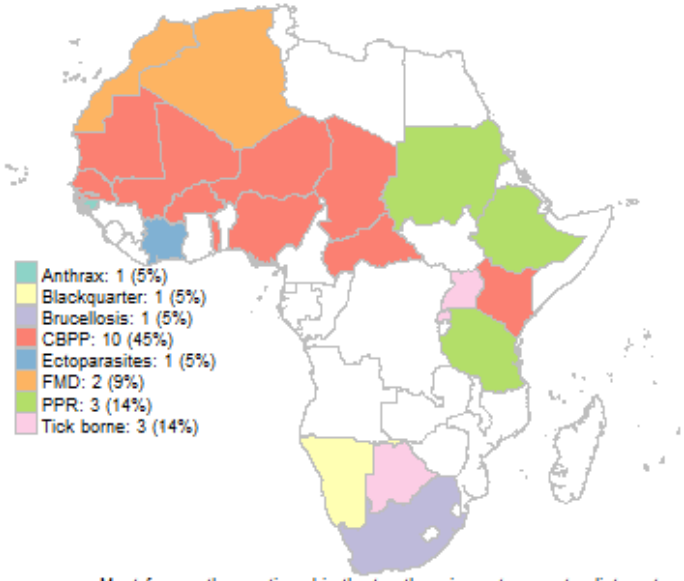
Greatest impact on internal trade



Greatest impact on smallholders



Greatest impact on pastoralists



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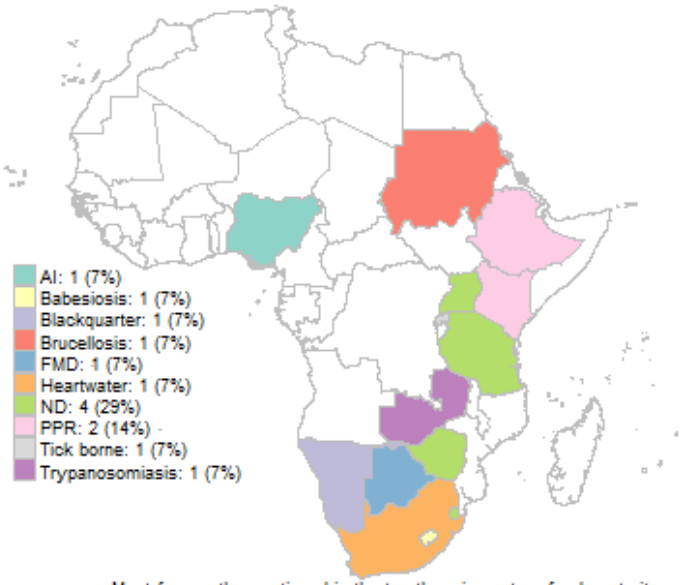
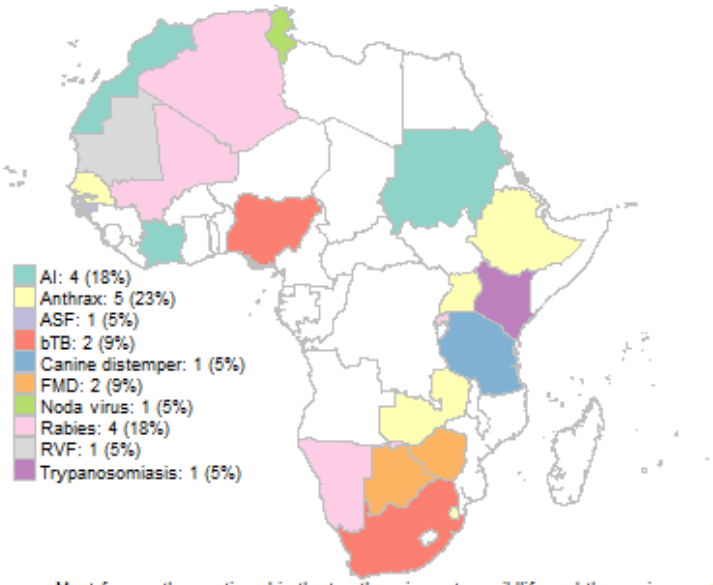
Disease impacts

Greatest impact on food security (anglophone only)



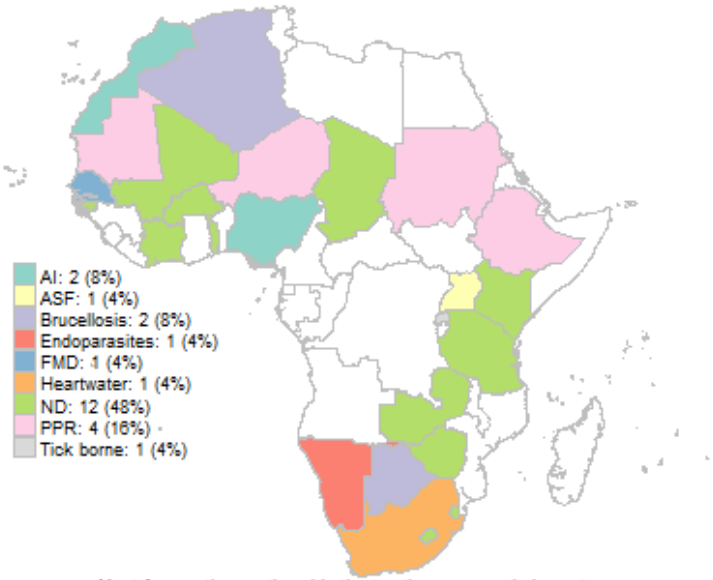
Most frequently mentioned in the top three impact on food secturity
Brucellosis: 8(11%) - bTB: 7(9%) - Anthrax: 6(8%) - ND: 6(8%)

Greatest impact on wildlife and the environment



Most frequently mentioned in the top three impact on wildlife and the environmen
Rabies:11(21%) - Anthrax:10(19%) - FMD: 6(11%) - AI:4(8%)

Greatest economic impact on women



Most frequently mentioned in the top three economic impact on women
ND:16(37%) - PPR:7(16%) - Brucellosis:3(7%) - Endoparasites:3(7%)

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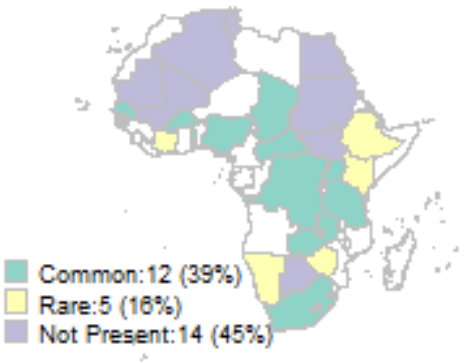
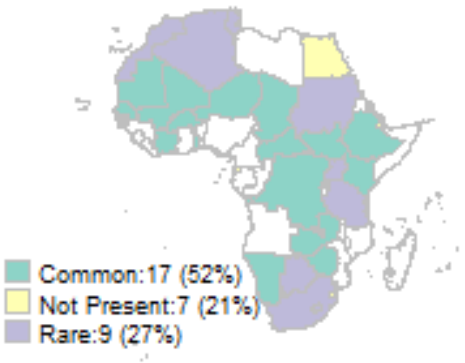
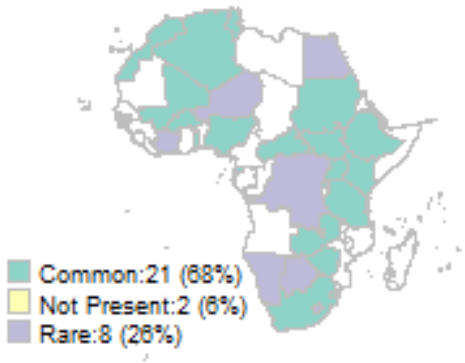
SVS considerations in deciding most important diseases

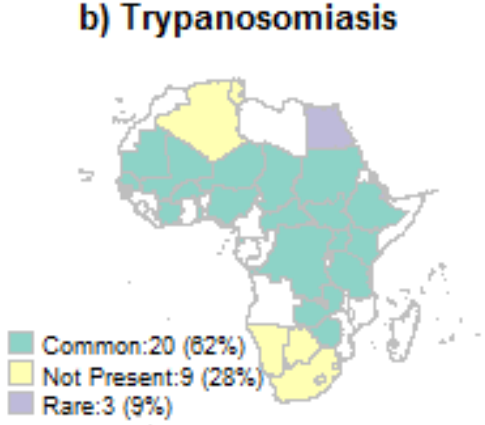
	Most important	2nd most important	3rd most important
Impacts on food security	65%	18%	6%
Impacts on the smallholder sector	47%	18%	24%
Impacts on the pastoralist sector	41%	9%	9%
Impacts on the export sector	35%	21%	18%
Impacts on the commercial sector	32%	38%	9%
Impacts on public opinion	15%	18%	21%
Impacts on wildlife and the environment	6%	26%	24%

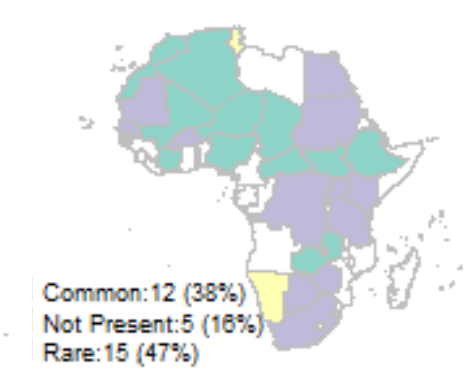
3. Prevalence and control

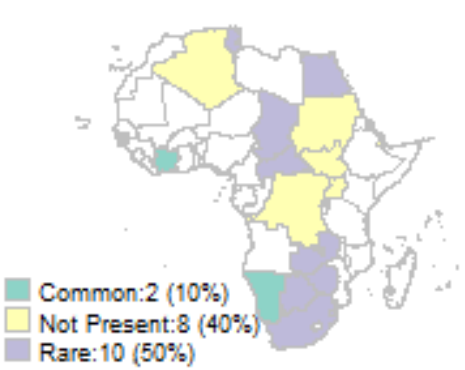

a) ASF
Common:12 (39%)
Rare:5 (16%)
Not Present:14 (45%)

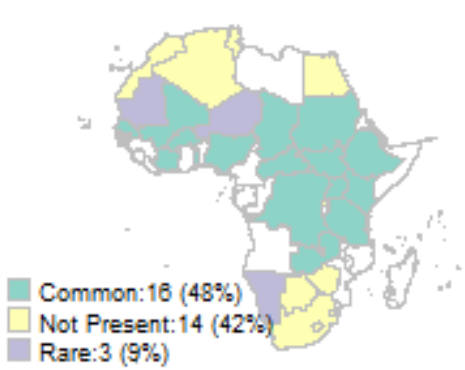

b) Anthrax
Common:17 (52%)
Not Present:7 (21%)
Rare:9 (27%)

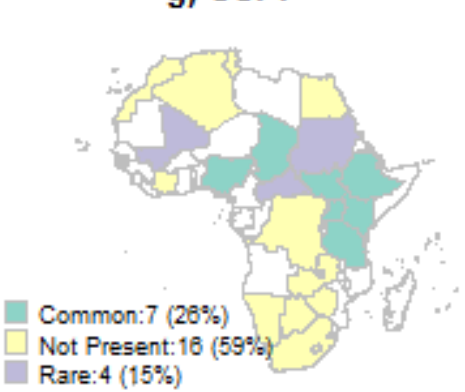

c) Brucellosis
Common:21 (68%)
Not Present:2 (6%)
Rare:8 (26%)

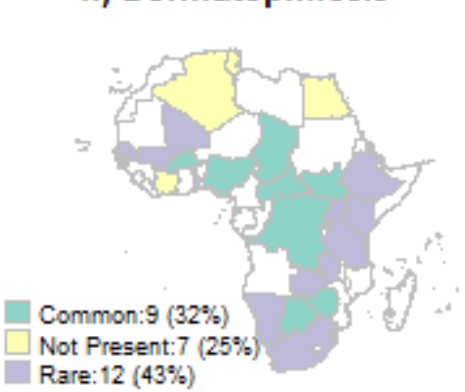

b) Trypanosomiasis
Common:20 (62%)
Not Present:9 (28%)
Rare:3 (9%)

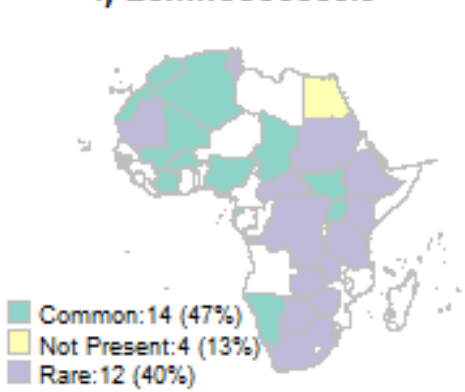

d) bTB
Common:12 (38%)
Not Present:5 (16%)
Rare:15 (47%)


e) BVD
Common:2 (10%)
Not Present:8 (40%)
Rare:10 (50%)


f) CBPP
Common:16 (48%)
Not Present:14 (42%)
Rare:3 (9%)


g) CCPP
Common:7 (26%)
Not Present:16 (59%)
Rare:4 (15%)


h) Dermatophilosis
Common:9 (32%)
Not Present:7 (25%)
Rare:12 (43%)


i) Echinococcosis
Common:14 (47%)
Not Present:4 (13%)
Rare:12 (40%)

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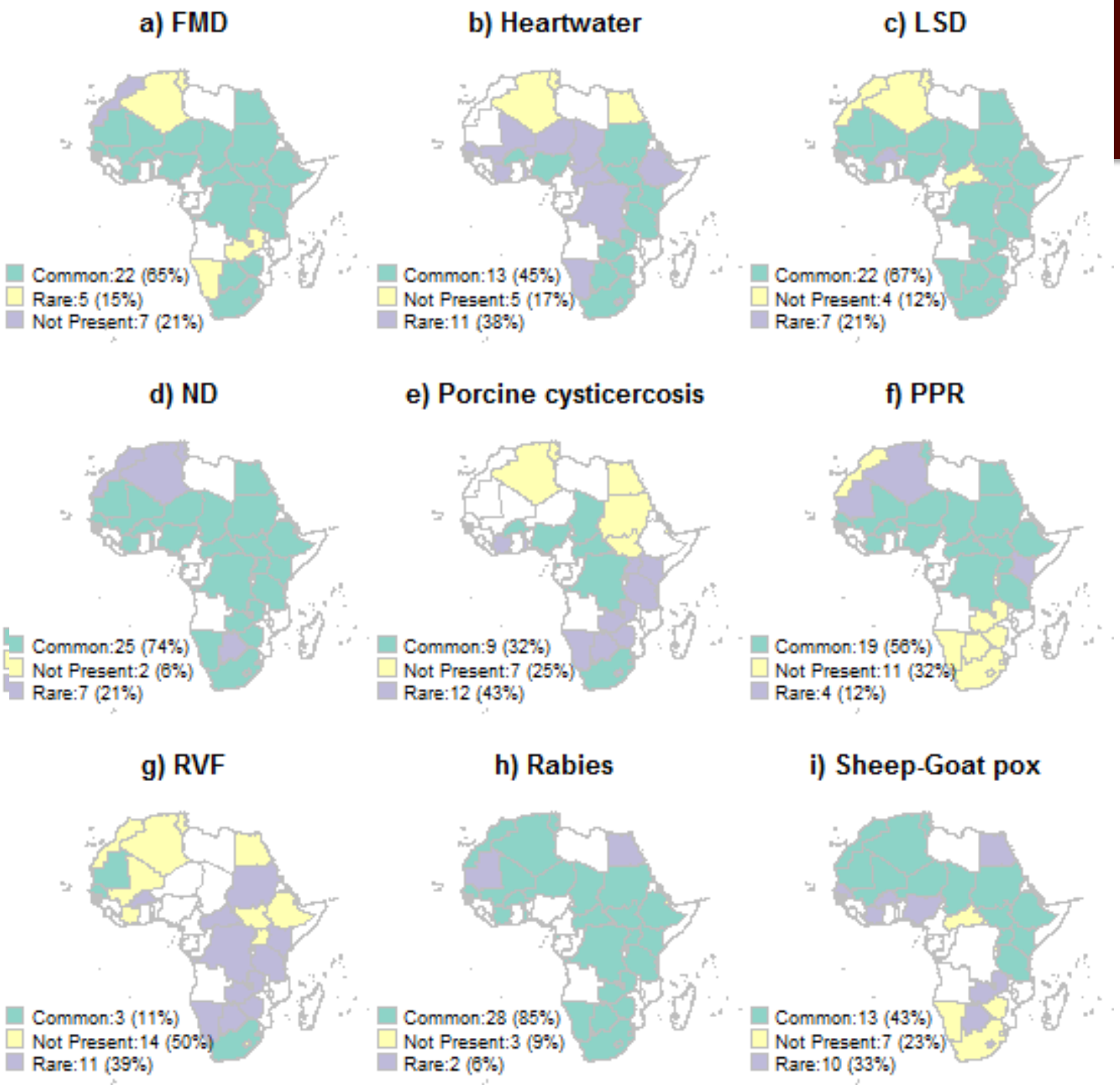
a) FMD
Common:22 (65%)
Rare:5 (15%)
Not Present:7 (21%)
b) Heartwater
Common:13 (45%)
Not Present:5 (17%)
Rare:11 (38%)
c) LSD
Common:22 (67%)
Not Present:4 (12%)
Rare:7 (21%)
a) ECF
ommon:9 (35%)
are:6 (23%)
ot Present:11 (42%)
d) ND
Common:25 (74%)
Not Present:2 (6%)
Rare:7 (21%)
e) Porcine cysticercosis
Common:9 (32%)
Not Present:7 (25%)
Rare:12 (43%)
f) PPR
Common:19 (56%)
Not Present:11 (32%)
Rare:4 (12%)
g) RVF
Common:3 (11%)
Not Present:14 (50%)
Rare:11 (39%)
h) Rabies
Common:28 (85%)
Not Present:3 (9%)
Rare:2 (6%)
i) Sheep-Goat pox
Common:13 (43%)
Not Present:7 (23%)
Rare:10 (33%)

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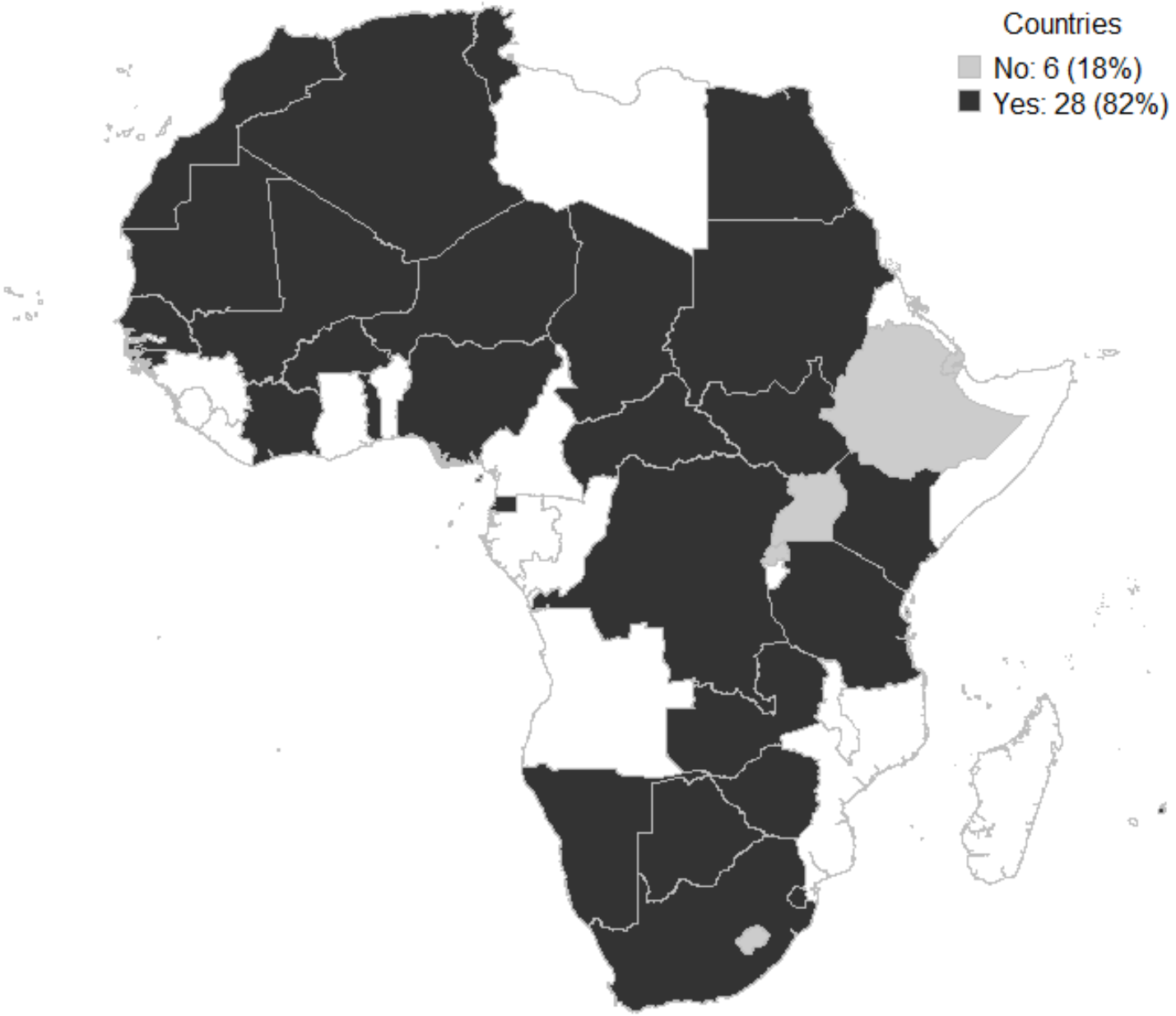
Is there a national list of notifiable animal diseases?



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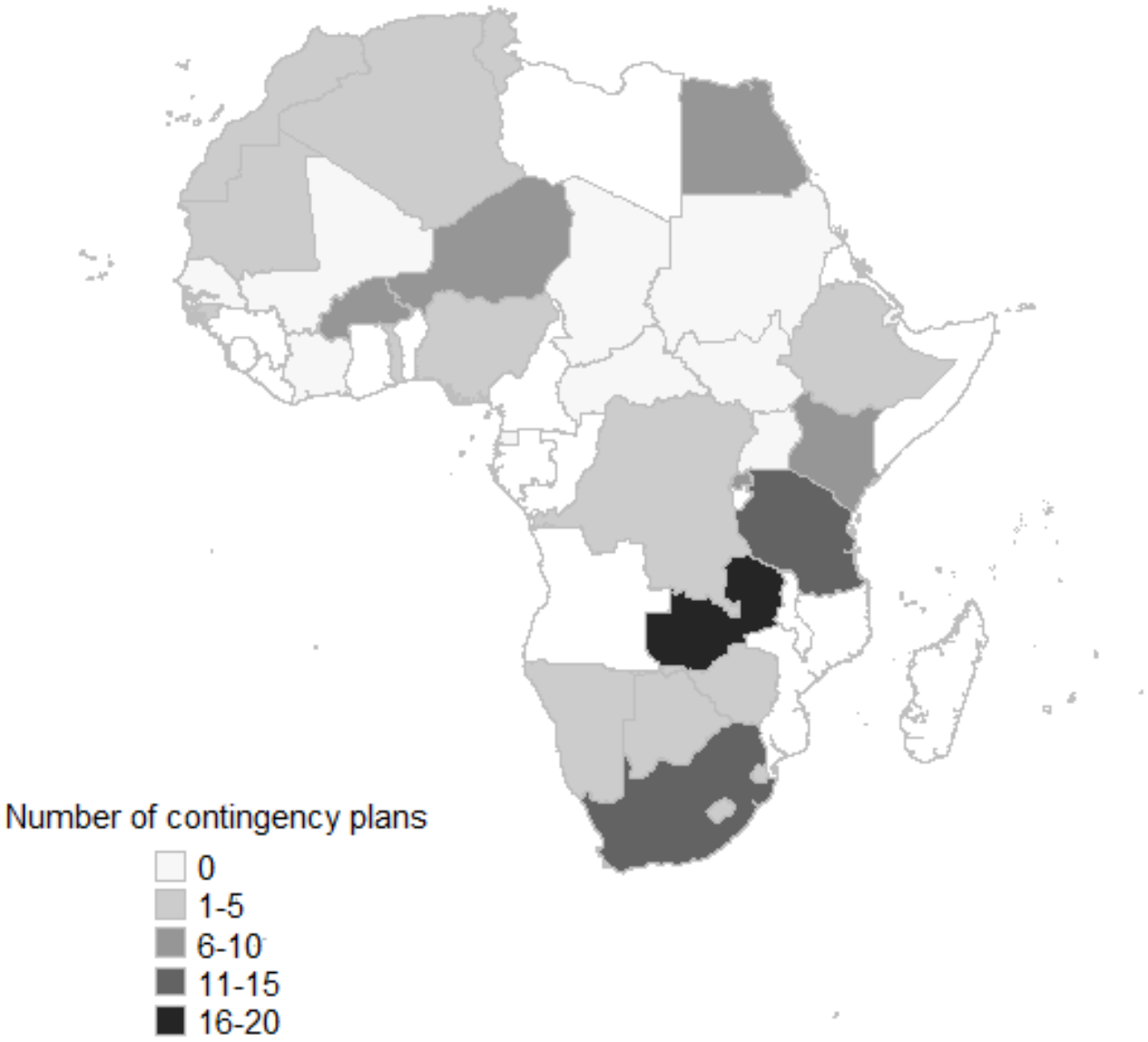
Number of contingency plans - max 20



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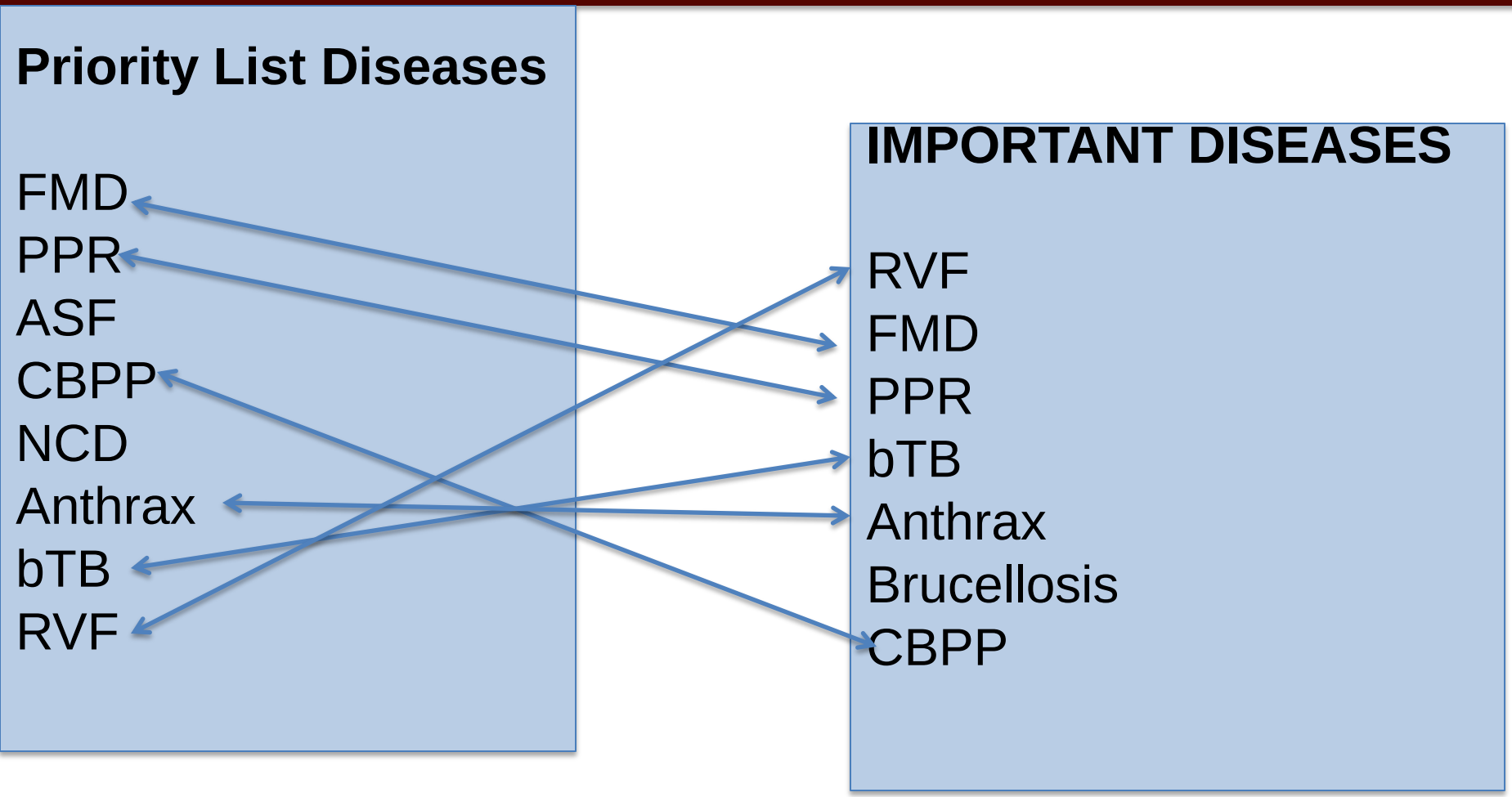
Africa: Priority list well aligned with important diseases



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SE Asia: Priority disease not aligned with important diseases

PRIORITY DISEASES
1: Avian influenza
3: Leptospirosis

IMPORTANT DISEASES
1: Vector-borne disease
2: Food borne disease

EcoHealth 8, 55–62, 2011
DOI: 10.1007/s10393-010-0357-3

EcoHealth

Original Contribution

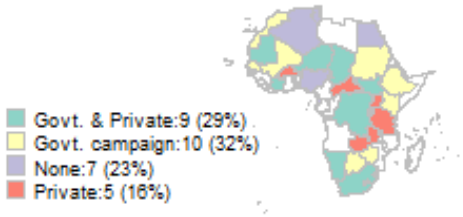
Zoonotic Emerging Infectious Disease in Selected Countries in Southeast Asia: Insights from Ecohealth

Delia Grace,[1] Jeffrey Gilbert,[1] M. Lucila Lapar,[1] Fred Unger,[1] Sonia Fèvre,[2] Hung Nguyen-Viet,[3,4,5] and Esther Schelling[3]

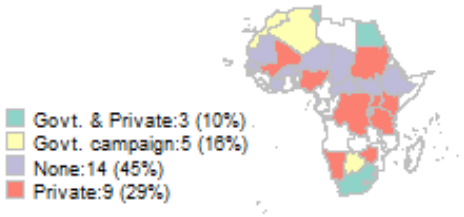
[1]*International Livestock Research Institute (ILRI), 30709, Nairobi, Kenya*

Vaccination for priority diseases

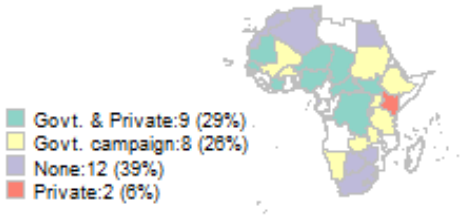
a) Anthrax



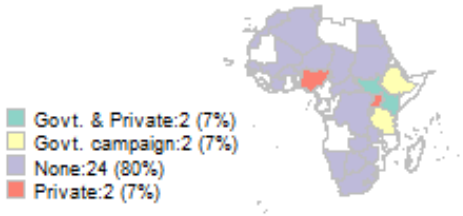
b) Brucellosis



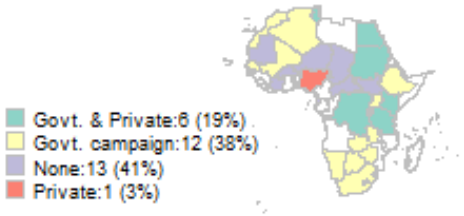
c) CBPP



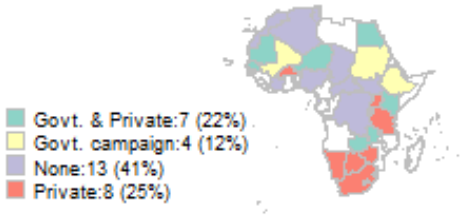
d) CCPP



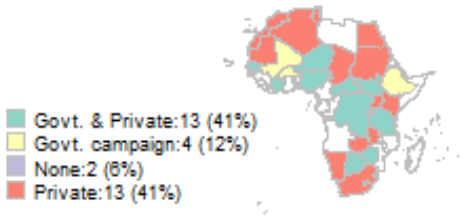
e) FMD



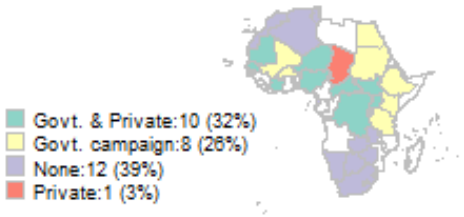
f) LSD



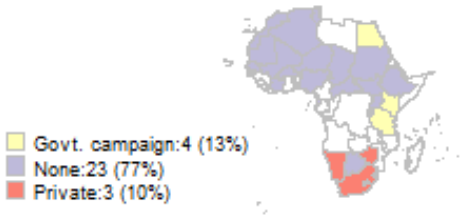
g) ND



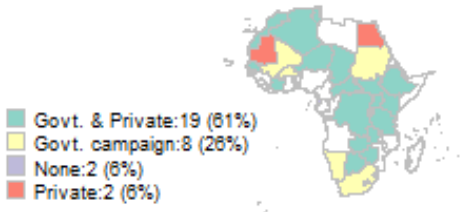
h) PPR



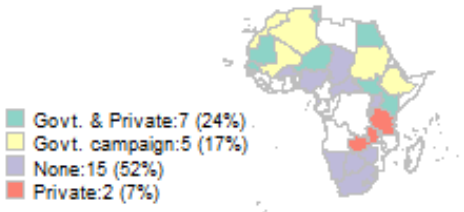
i) RVF



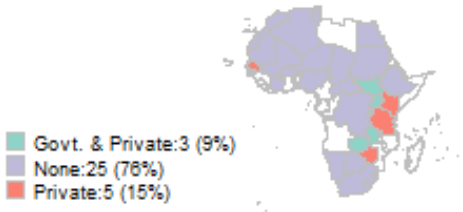
j) Rabies



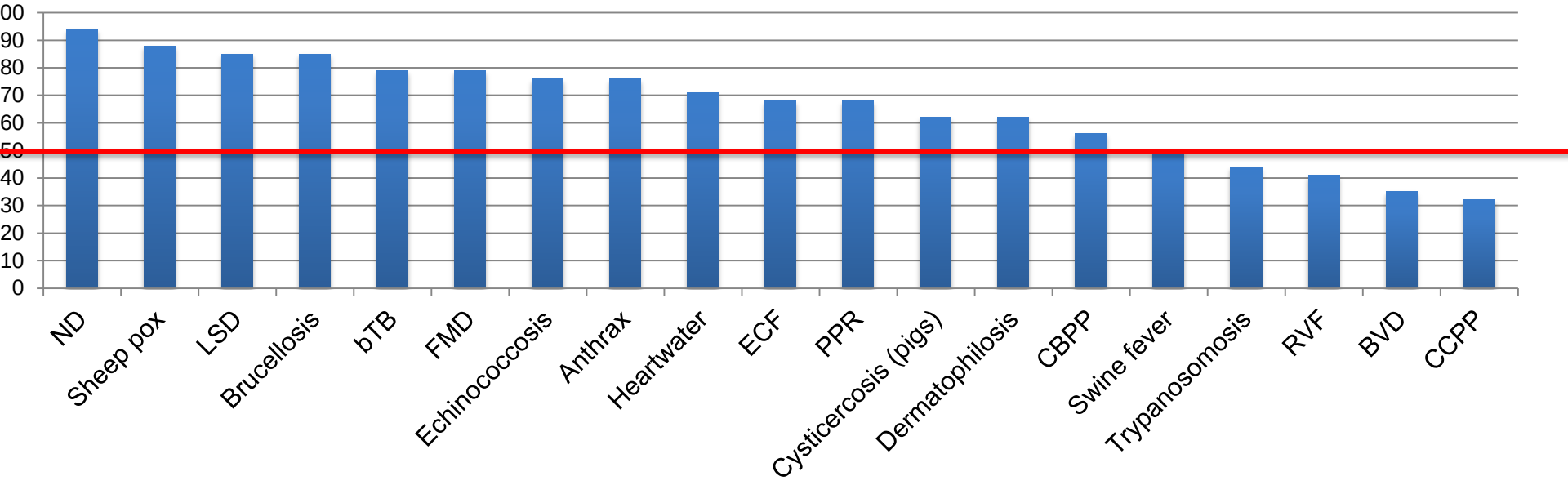
k) Sheep-Goat pox



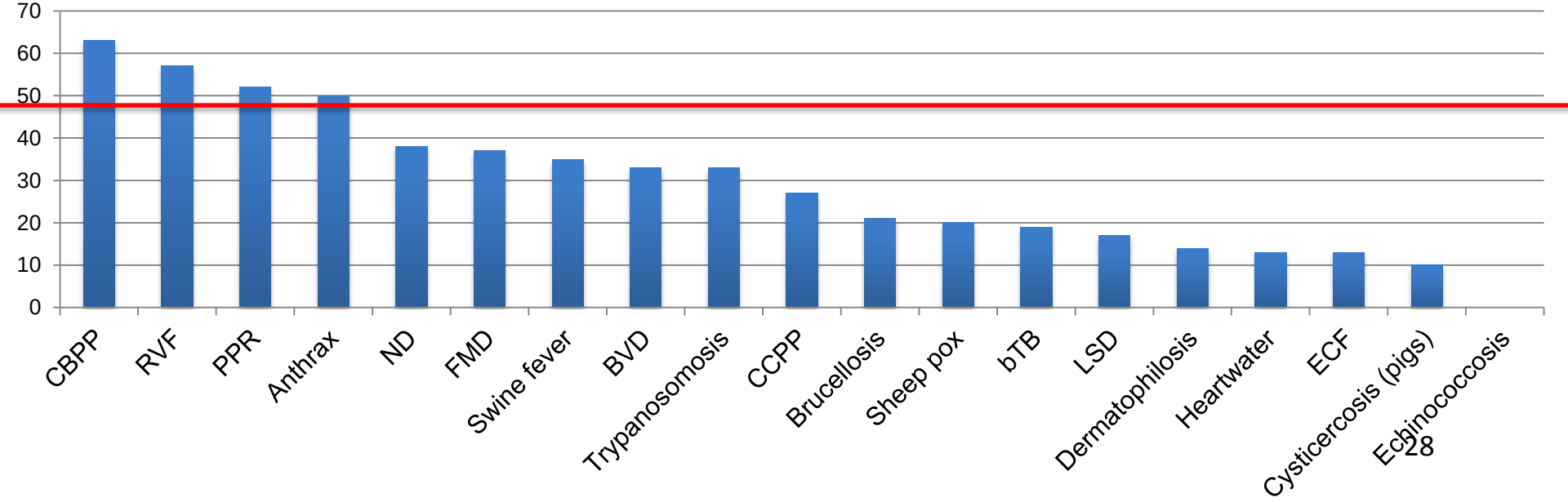
l) ECF



Countries with disease present %

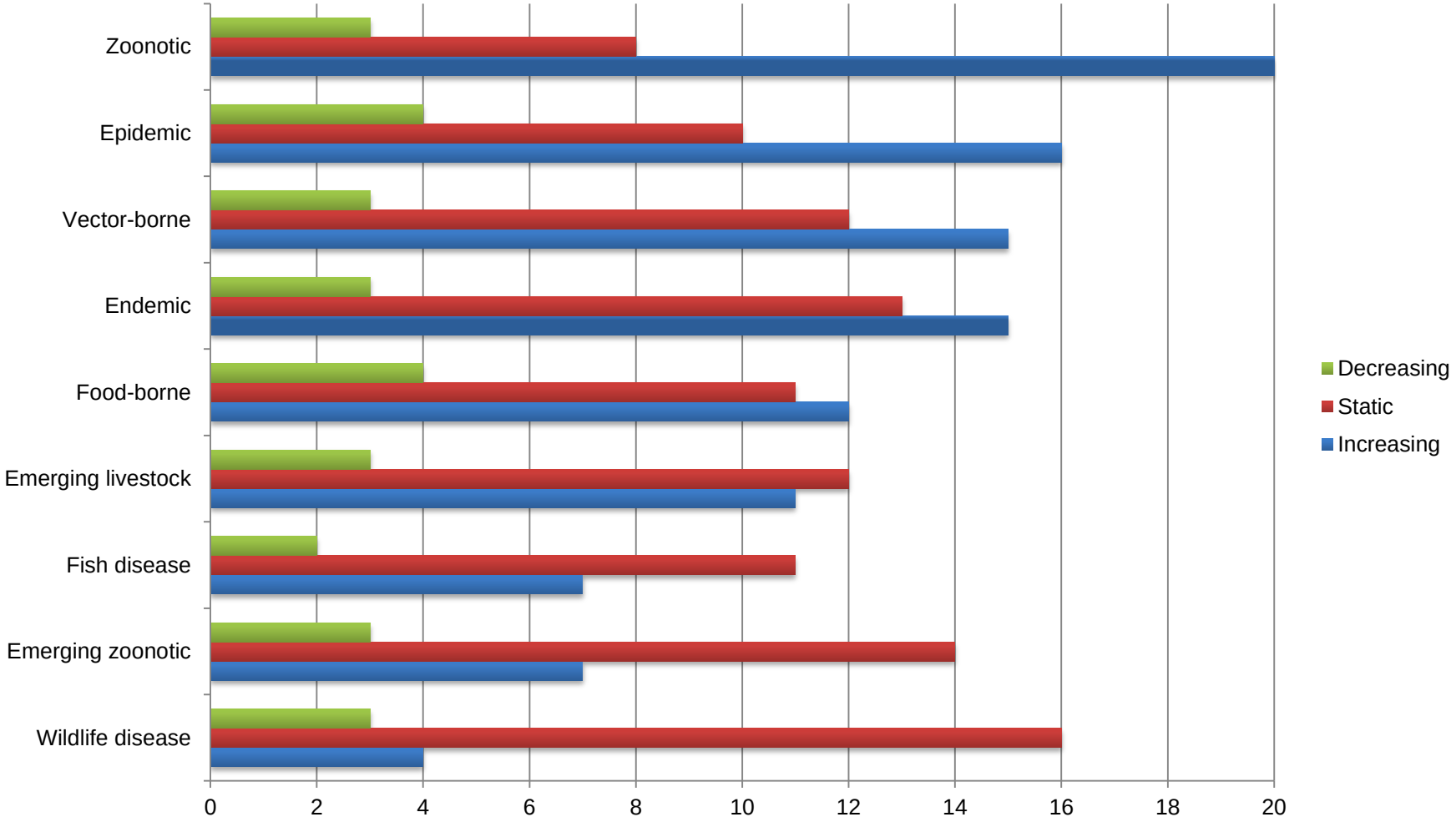


Good control (as % of countries with disease)

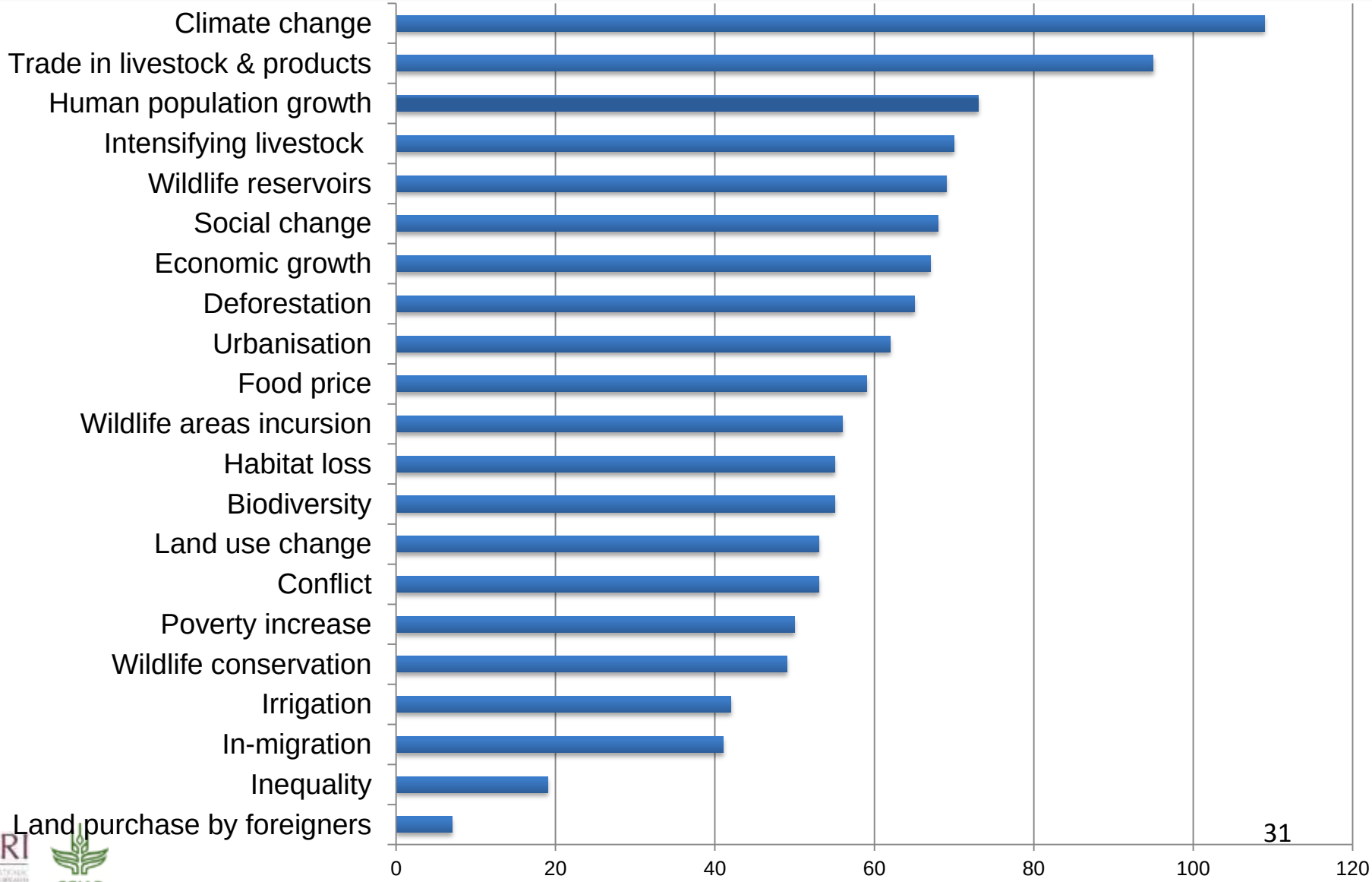


4. Trends, drivers and change

Most diseases are increasing or static



These trends have important drivers



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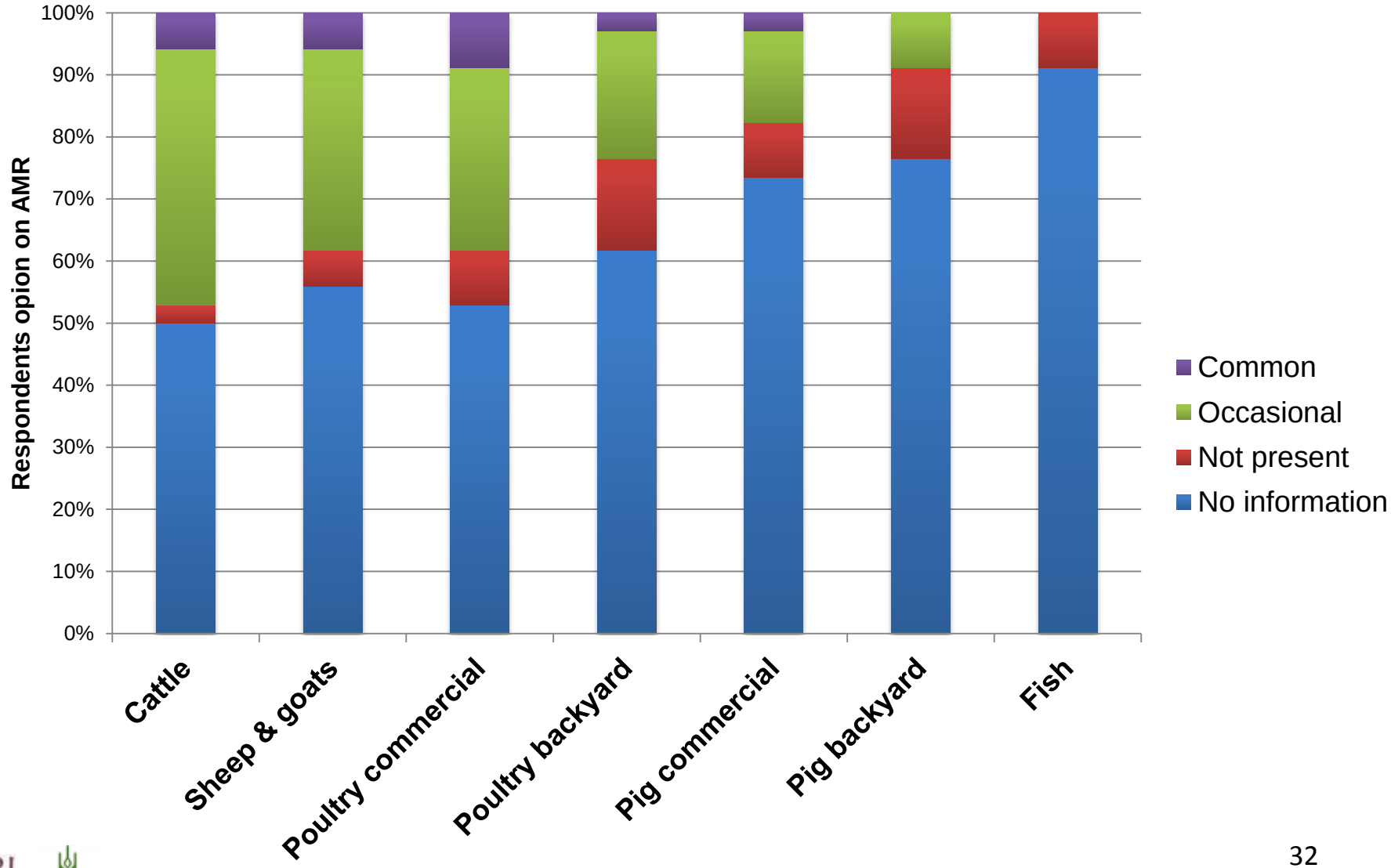
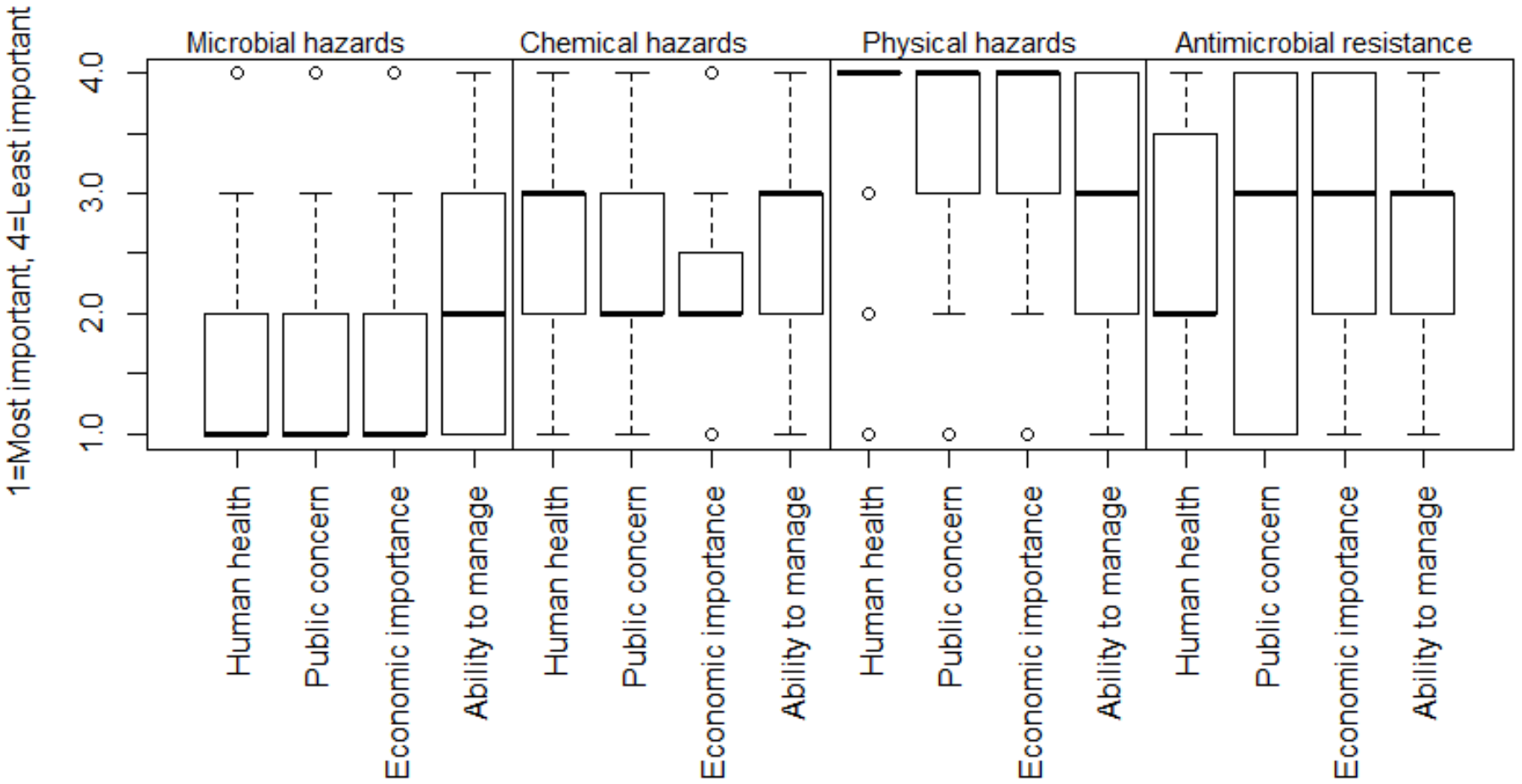
Drug resistance an increasing threat



Foodborne disease a public concern



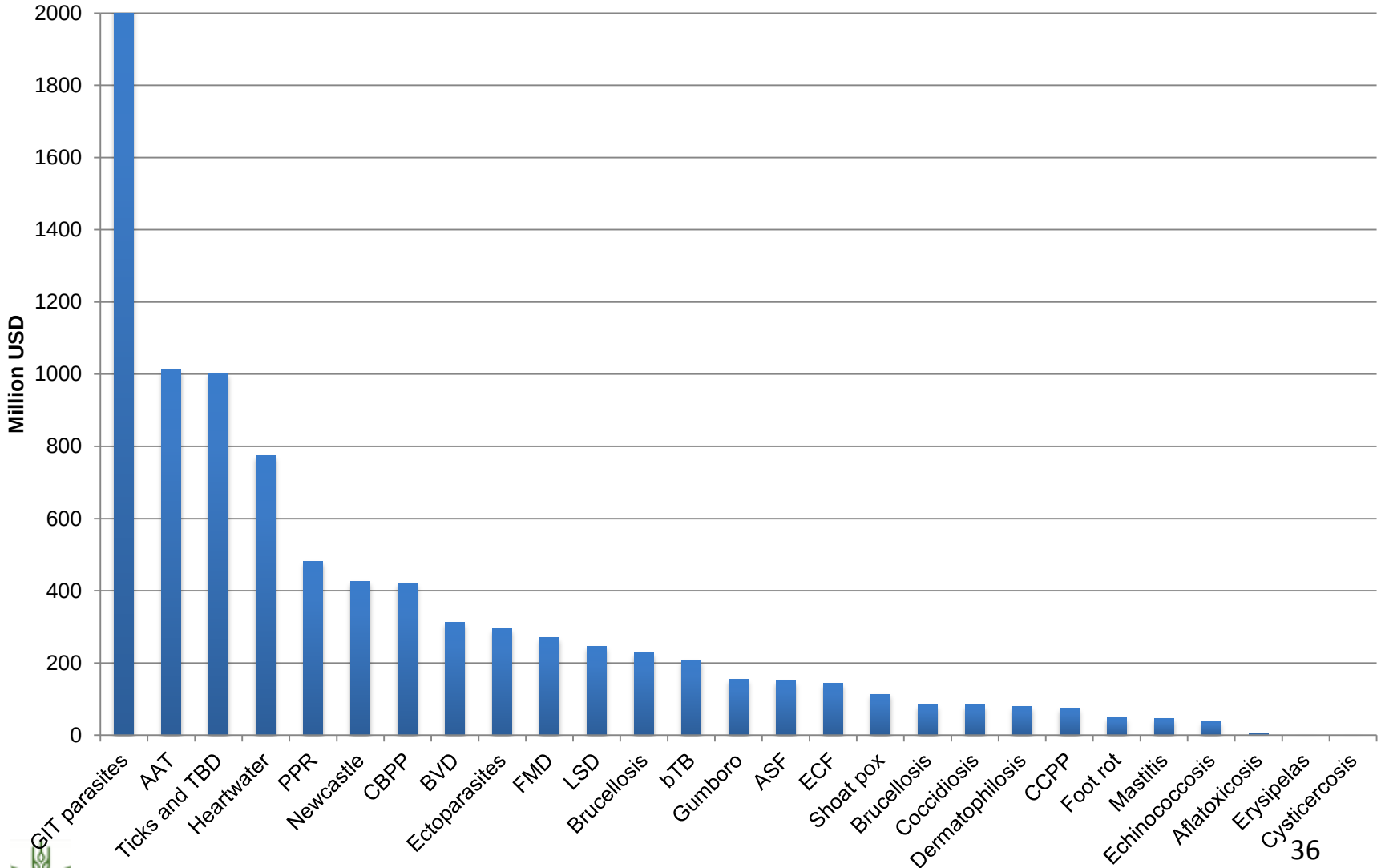
5. Costs

Multiple burdens of animal disease

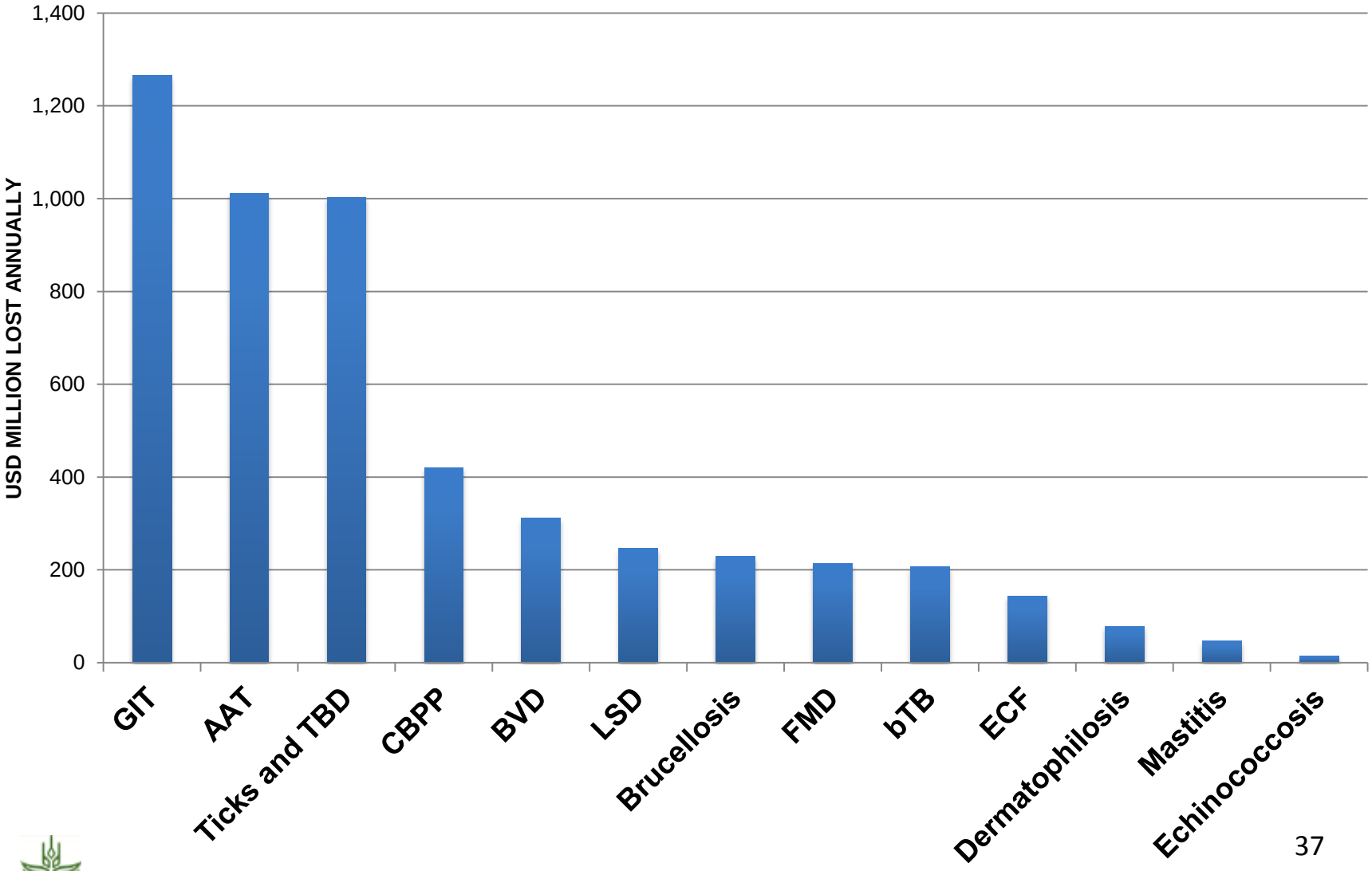
	Direct impact	Treatment	Prevention	
	Burden of illness in people (DALY's)	Costs of treating disease in people ($)	Costs of preventing disease in people	People
	Losses in agri-food chains ($)	Costs of Responding to disease in food chains($)	Costs of preventing disease in food chain	Animals
	Losses due to ecosystem impacts (?)			Ecosystem

Shaw & Grace, 2014

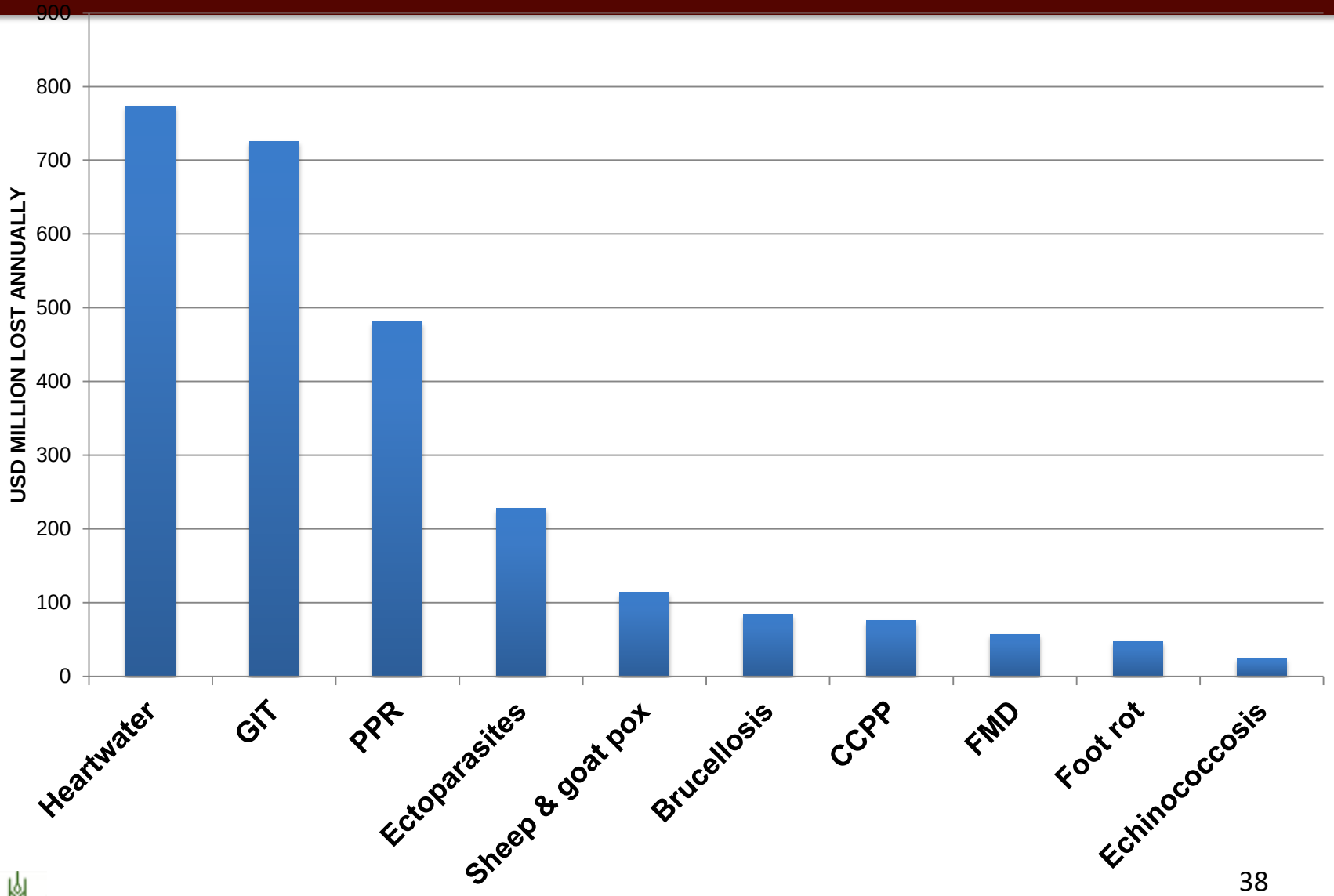
Annual losses from animal mortality and costs of disease control in Africa



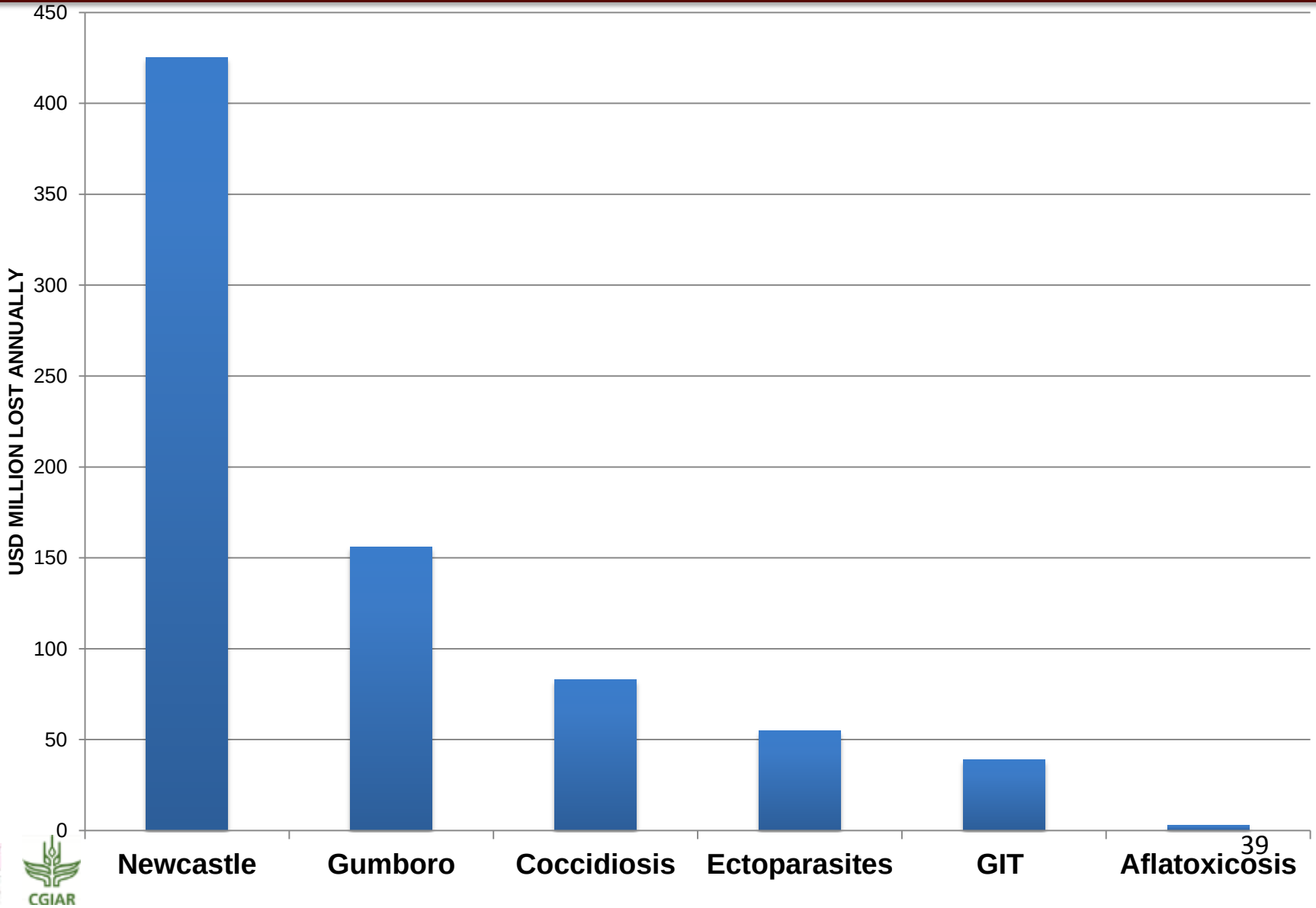
Losses from cattle disease



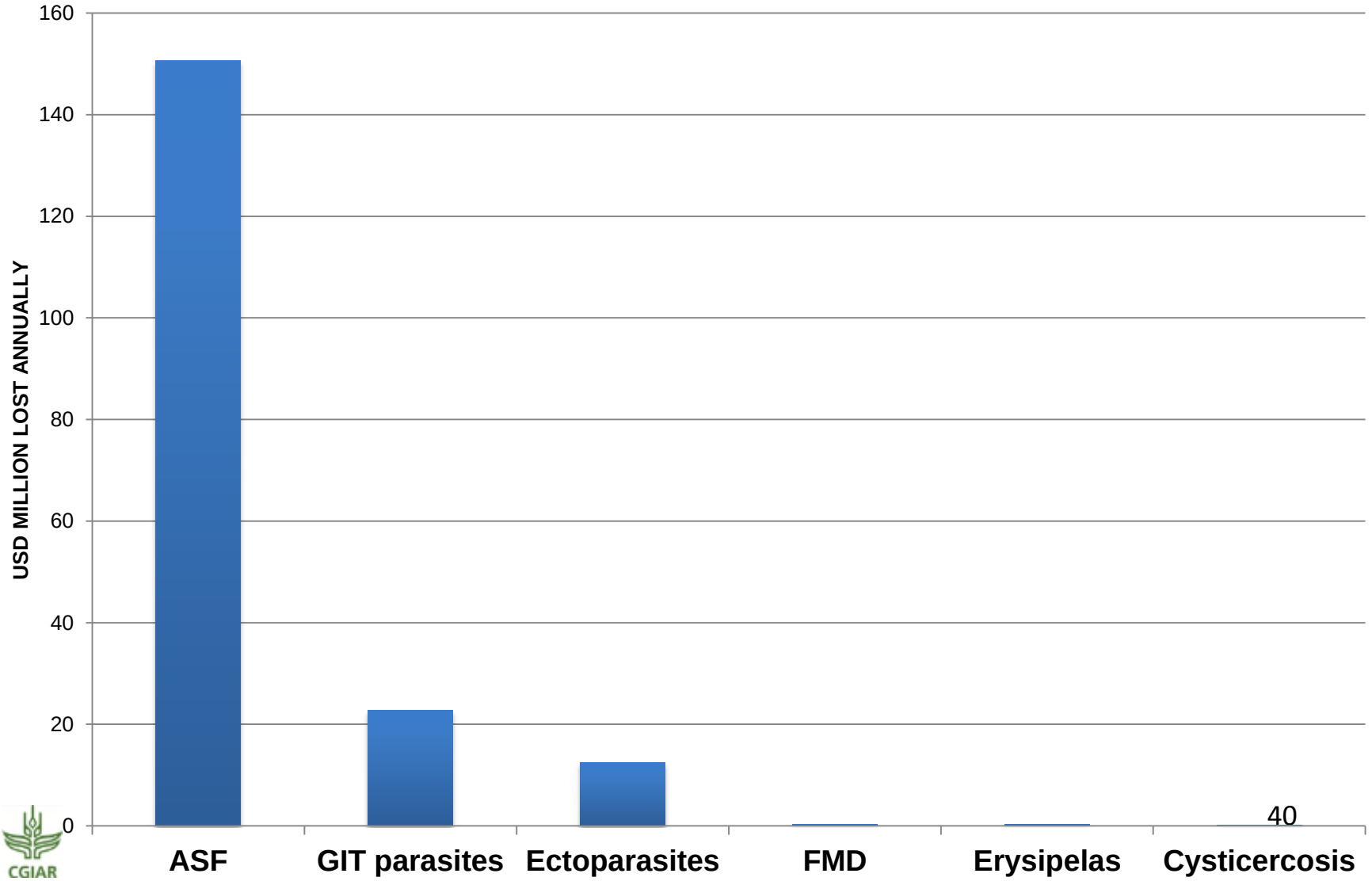
Losses from sheep & goat disease



Losses from poultry disease



Losses from pig disease



How does this compare to other estimates?

	Million USD	Value sector
WLDA	$39	0.03%
SVS estimate	$9,000	6%
Literature	$30,000	21%
BMGF	$35,000	

Only death or control

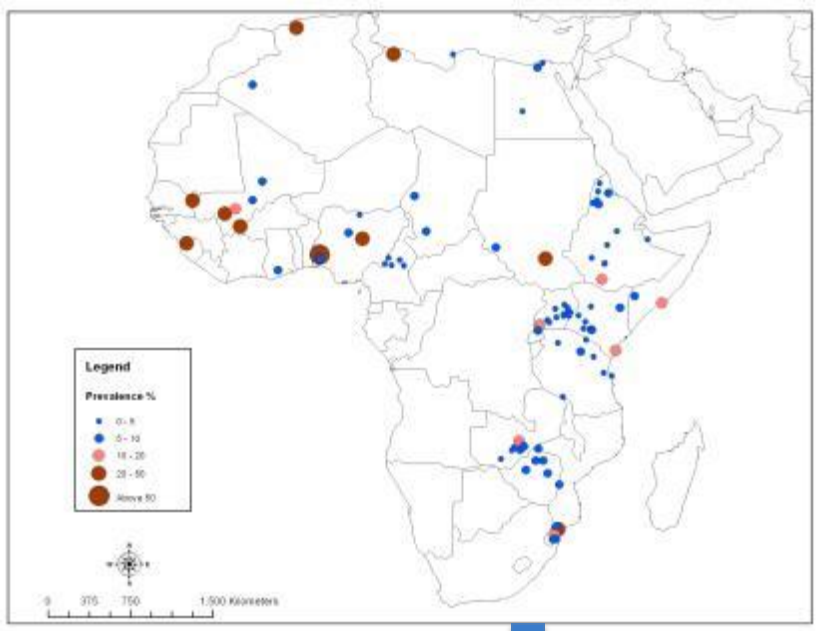
2/3 from death
1/3 production

	Million USD	Value sector
Australia	979	16%
UK	1,178	8%

Bennett RM, Ijpelaar J, 2005, Sackett D & Holmes P, 2006

Reporting common, non-pathognomonic disease a challenge

Bovine brucellosis according to 440 surveys



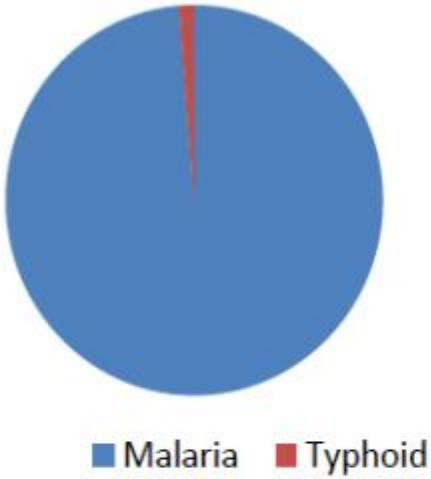
Bovine brucellosis reported 2008-2012

	Bovine brucellosis Predicted cases annual	Bovine brucellosis Cases reported 2010
East Africa	21,104,976	12
West Africa	30,646,060	37
South Africa	8,492,555	6305
North Africa	7,952,853	1073

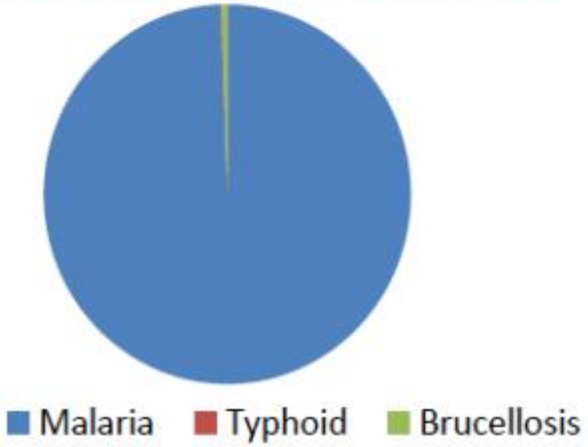
Source: LRI report to DFID Mapping poverty and likely zoonosis hotspots

Diagnosis a challenge

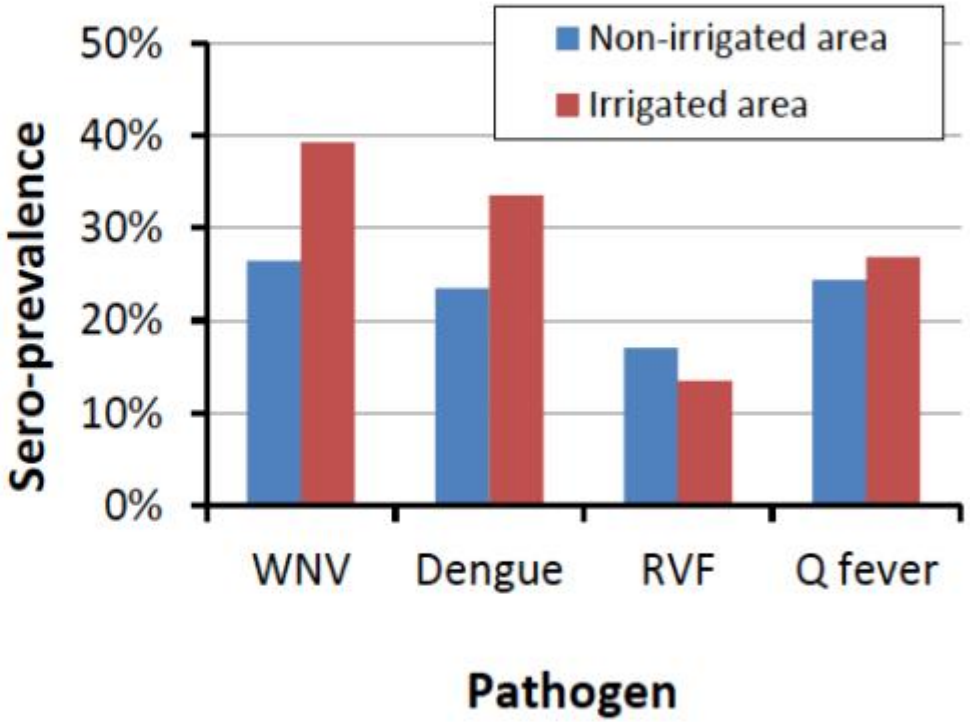
Cases from Bura health centre



Cases from Hola health centre

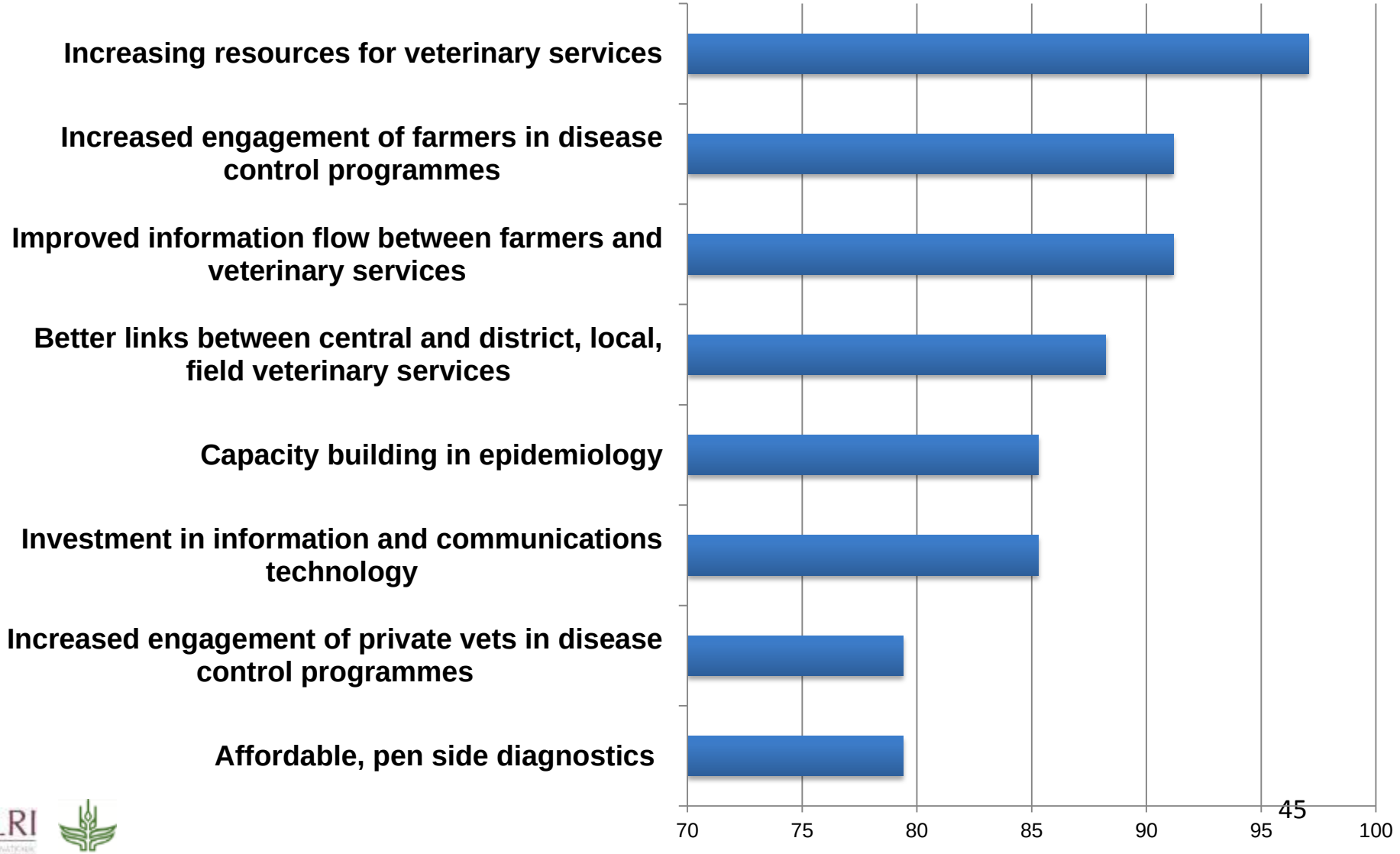


- A total of 1,323 samples collected in cross-sectional surveys, 481 already screened

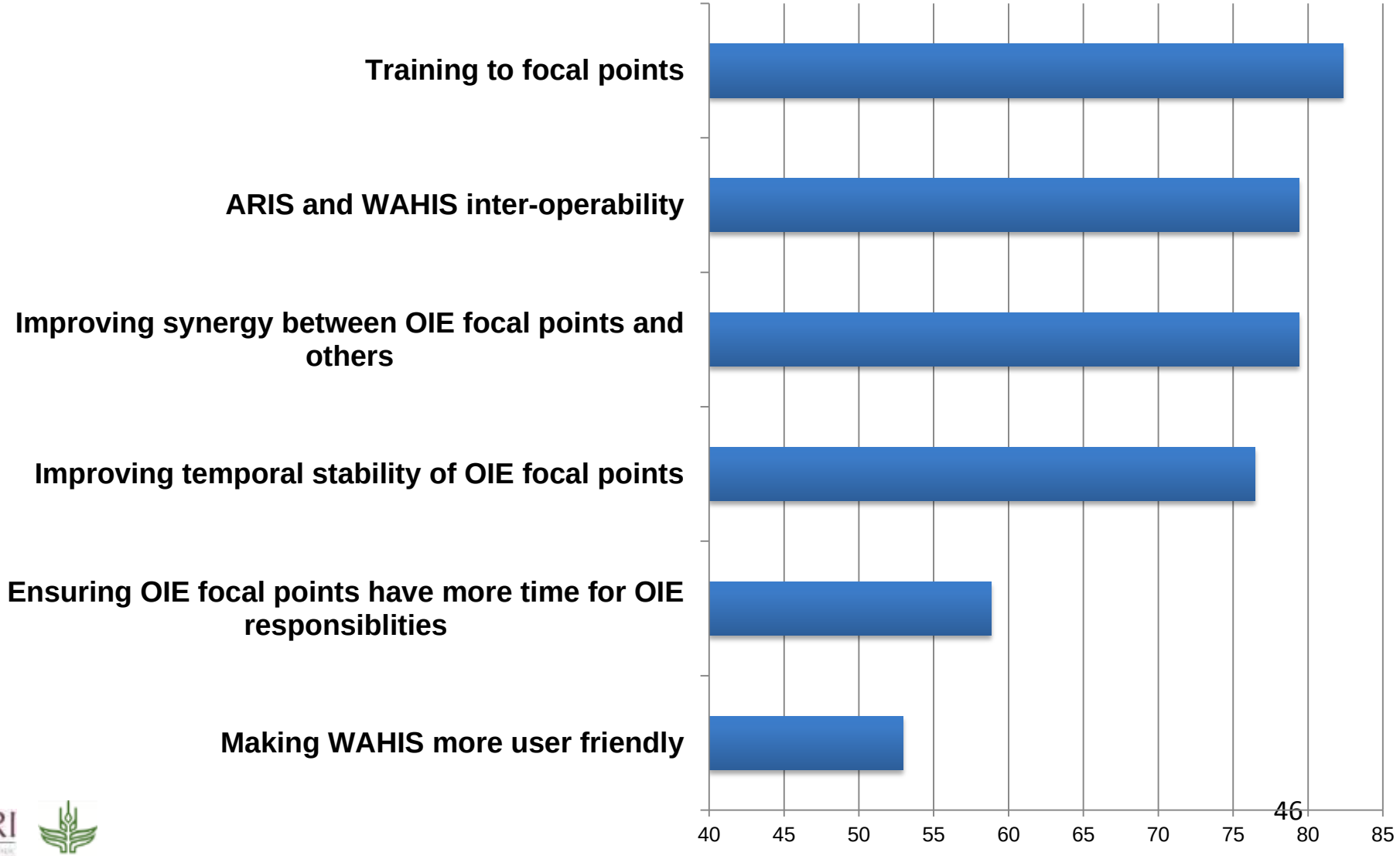


6. Opportunities

How to improve disease reporting



How OIE can help reduce disease impact



Take homes

- Unlimited wants in a world of limited resources
- Vital few and trivial many: Pareto principle
- The multiple burdens of animal disease
- What cannot be measured, cannot be managed
- Foreseen is forearmed

Ways Forward

- An Africa list of “neglected animal diseases”?
- More detailed disease impact studies?
- Sharing & harmonisation of contingency plans?
- Pilot novel ways to improve reporting?
- A One Health system for monitoring animal use of antimicrobials?
- Norms for informal food markets?

Conclusion

- Good progress has been made on disease control, priority lists, contingency plans, and vaccination
- SVS have broad-based, equitable, development-oriented approach to disease control
- ***But*** *diseases have multiple, heavy burdens and trends are upwards*
- ***While*** *new and important threats emerge (climate sensitive disease, EIDs, FBD and AMR)*
- ***And*** *limited quantification of impacts may chill investment in disease control*

Therefore improved reporting, more information, stronger engagement, and deeper co-operation, is needed to tackle neglected animal disease in Africa.

ILRI CGIAR

Better lives through livestock

ilri.org

ilri.org

Box 30709, Nairobi 00100, Kenya
Phone: + 254 20 422 3000
Fax: +254 20 422 3001
Email: ILRI-Kenya@cgiar.org

Box 5689, Addis Ababa, Ethiopia
Phone: +251 11 617 2000
Fax: +251 11 617 2001
Email: ILRI-Ethiopia@cgiar.org

other offices
China • India • Mali
Mozambique • Nigeria • Tanzania
Thailand • Uganda • Vietnam

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