Economics of One Health

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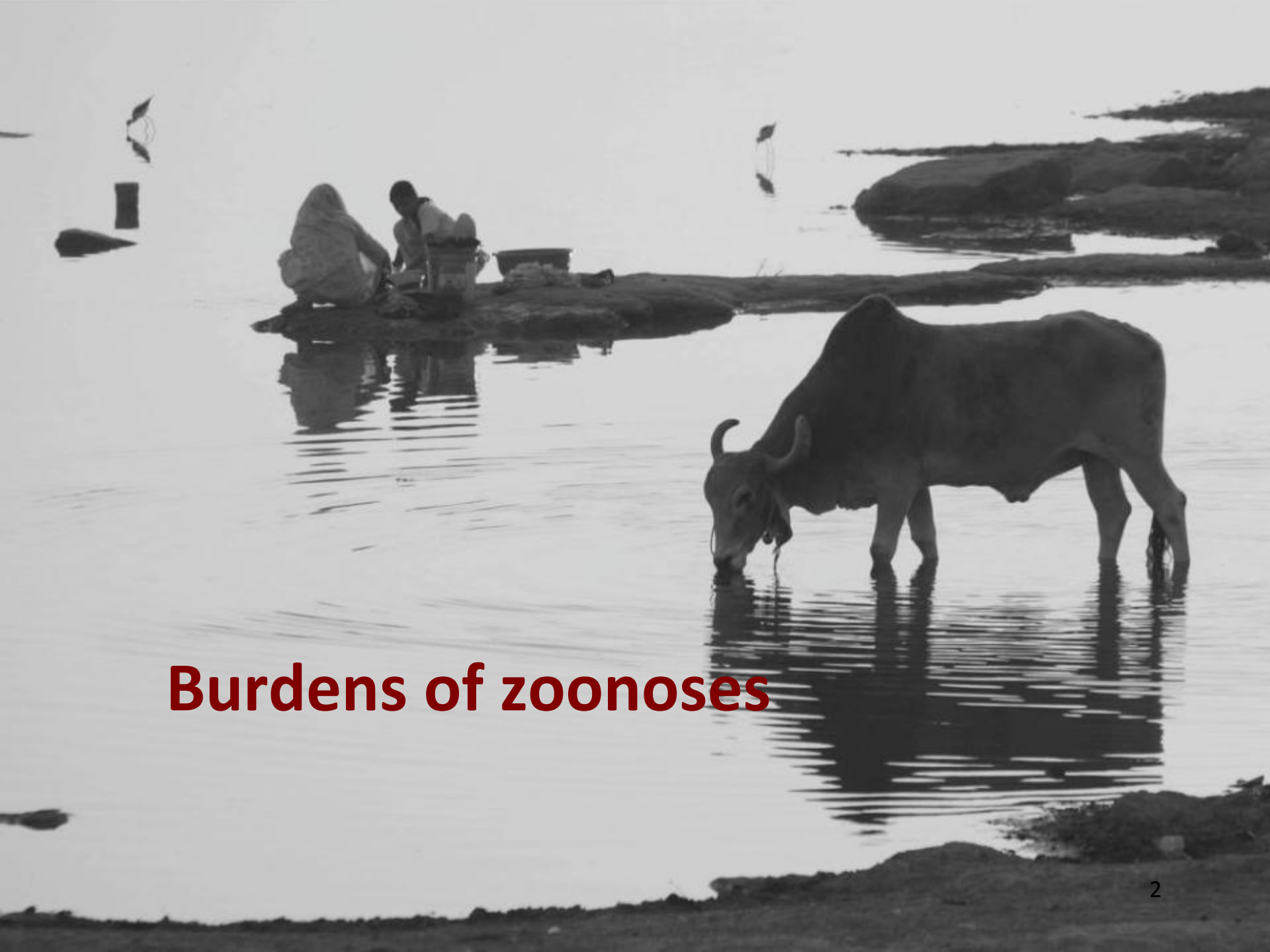
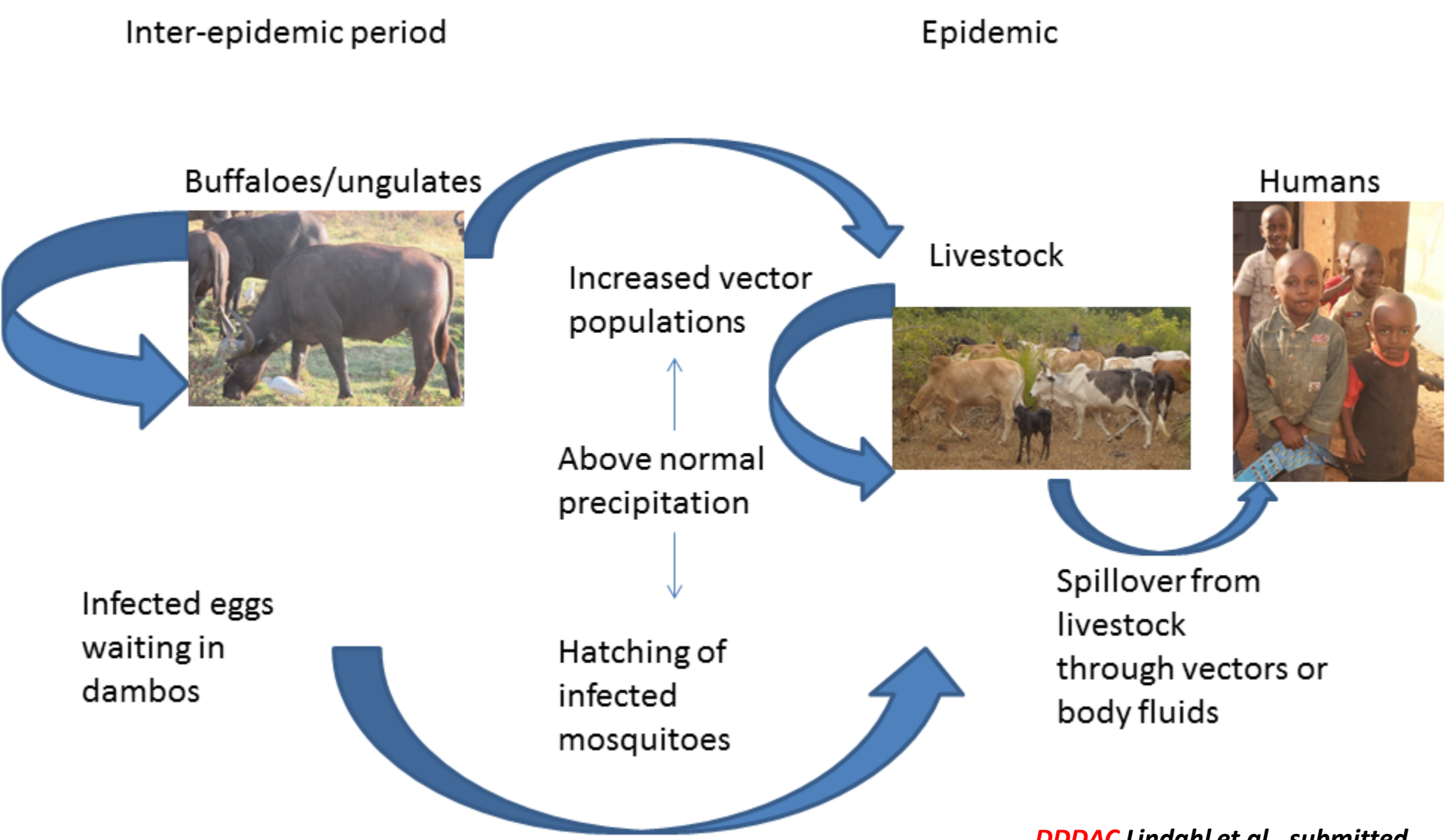
One Health for the Real World: Zoonoses, Ecosystems and Wellbeing, **17–18 March 2016**

Dynamic Drivers of Disease
in Africa Consortium
NE-J001570-1



Burdens of zoonoses

The challenge of defining zoonotic burden



DDDAC Lindahl et al., submitted

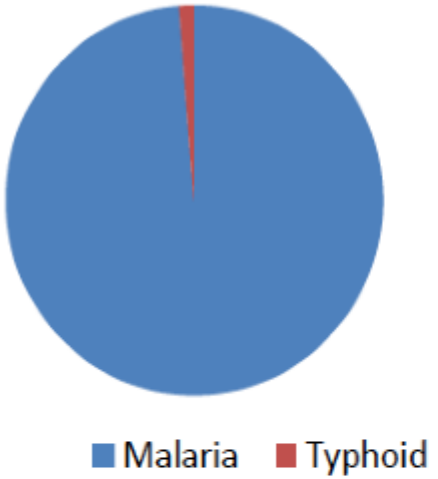
The challenge of multiple burdens

	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

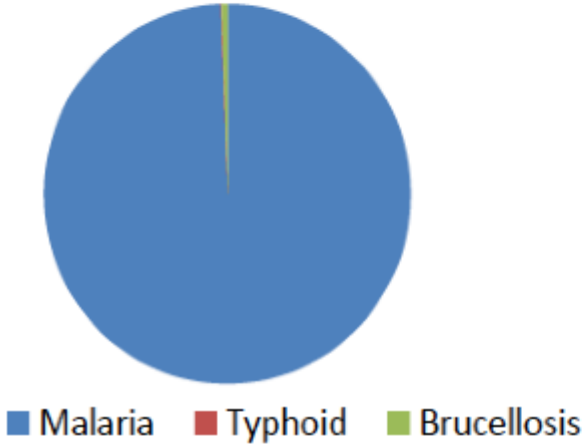
DDDAC Shaw & Grace, 2014

The challenge of misdiagnosis

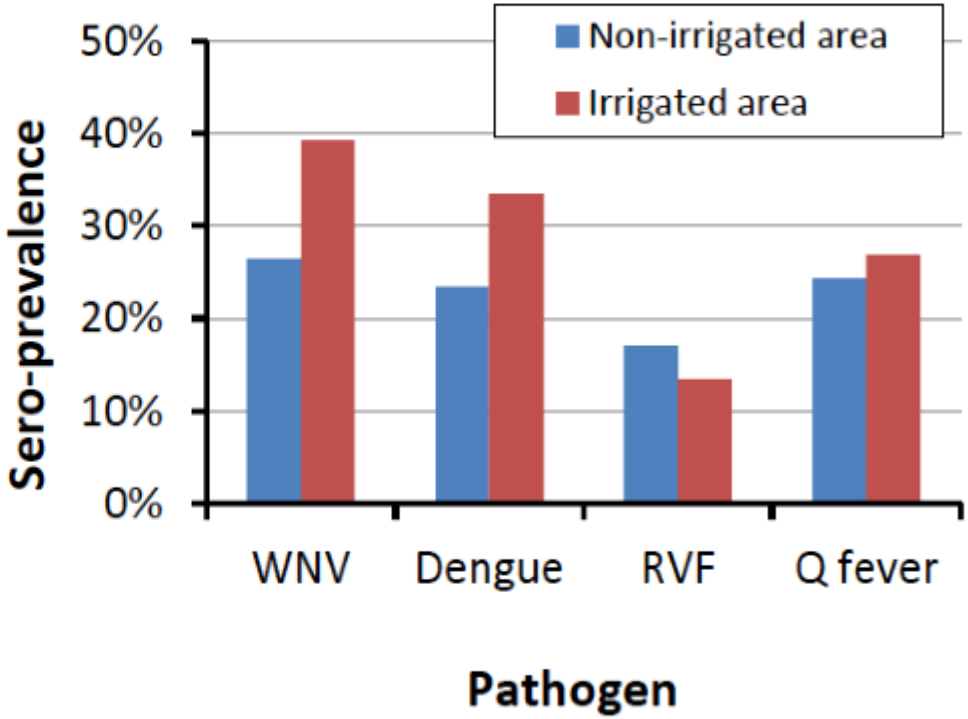
Cases from Bura health centre



Cases from Hola health centre



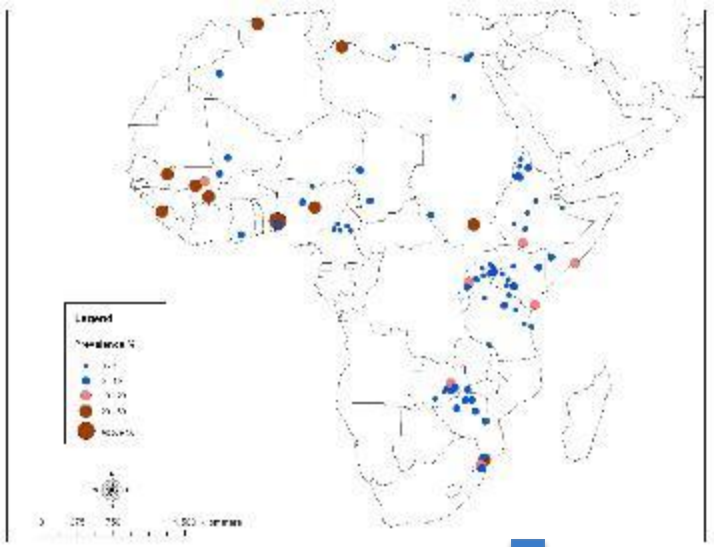
- A total of 1,323 samples collected in cross-sectional surveys, 481 already screened



DDDAC Bett, project results

The challenge of under-reporting

Bovine brucellosis according to 440 surveys

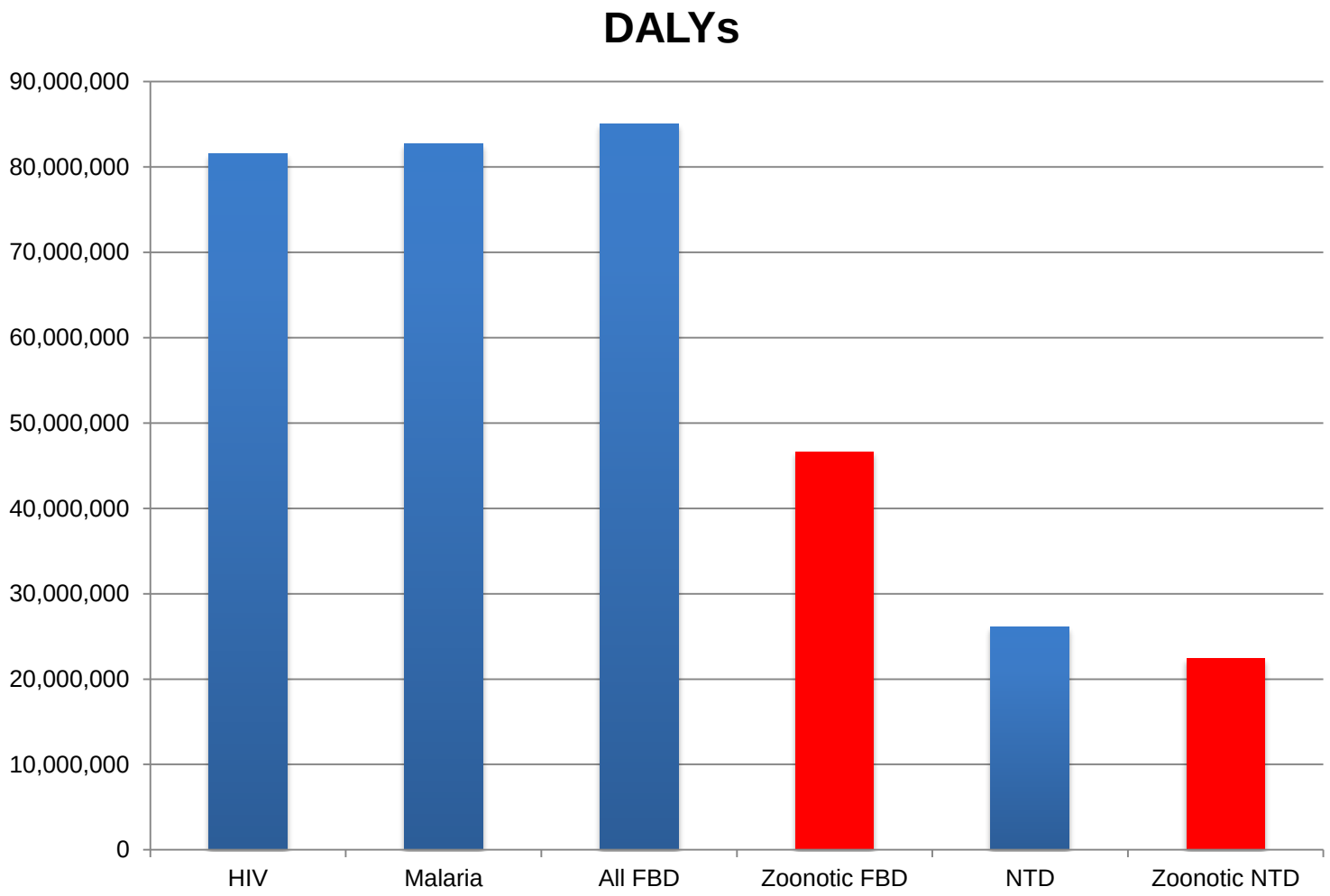


Bovine brucellosis official reports 2008-2012

	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

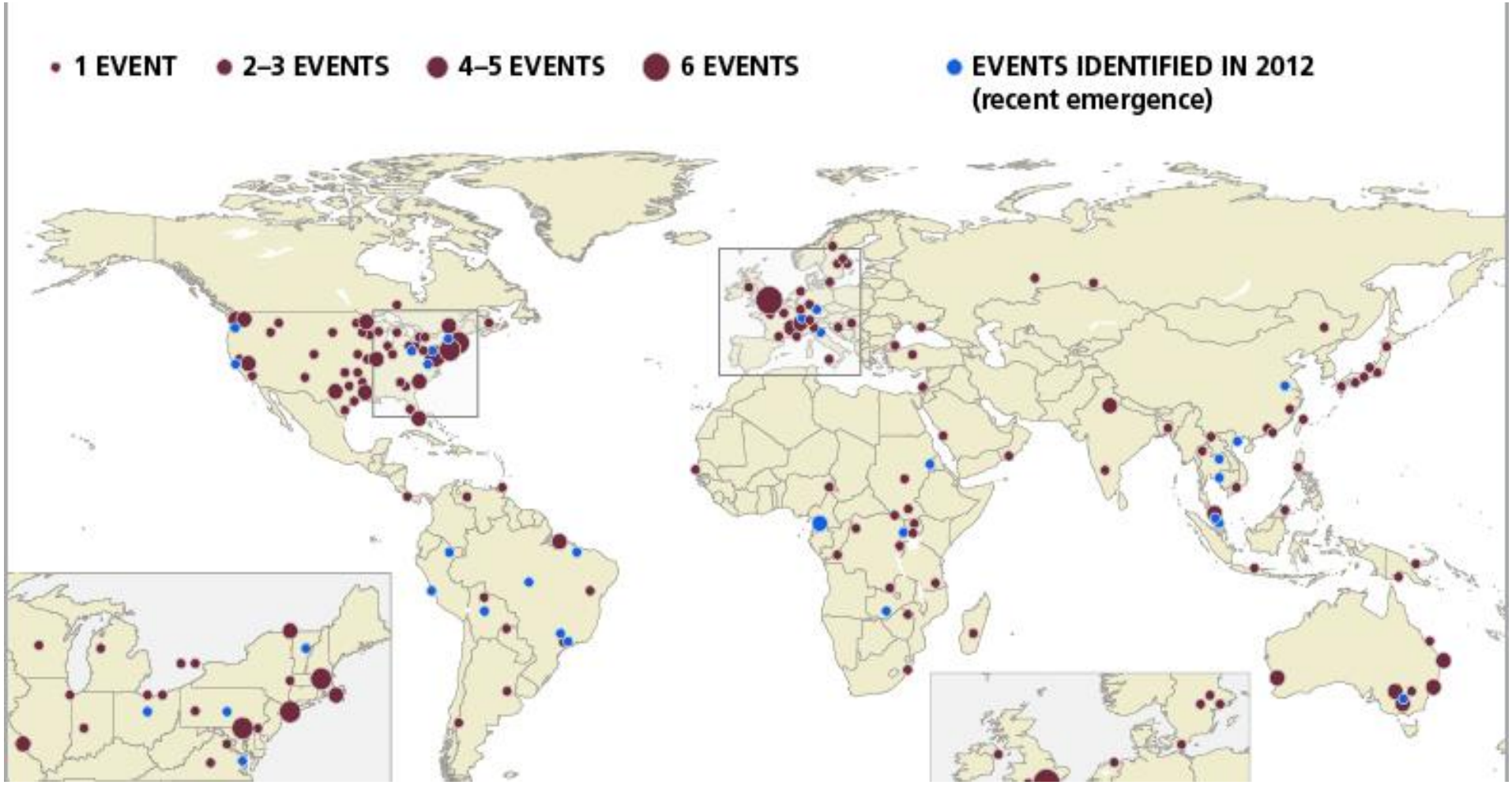
Burden of zoonotic disease



Source: adapted from IMHE and WHO FERG report

Burden of emerging infectious disease

Zoonoses make up 75% of EIDs and cost 6.7 billion a year



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

Reliable benefits from controlling endemic zoonoses

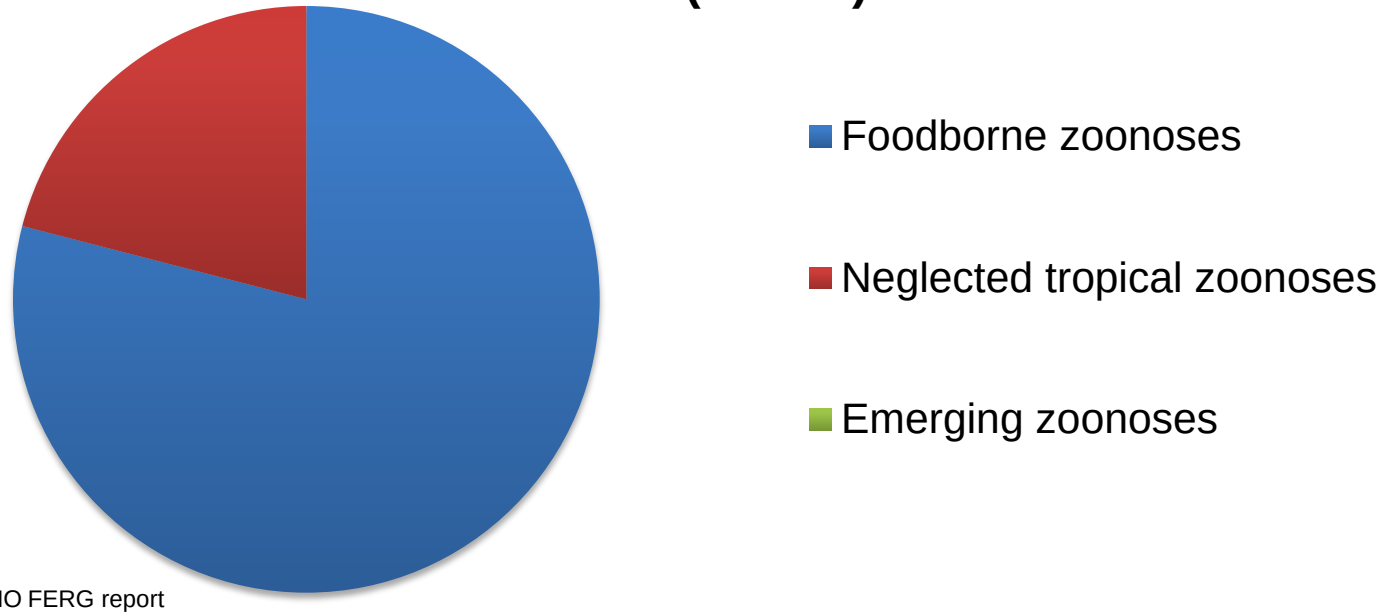
- Credible economic cost benefit studies on brucellosis control (n=13)
  - Average benefit cost ratio 6:1
  - Median 4:1
  - Range 1.1-19.8

Ex ante	**5**
Ex post	**6.6**

Developing countries	**3.7**
Developed countries	**7.4**

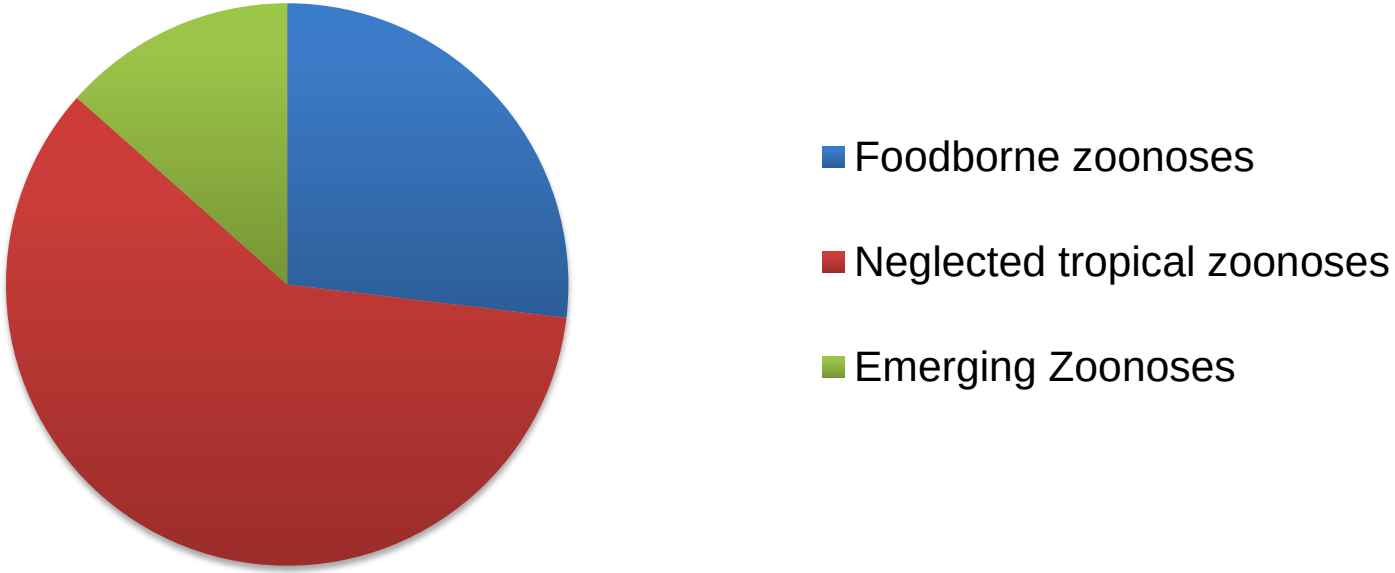
DDDAC Grace, 2015

Burden (DALYs)



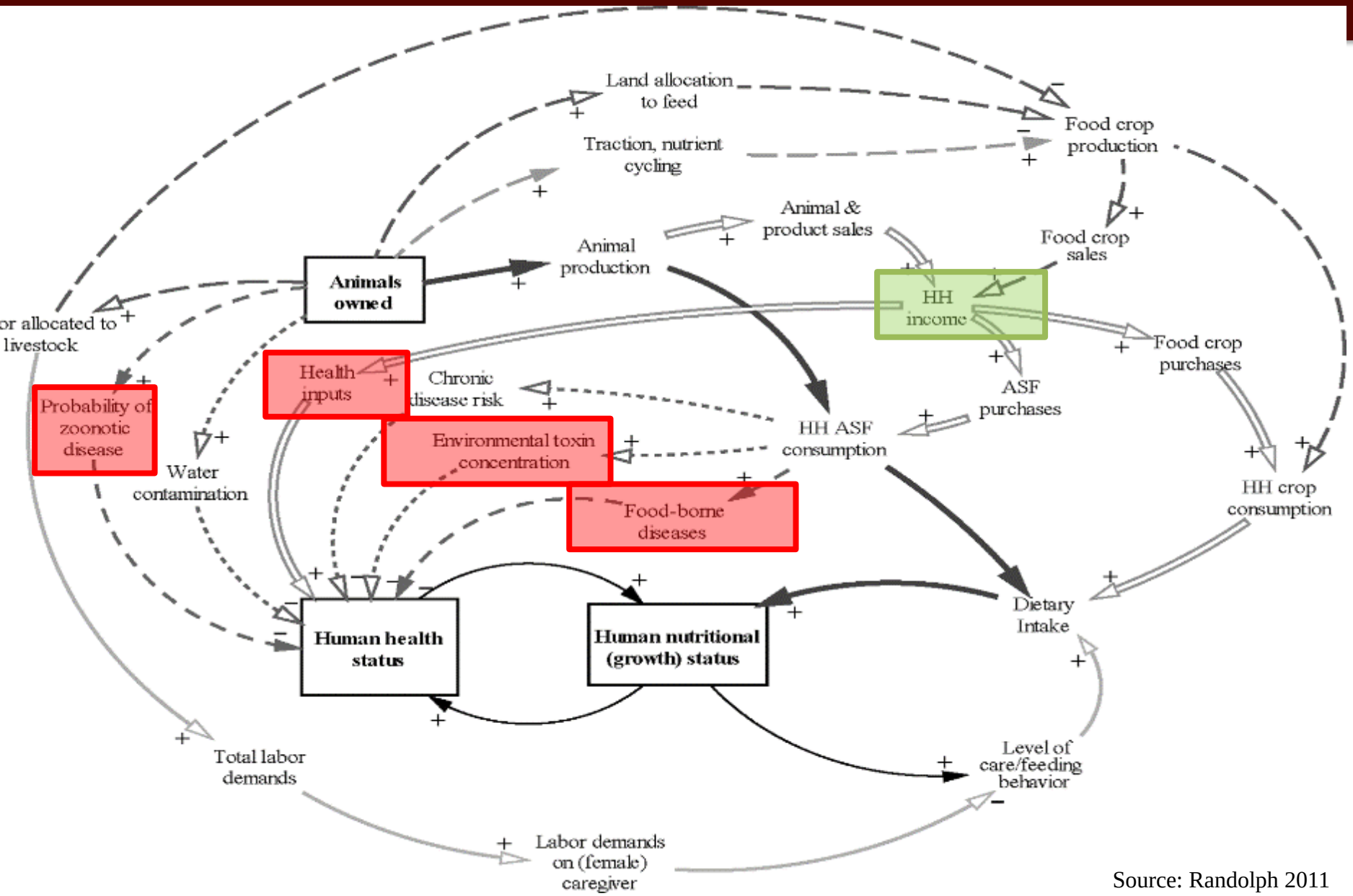
Source: IMHE and WHO FERG report

Priority of state veterinary services in Africa

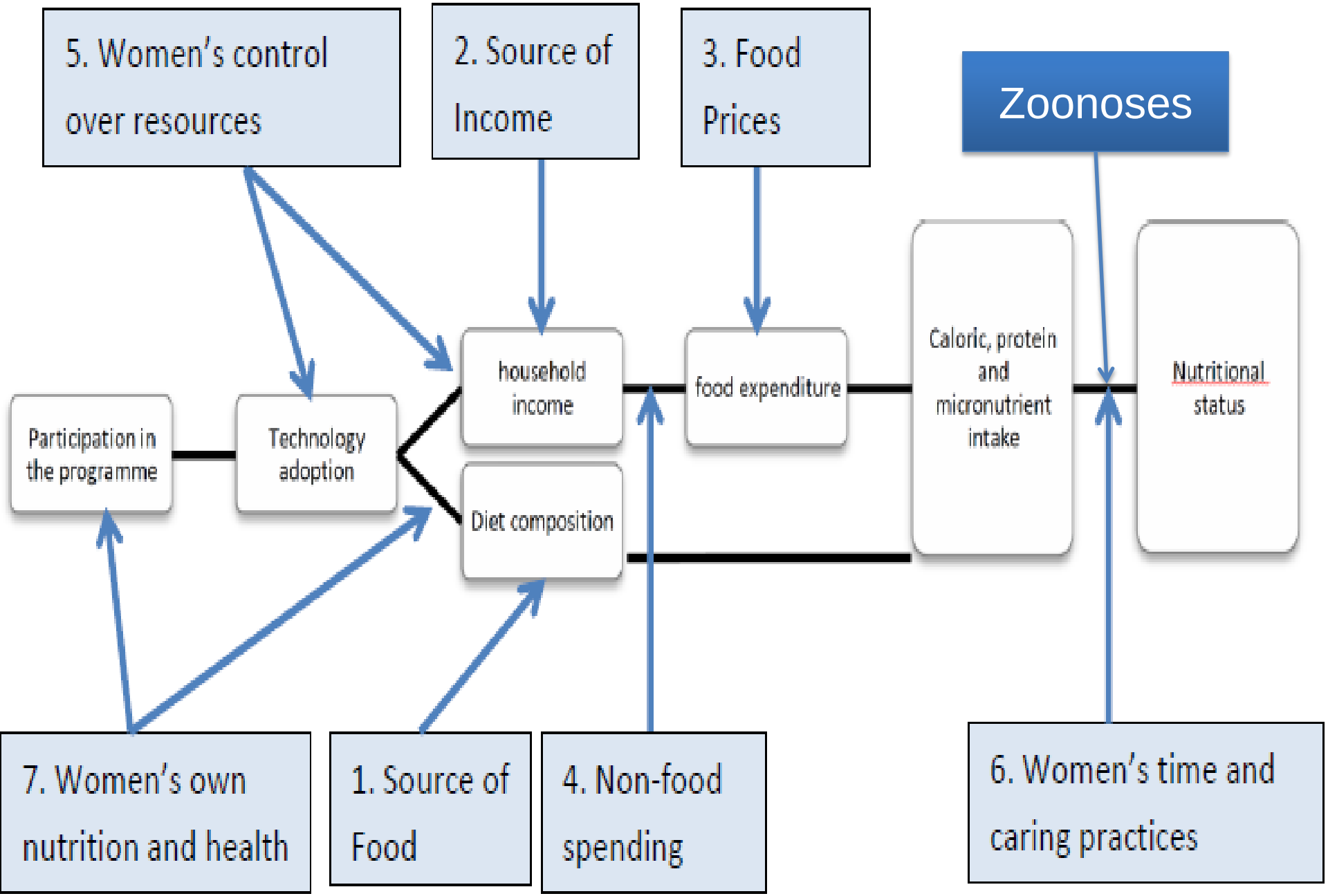


Source: Grace et al., 2015

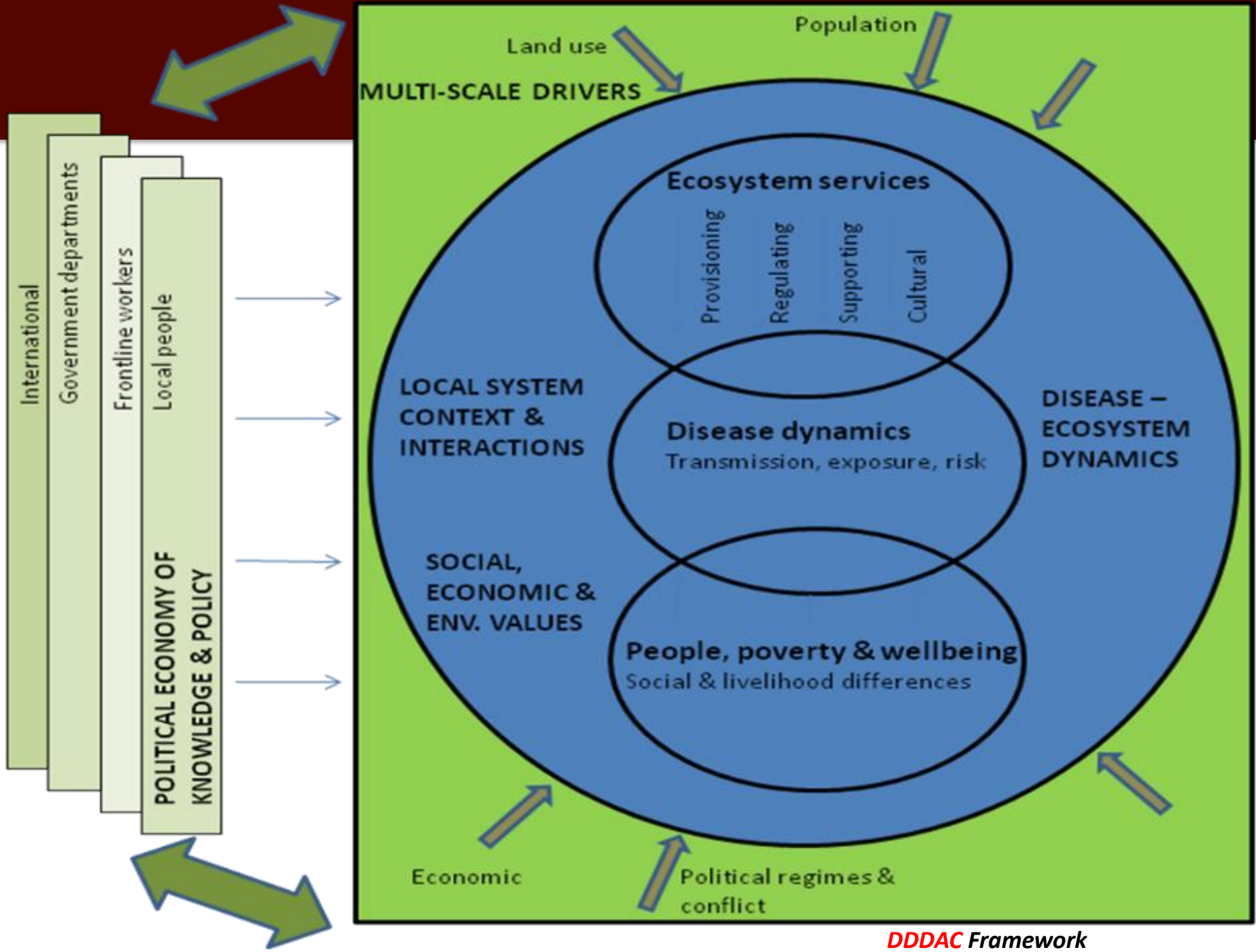
Drivers of wellbeing outcomes



Source: Randolph 2011

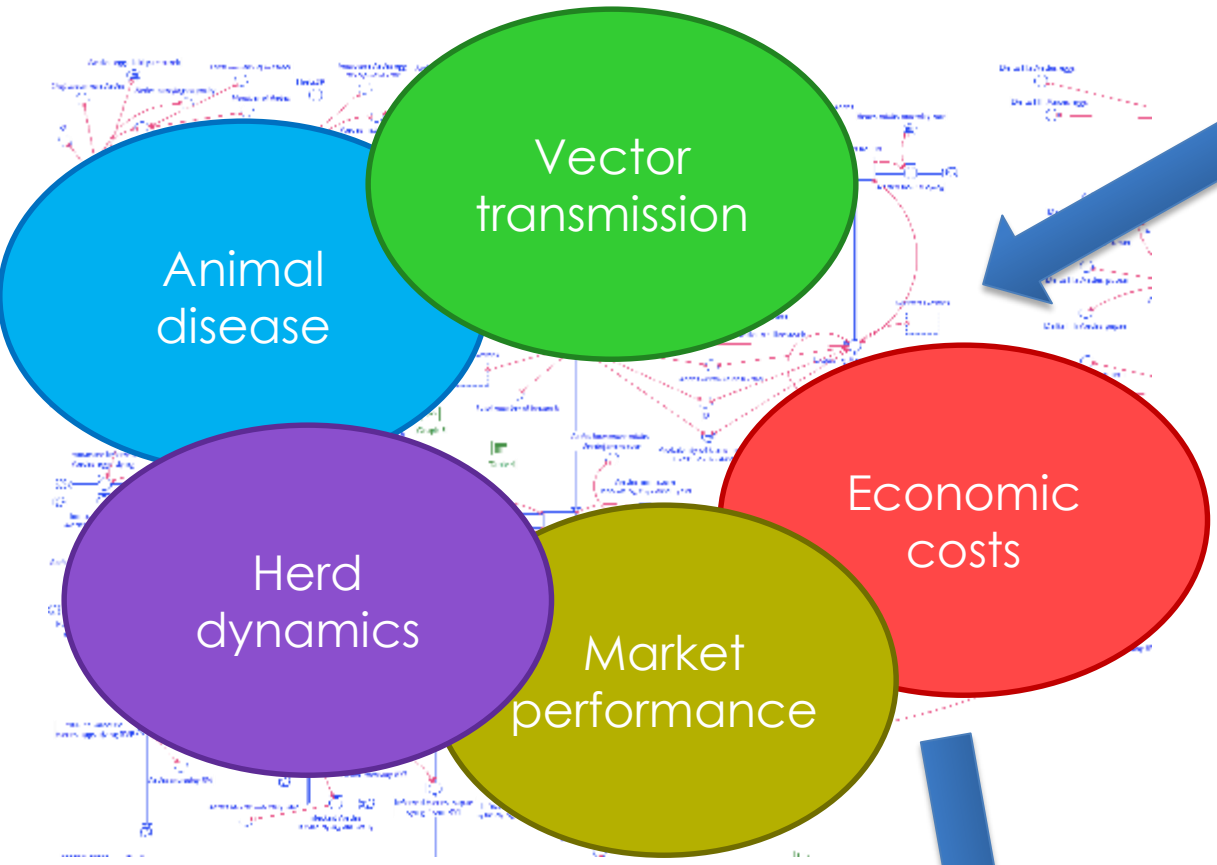


Source: Gillespie et al, 2012; Masset et al, 2012; Webb, 2013



DDDAC Framework

System dynamics model



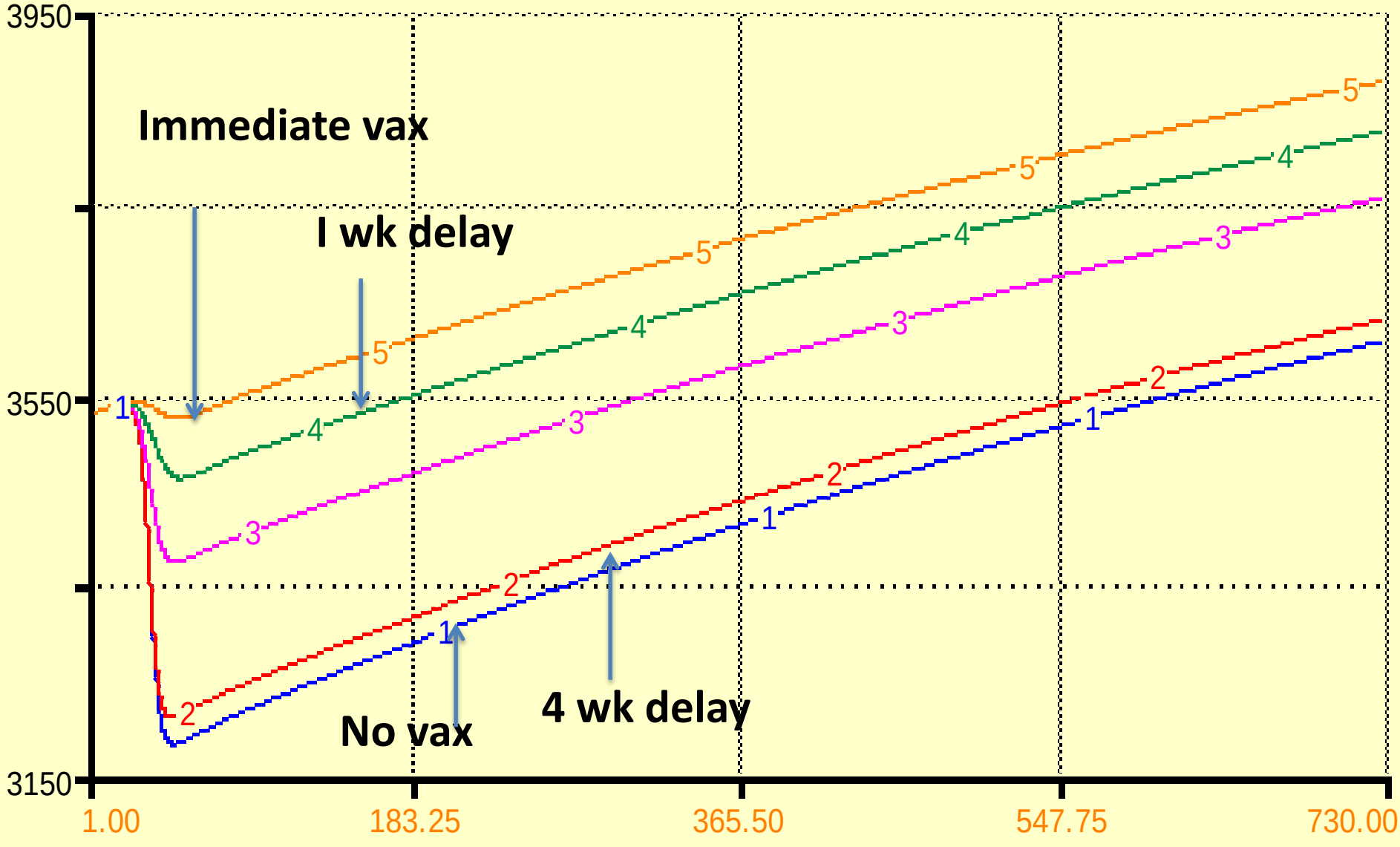
Interventions

Policy and implementation recommendations

Outcomes

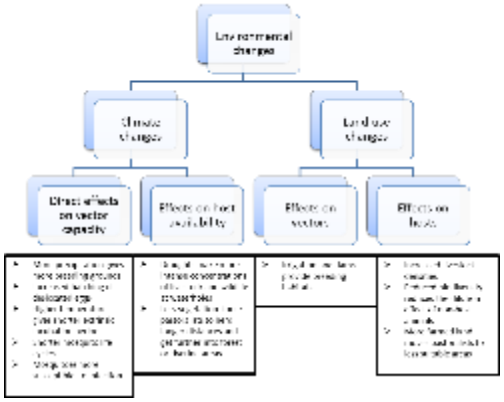
***DDDAC** Rich et al., in progress*

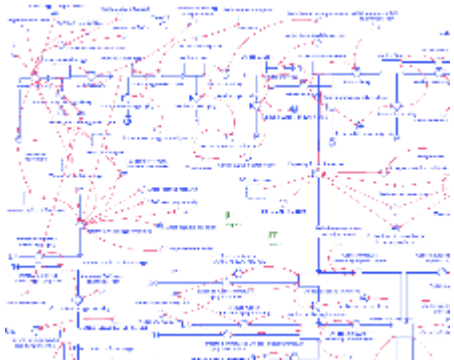
Effect of vaccination delay on cattle pop.

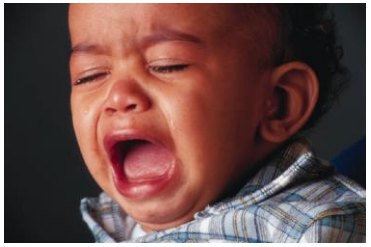


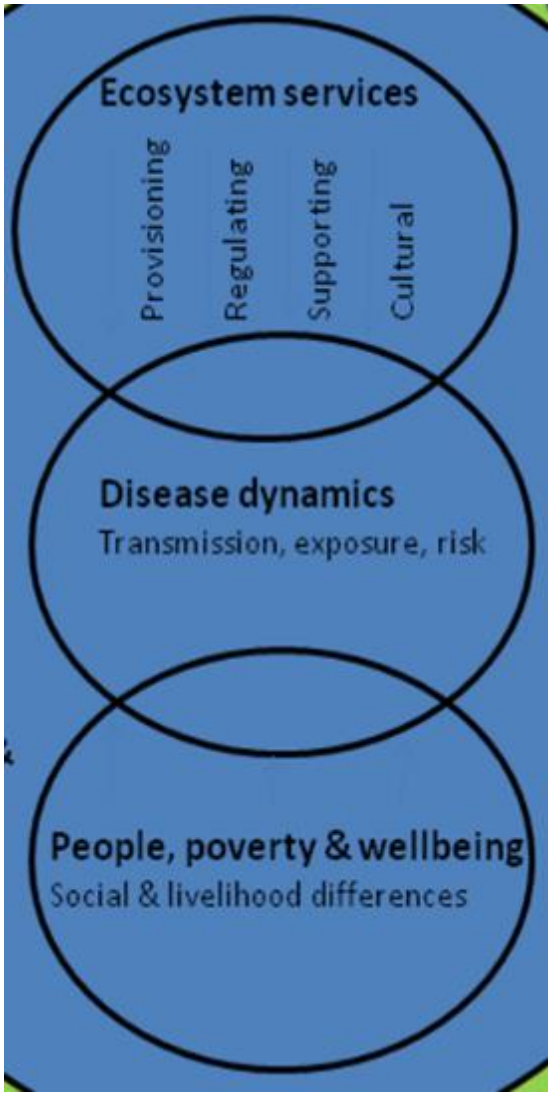
DDDAC Wanyoike et al. project results

From drivers to decisions









Interventions

Outcomes

Policy and implementation recommendations

Building a business case for zoonoses control

	Annual benefit	Annual cost	Confidence in investment
Sharing resources	4 billion	1 billion	++
Controllable zoonoses	85 billion	21 billion	+++
Timely response	6 billion	3.4 billion	++
Averting pandemics	30 billion		+
Generating insights	?	?	+++
Bottom line	**125 billion**	**25 billion**	**+++**

DDDAC Grace, 2015

Conclusions

Zoonoses & poverty

- Poor people get exposed to zoonoses (DDDAC, Dzingirai et al., submitted)
  - Ecosystem modification, gender, occupation can affect risk
  - But statistical relation between poverty and zoonoses often weak and relations between ecosystem and disease outcomes complex (DDDAC, Muriuki, 2015)

- Good evidence for high levels of multiple zoonotic infections
  - But high levels of under-reporting and misdiagnosis
  - And less data for specific health and livelihood outcomes related to this

- Expenditure on human and animal health prevention and cure a significant burden for poor people
  - But less evidence on the role of zoonoses in this or benefit for zoonosis control

- Official and public response to outbreak diseases impose a large part of the burden

Conclusions

- In developing countries, human sickness is a major cause of falling into and remaining in poverty
- Zoonoses are responsible for a substantial proportion of human illnesses in developing countries
  - Lack of agreed definitions and metrics hinders understanding of the impact of zoonoses on human health
  - Participatory and expert prioritisations of zoonoses are often misleading
  - Little information on multiple infections
- Neglected, endemic zoonoses have more important poverty impacts than emerging diseases
- Responses to zoonoses are often anti-poor, and may be more injurious than zoonoses themselves

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