

Livestock and antimicrobial resistance in low- and middle-income countries

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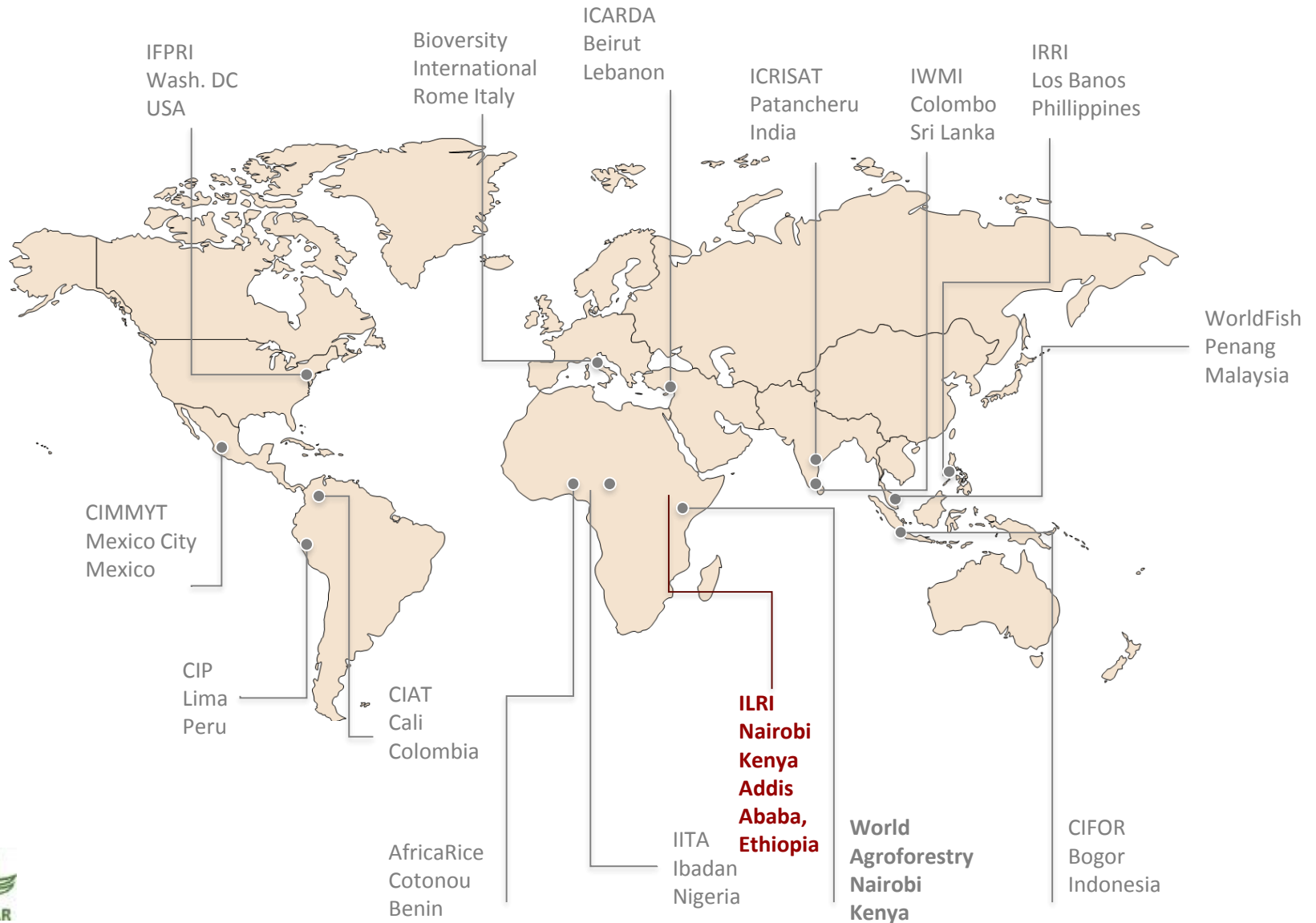
Antimicrobial resistance: The silent tsunami

Sida, Stockholm, Sweden

Thursday 7 September 2017



CGIAR Research Centres



ILRI resources 2017

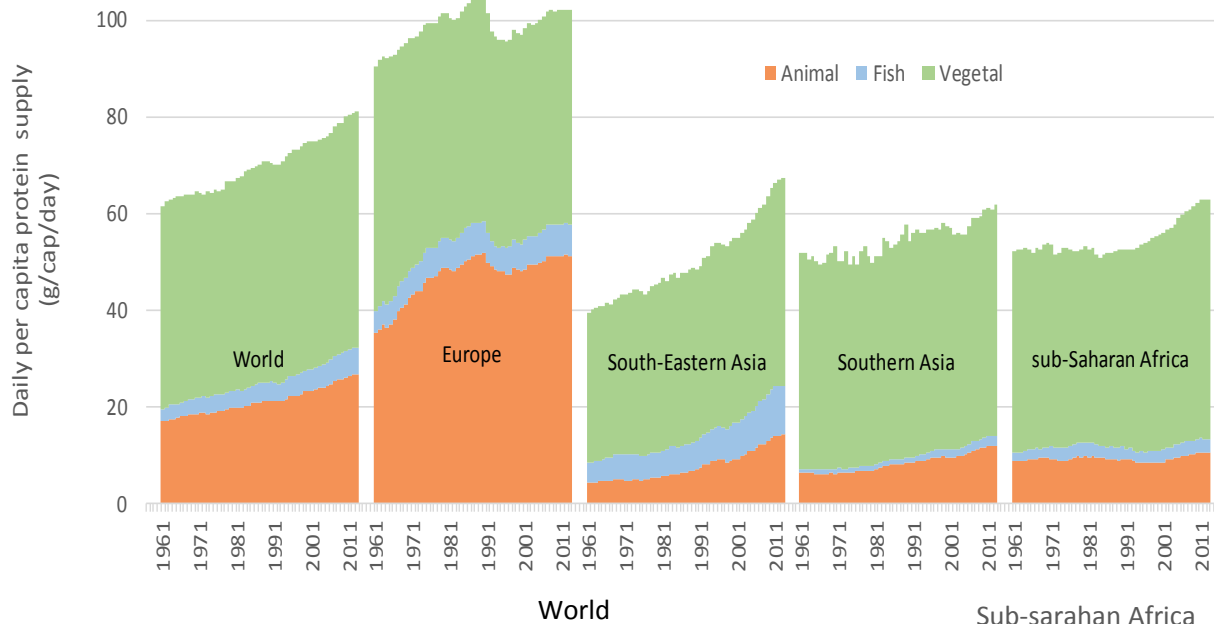
- **Staff: 670+**
- **Budget: about US\$80 million**
- **Senior scientists from 39 countries**
- **One third of ILRI staff are women**
- **Main campuses in Kenya and Ethiopia, and offices in 14 other countries around the world**



ILRI offices

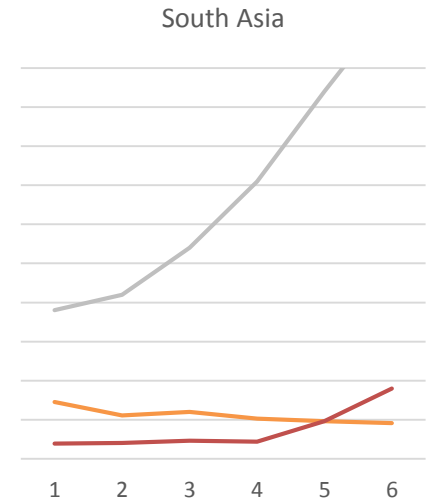
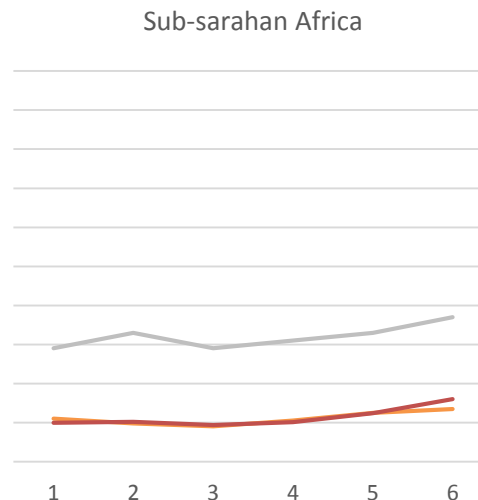
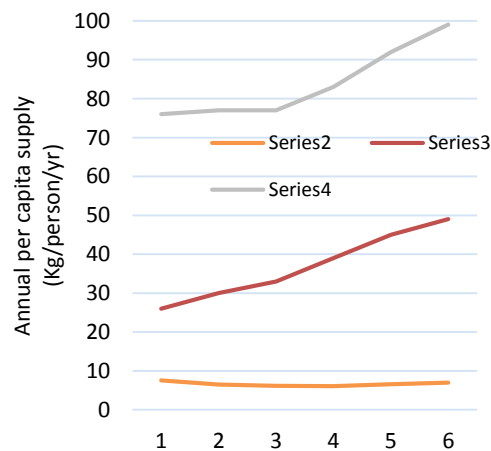


Animal-source food consumption



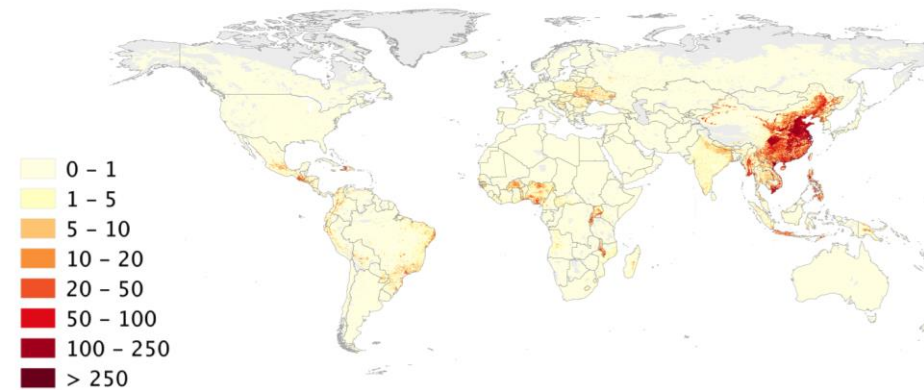
Daily per capita protein supply

Annual per capita protein supply

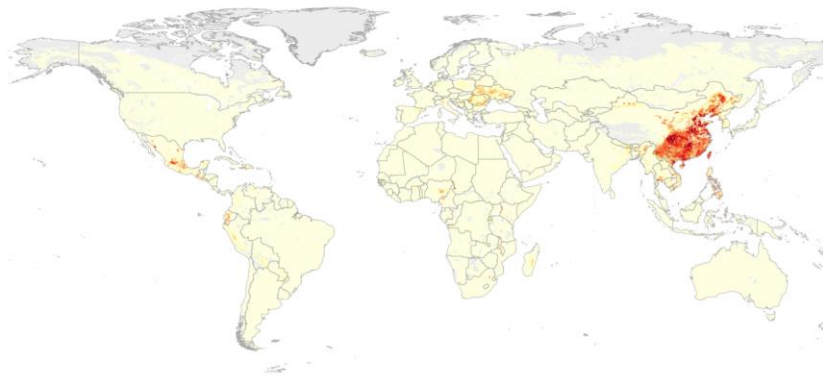


Courtesy Mats Lannerstad. Grace et al. (forthcoming)

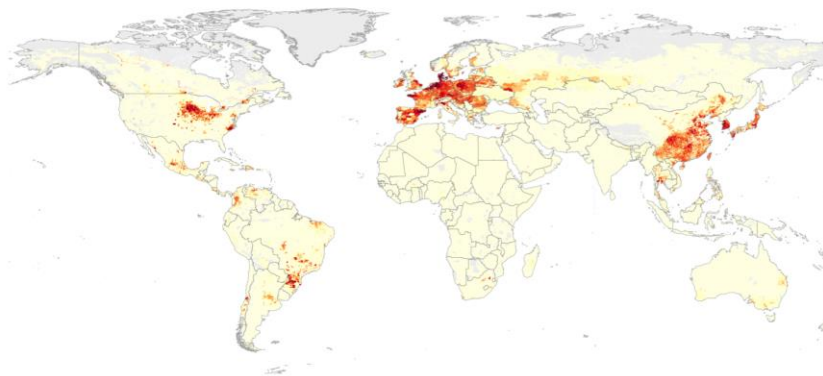
Modelling pig systems



Extensive



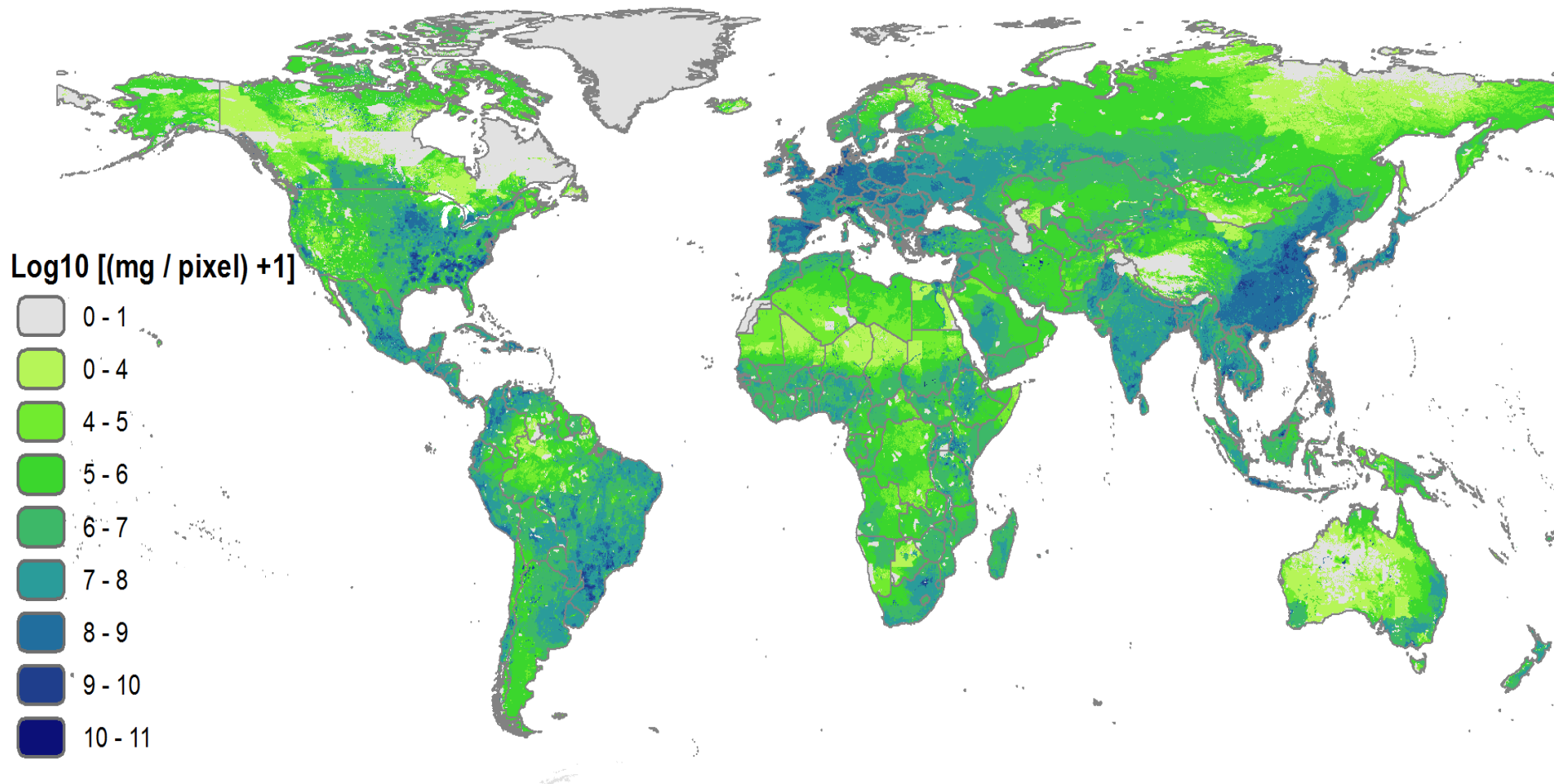
Semi-intensive



Intensive

Antimicrobial resistance

Global antimicrobial consumption in livestock
(mg per 10km pixel)



Source: Van Boeckel et al. (2015)

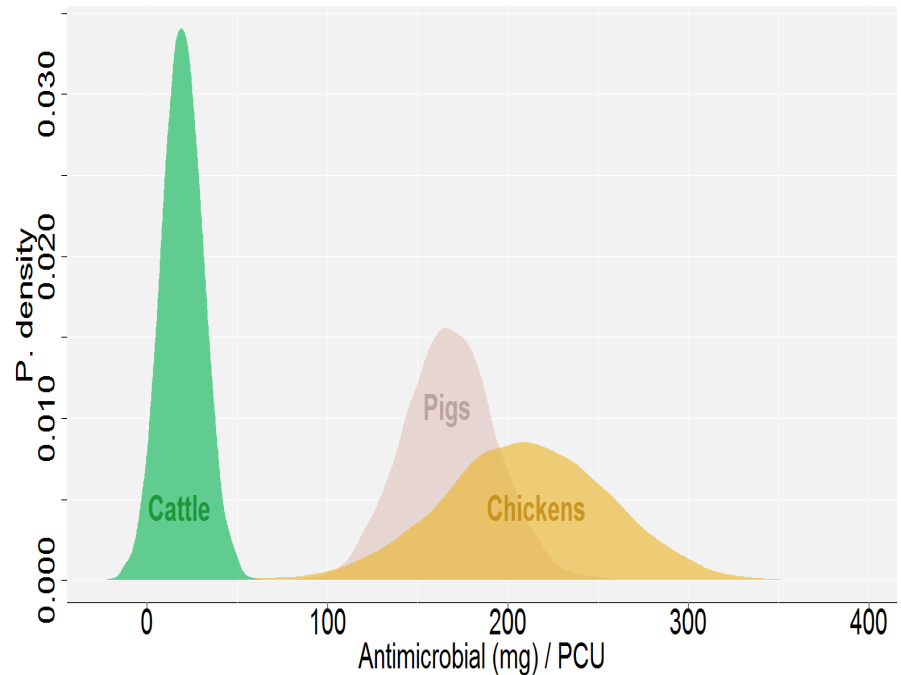
Antimicrobial use in livestock



Global trends in antimicrobial use in food animals

Thomas P. Van Boeckel^{a,1}, Charles Brower^b, Marius Gilbert^{c,d}, Bryan T. Grenfell^{a,e,f}, Simon A. Levin^{a,g,h,1}, Timothy P. Robinsonⁱ, Aude Teillant^{a,e}, and Ramanan Laxminarayan^{b,e,j,1}

- Total consumption in the livestock sector in 2010 estimated at 63,151 tons
- Global antimicrobial consumption will rise by 67% by 2030
- It will nearly double in BRICS nations



Animal disease is a key constraint

- Animal disease is a key constraint in LMIC:
Remove it and animal productivity increases greatly



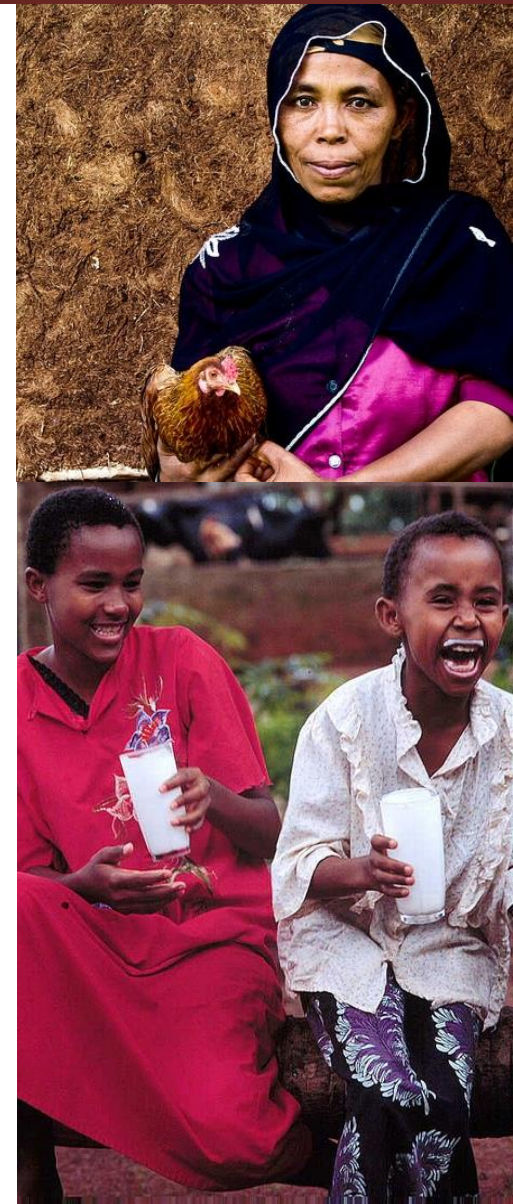
AM Resistance and livestock in LMIC

Different systems in LMIC – can't use “one size fits all” approach

Need to address the “too much” and the “too little”

Next slides:

- AM usage in LMIC
- Contribution of AM usage in livestock to AMR
- How to tackle it?



Reality check

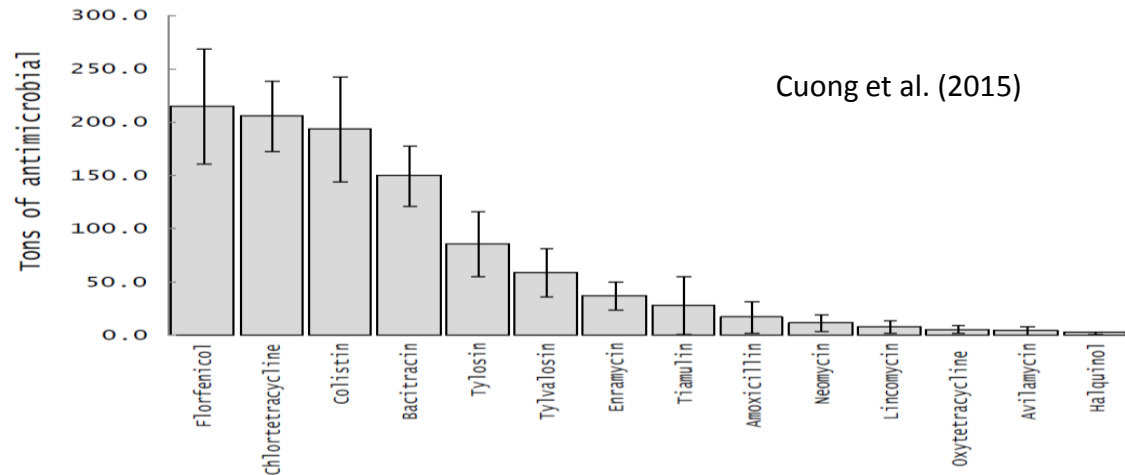
- Salbutamol – ‘growth promoter’ in pigs
- Clearly illegal in Vietnam
- High concern of authorities and consumers
- Easy to test for



In 2015, 6000 kg salbutamol imported and sold:
10 kg had a legitimate medical use (Van Duan and Huong 2016)

11% of packaged feed and 4% of pork pooled samples were positive for chloramphenicol, a banned substance (Tuyet-Hanh et al. 2017)

Antibiotic use: Vietnam



Livestock farmers

- 45 antibiotics from 10 classes
- 100% industrial farmers treat themselves; 60% of household farmers

AM usage - smallholder farming

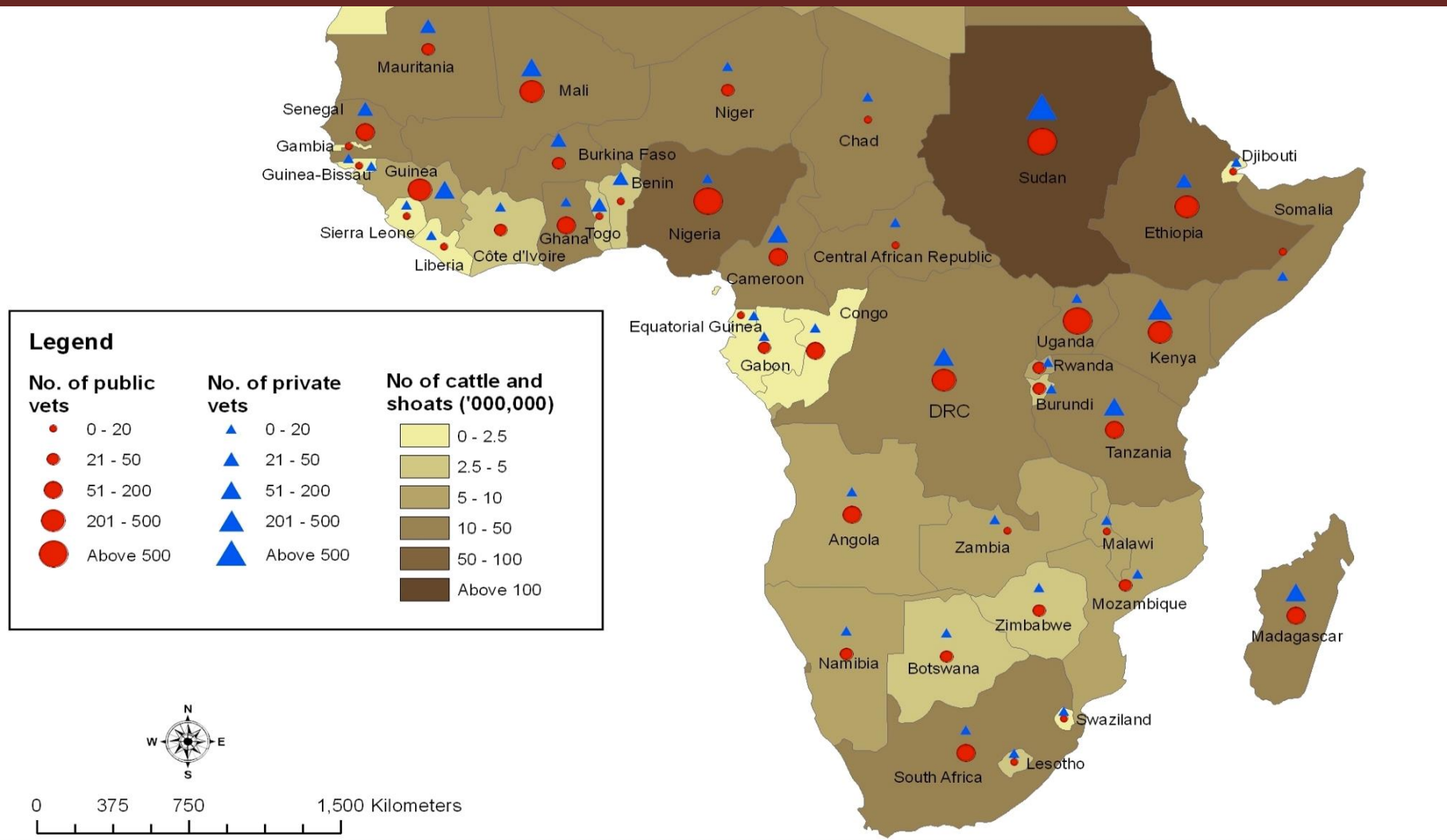
No official records - less usage than intensive units

Some of the problems commonly found across LMIC:

- Misuse: Poor diagnostic capacity and wrong treatment (no vets)
- Under-dosage: poor access to drugs
- Under-dosage: poor administration of drugs
- Most AM obtained from informal markets



Africa: dozens of vets, tens of millions livestock



Reality check

THE
MONITOR

24 APRIL 2016

Uganda: Lira Farmers Share Arvs With Their Pigs

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By Bill Oketch

Lira — The pork you are enjoying for breakfast, lunch or dinner could take you to an early grave. Yes! The same life-prolonging drugs that are prescribed to treat HIV/Aids patients are now being given to pigs that supply the pork we eat every day.

Farmers say they have to feed ARVs to pigs to keep them healthy and meet the area's growing appetite for cheap pork. But public health advocates argue that the practice breeds antibiotic-resistant germs in animals that can cause deadly harm to the consumers.

RELATED TOPICS

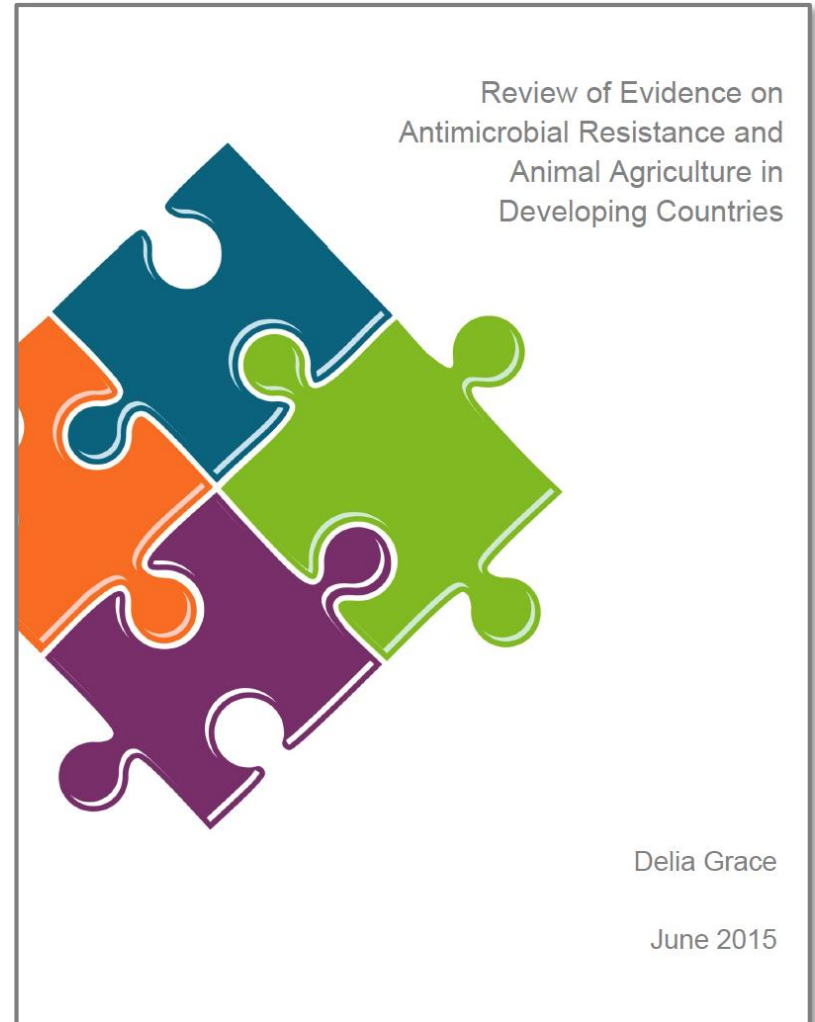
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AM use in LMIC and AMR

AM usage in animals:

- likely to lead to resistance in **animal pathogens**
- Likely to lead to increase circulation of resistant strains of **zoonotic pathogens** (especially foodborne pathogens)
- Possibly, but rarely demonstrated, could lead to resistance of **human pathogens** (not zoonotic). Only demonstrated in few cases.
- For human pathogens – it is unlikely the primary source of resistance comes from AM use in animals.



Kampala pork butcheries: *Salmonella*

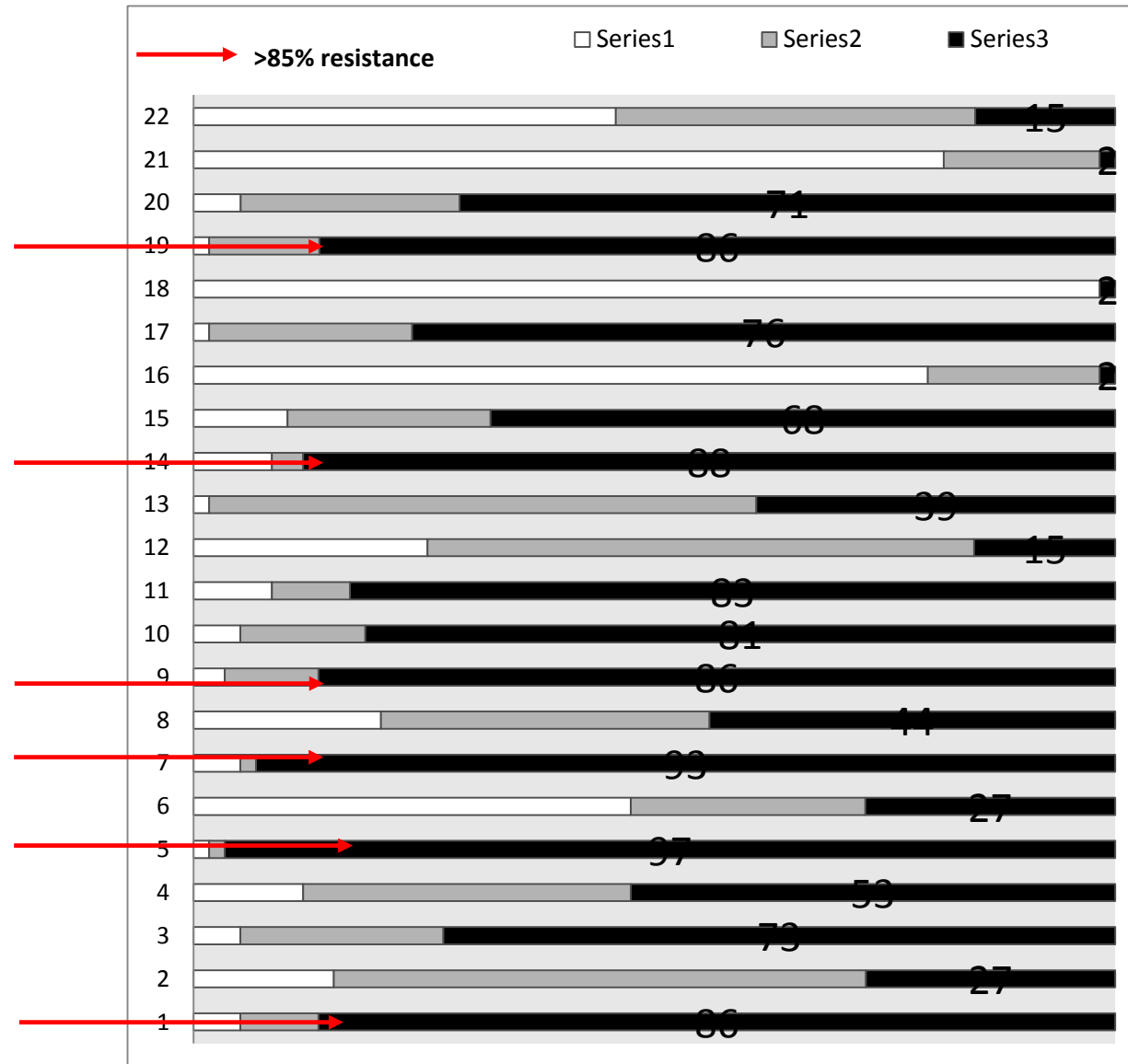


All isolates were confirmed *Salmonella* at FUB using species primer

Heilmann and Ndoboli (2015)



Drug sensitivity tests



Source: Ndoboli et al. (forthcoming)

Addressing AMR in LMIC

- **Reducing use:**
 - Must be a targeted approach
 - Requires improving monitoring and diagnostic capacities in LMIC
 - Regulation and enforcement – unlikely to work in many settings

- **Reducing transmission**

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Cite this article: van Bunnik BAD, Woolhouse MEJ. 2017 Modelling the impact of curtailing antibiotic usage in food animals on antibiotic resistance in humans. *R. Soc. open sci.* **4:** 161067.
<http://dx.doi.org/10.1098/rsos.161067>

Modelling the impact of curtailing antibiotic usage in food animals on antibiotic resistance in humans

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