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EcoAMR

Forecasting the fallout from AMR - Economic impact of antimicrobial resistance in food-producing animals

RAND EUROPE

World Organisation for Animal Health

Focus of the research:

Understanding the burden of antimicrobial resistance in livestock production

Estimating the economic value of interventions to reduce antimicrobial use

Livestock production disease (LPD) model

Livestock sector and disease inputs:

- Animal stocks
- Production parameters
- Disease incidence

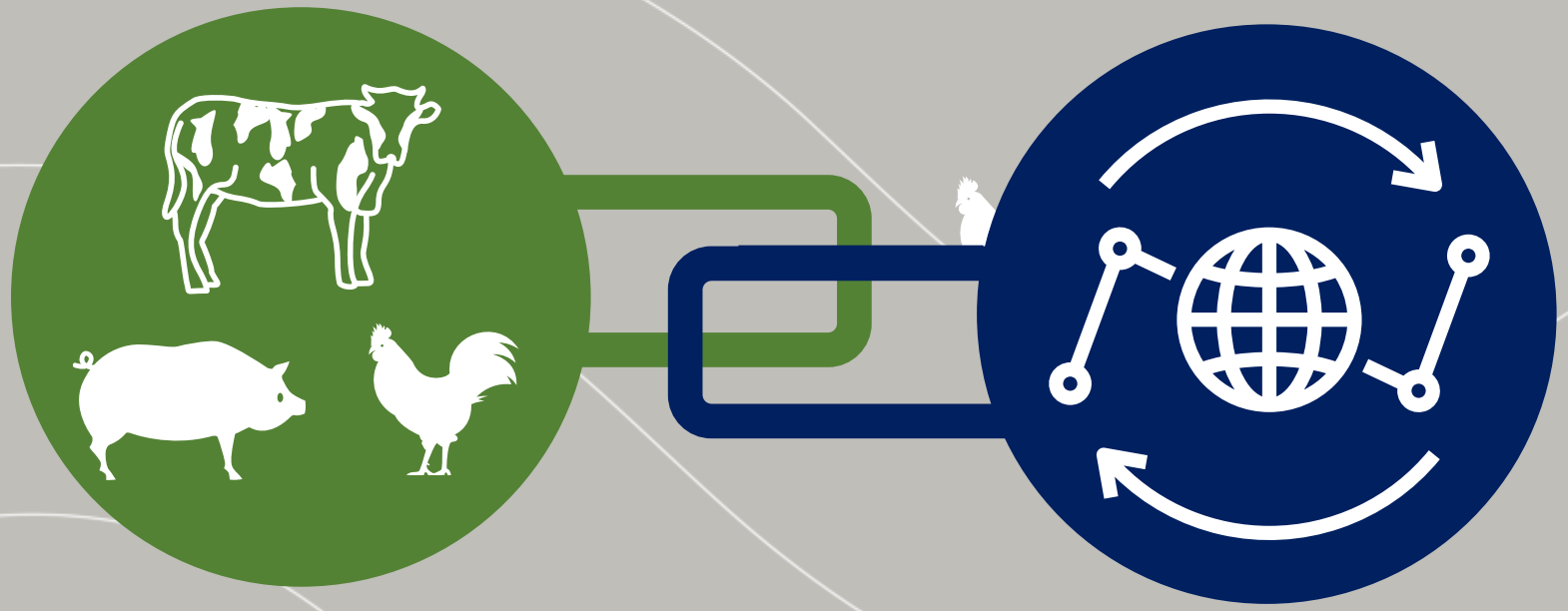
Link between antimicrobial use and resistance:

- ANIMUSE
- Resistancebank

Modelling the cost of resistance in livestock production

Livestock production disease (LPD) model

Dynamic computable general equilibrium (DCGE) macroeconomic model



Economic inputs:

- Consumption of intermediate and final goods and services
- Bilateral trade flows factor use tables
- Transport, taxes and subsidies

Business as usual and other “what-if” scenarios

Business as usual case:
Resistance projected based on historical rates; **business as usual antimicrobial use**

Pessimistic scenario:
Higher AMR-attributable disease burden

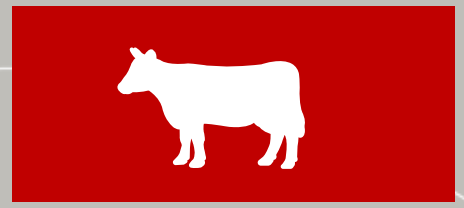
Human spillover scenarios:
Moderate spillover effects from animal antimicrobial use on humans

Estimated production losses in livestock sectors attributable to resistant infections in 2025

Middle East & North Africa*

**United Arab Emirates, Bahrain, Djibouti, Algeria, Egypt Arab Rep. Iran Islamic Rep., Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Malta, Oman, West Bank and Gaza, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, Yemen Rep.*

CATTLE: MEAT



-3.1%

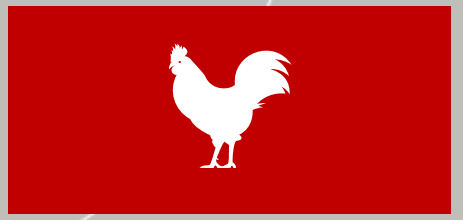
(-7.3 million)

CATTLE: RAW MILK

-0.7%

(-3.6 million)

CHICKEN: MEAT



-2.7%

(-10 million)

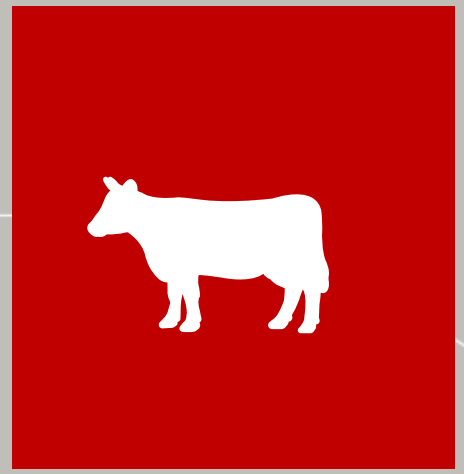
Consumption equivalent based on per capita consumption

Estimated production losses in livestock sectors attributable to resistant infections in 2050

Middle East & North Africa*

**United Arab Emirates, Bahrain, Djibouti, Algeria, Egypt Arab Rep. Iran Islamic Rep., Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Malta, Oman, West Bank and Gaza, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, Yemen Rep.*

CATTLE: MEAT



-8.7%

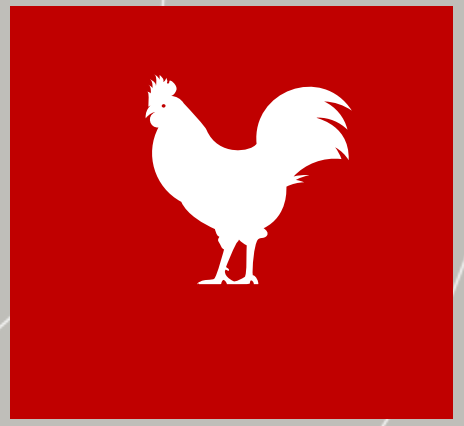
(-34 million)

CATTLE: RAW MILK

-3.5%

(-26 million)

CHICKEN: MEAT

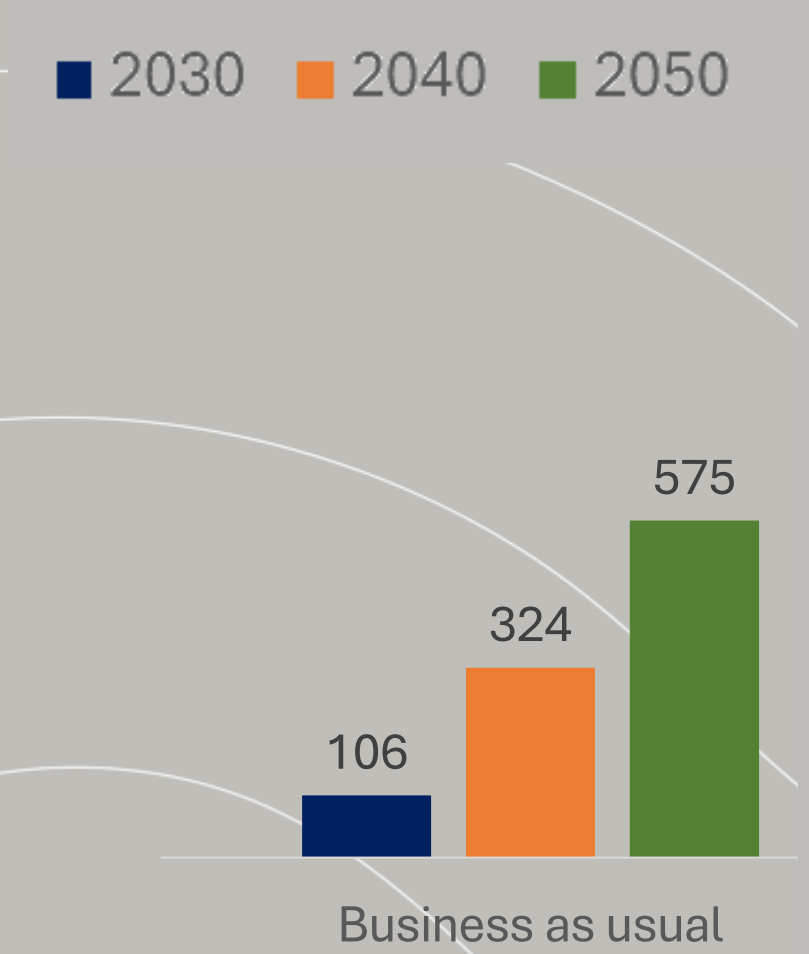


-7.6%

(-36 million)

Consumption equivalent based on per capita consumption

Global cumulative GDP loss attributable to AMR in livestock sectors ($ billion)



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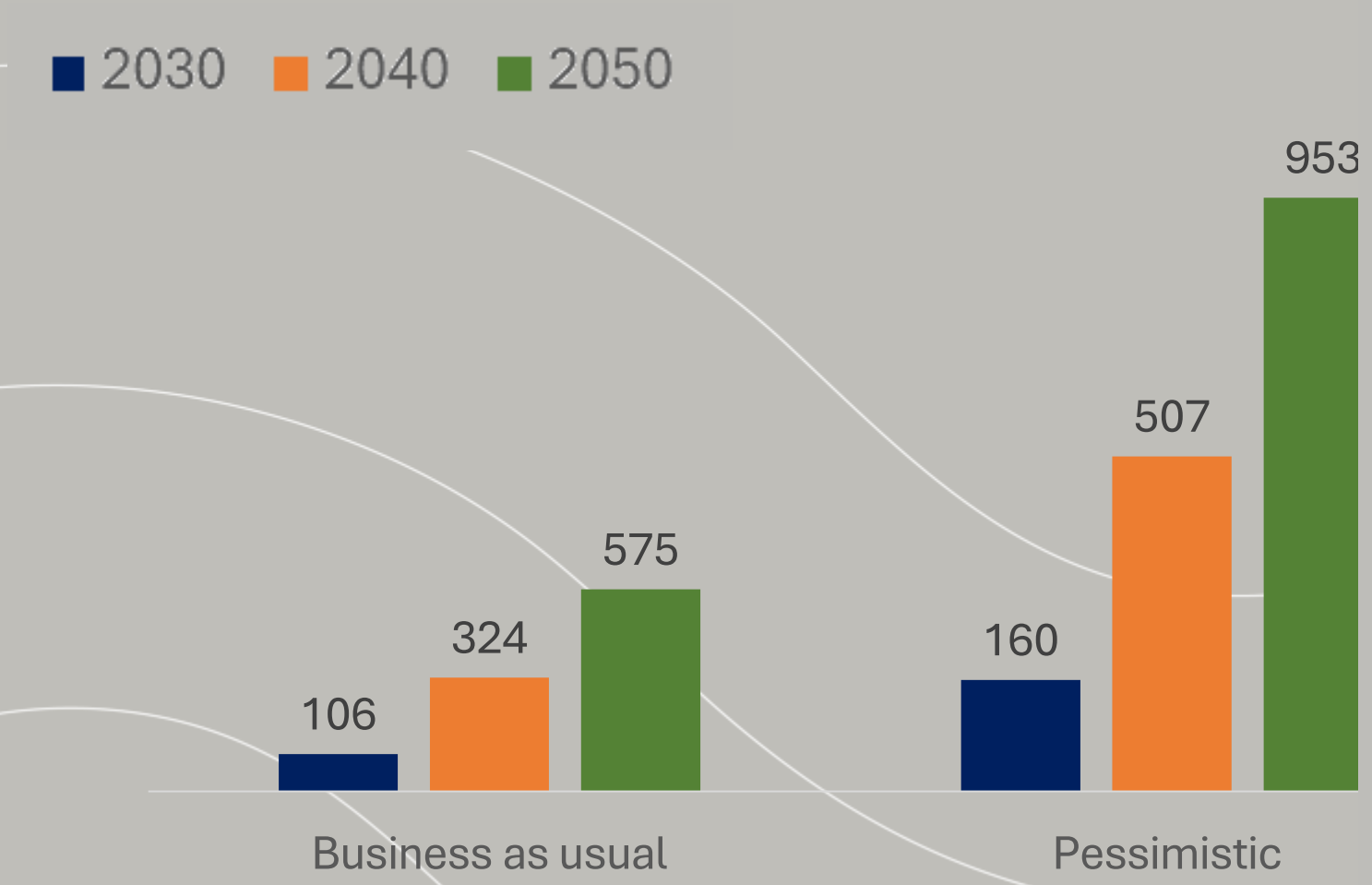
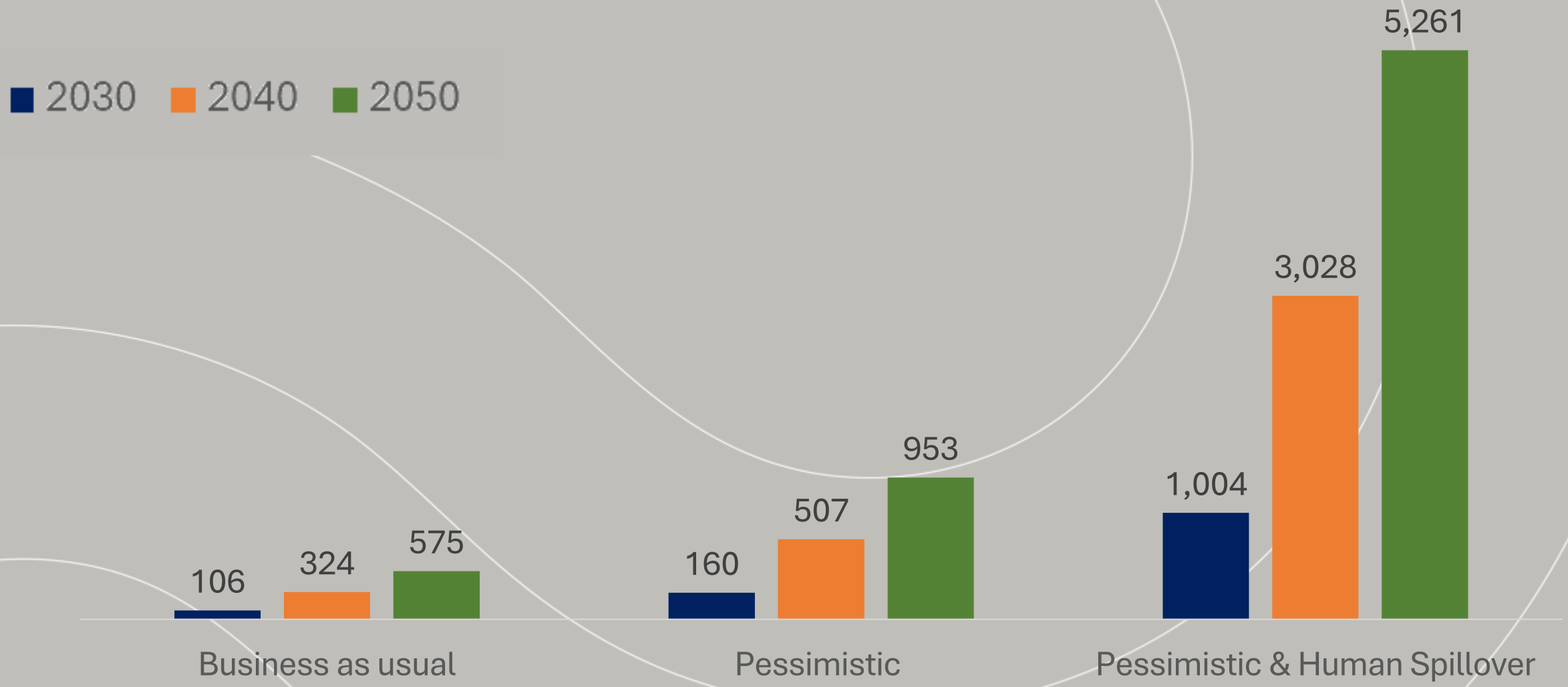
2024

Global cumulative GDP loss attributable to AMR in livestock sectors ($ billion)



Global cumulative GDP loss attributable to AMR in livestock sectors ($ billion)



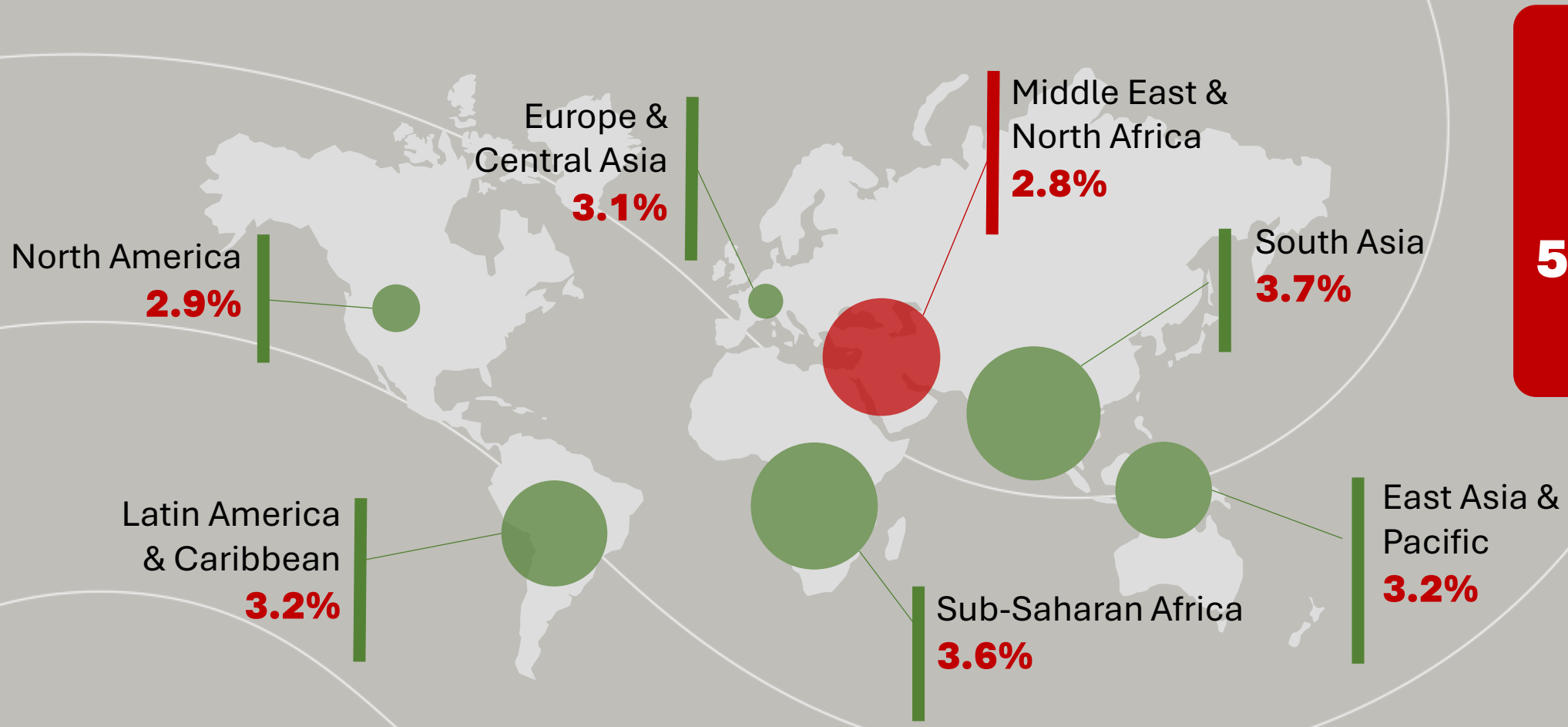
From 2025 to 2050, the spillover of resistant pathogens from livestock to humans could reduce global GDP by ...

$ 5.2 trillion

Annual **global** losses at the peak of the COVID-19 pandemic

https://www.imf.org/en/Publications/WEO/Issues/2020/06/24/WEOUpdateJune2020

Cumulative GDP loss attributable to AMR in livestock sectors by 2050



WORLD
5,261 $bn
3.2%

AMR is already causing productivity losses...

and current course of action will lead to serious food security concerns

So...Is this the end ? Do we just give up and resign ? Are we out of options ?

OF COURSE NOT !!
We need to use evidence & guidance on cost-effective interventions

BETTER FUTURES

Scenario modelled	Annual impacts by 2050
Regular release of new antimicrobials for humans, targeting gram-negative bacteria	■ Annual GDP gain of US$ 743 billion ■ New antimicrobials will avert 10.2 million deat and 2050
Better human health care and regular release of new antimicrobials	■ Annual GDP gain of US$ 959 billion ■ GDP-based health benefits will be worth US$ 679 billion per ye ■ Better health care and new antimicrobials will avert 100 million deaths due to bacterial infections between 2025 and 2050
Better human health care, including access to new antimicrobials, improved vaccination and the elimination of unsafe WASH	■ Annual GDP gain of US$ 990 billion ■ Combined improvements will avert 110 million deaths due to bacterial infections between 2025 and 2050
A global 30% reduction in animal AMU by 2030	■ Annual GDP gain of US$ 14 billion
A more significant reduction in animal AMU by 2045, reaching use levels of 20 mg per kg of biomass, as tracked in the global ANIMUSE database	■ Annual GDP gain of US$ 26 billion

Investing in AMU reduction: a driver of growth

=

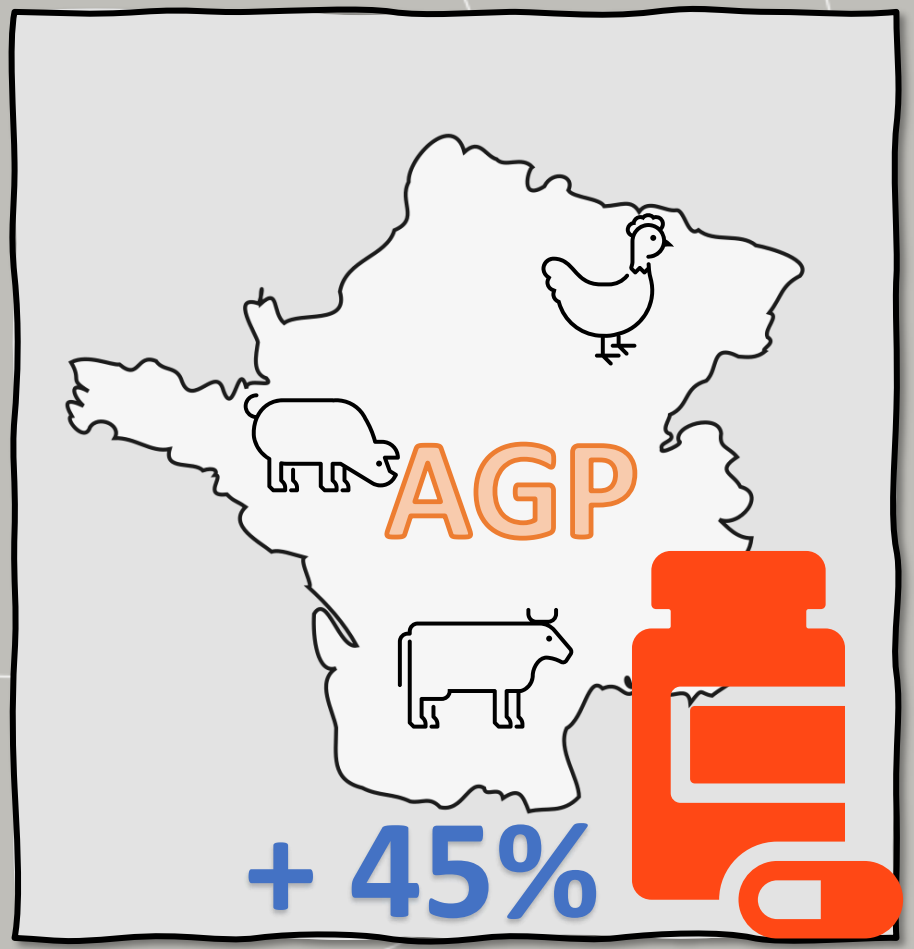
30% global reduction in AMU by 2030

A cumulative increase in global GDP by US $ 120 billion

Is this achievable? Would this jeopardise medical veterinary use & animal health ?

Modelling the impact around antimicrobials used for growth promotion

20% of WOAH Members still allow growth promotion (75% are in the Americas & Asia-Pacific)



higher AMU per kg biomass (excl. ionophores)

Investing in AMU reduction: a driver of growth

=

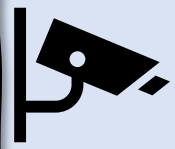
30% global reduction in AMU by 2030 → **A cumulative increase in global GDP by US $ 120 billion**

Is this achievable? YES !!!

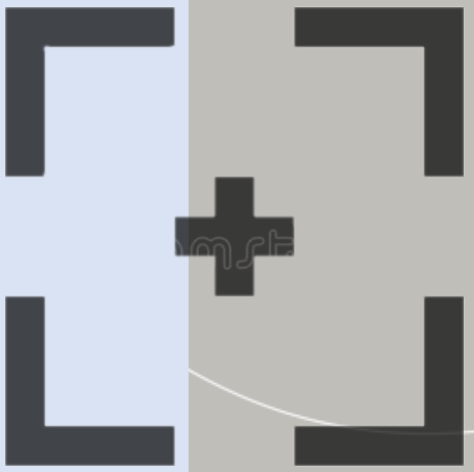
The power of proper animal husbandry, early diagnosis & access to veterinary care

CASE STUDY

AI-based intervention for real-time disease diagnostics



- CCTV monitoring, supporting farmers in monitoring animals, providing real-time surveillance of weight, behavior and early signs of disease
- Facilitates early disease detection, reduces the need for antimicrobials and better animal welfare



Estimated ROI of 4:1

From 255% in Year 1 to 537% in Year 3

Medical costs per animal dropped by up to 53%

Adaptable to lower- and middle-income countries

- Annually, drug-resistant bacteria kill as many people as road accidents
- AMR is already causing animal productivity losses
- No change will unequivocally lead to medical and food insecurity
- The choice & the responsibility are ours !

Thank you!

RAND EUROPE

EcoAMR **Series**:

World Organisation for Animal Health