

South Asia GCRF Workshop:
Food Security, Agriculture & Nutrition
Islamabad, Pakistan

Building Capacity in Animal Health:

Centre of Expertise Research Model

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Challenges to Food Security in Pakistan

- i. Barriers to trade
- ii. Detection of important zoonotic, animal or emergent disease risks
- iii. AMR

Future Challenges for Food Security in Pakistan

Challenge I

OIE Listed Diseases: Trade Barriers to International Market Access

Barriers to Trade

- Access to international markets is necessary for farmers to “step up and out” of subsistence farming
- Pakistan is one of the largest milk producers in the world but...
 - 90% sold unprocessed through informal markets
 - Significant growth in numbers of livestock – but milk production to meet local demand is lagging due to poor productivity (disease- and nutrition-related) → low farm profitability
 - FMD, brucellosis and tick-borne pathogens *Haemonchus*, *Theileria* – major concern for productivity*
 - One of the least commercialised enterprises: high input costs, fragmented supply chains and lack of availability of transport and cold storage → hampered market access
- China, India, Brazil: emerging economies for Pakistani milk exports
- Notifiable diseases: Foot and Mouth Disease, Brucella affect productivity and impede intl market access

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Onus on country of origin to meet international standards

Local partners

HORIZON SCANNING

Weather, Geology, Defence, Animal and Public Health, International politics

Data Sharing Platforms

Operational

MONITORING AND SURVEILLANCE

Public Health and veterinary Infrastructure, Diagnostic feasibility, Stakeholder opinion, Legislation

Farm to Fork Traceability & Diagnostics

Tactical

CONTROL AND ERADICATION

(Public and private partnerships)

Cost-effective Interventions

Strategic

CONTINGENCY PLANNING

State Veterinary Services, Centres of Expertise, Advisory Bodies and Stakeholders

Trade-offs and Unintended Consequences

Disease freedom

International standards

Access to international markets

Global partners

WHO

FAO

OIE



“To provide access to high quality advice and analyses on the epidemiology of animal diseases that are important to Scotland and to best prepare Scotland for the next major disease incursion..”

A grid of four panels from the EPIC website. The top-left panel is blue and titled "Our research", describing world-leading industry-informed research. The top-right panel is green and titled "Latest publication", featuring a paper on the economic impact of vaccine availability. The bottom-left panel is light blue and titled "Vets & farmers", offering information for various sectors. The bottom-right panel is a photograph of a pig. Each text panel includes a "VIEW" link with a play button icon.

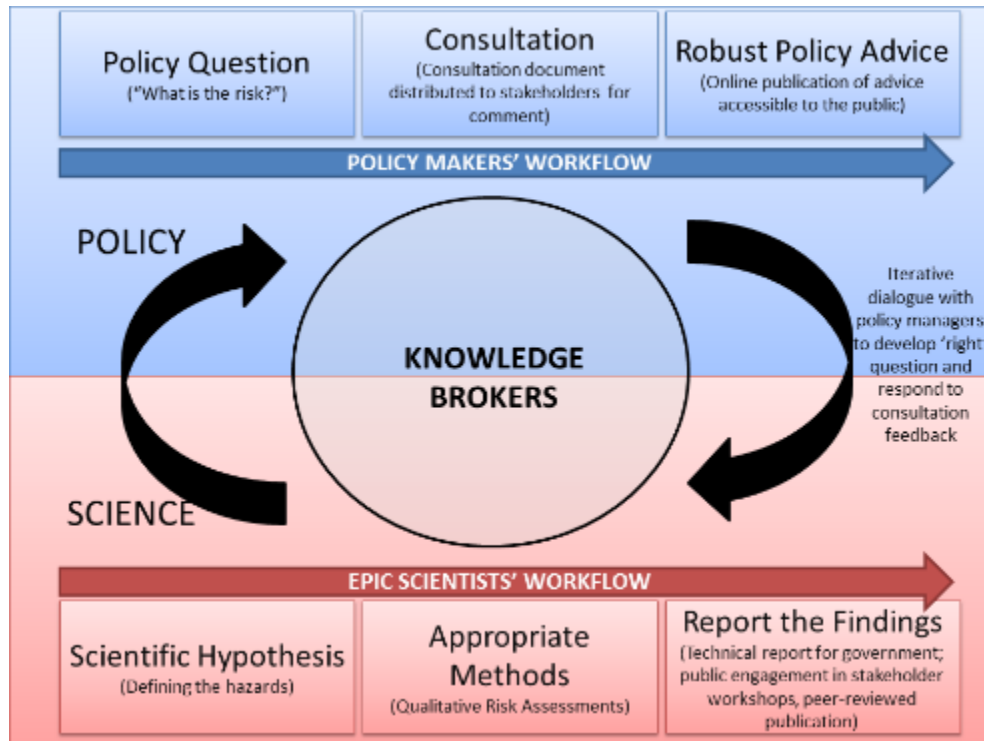
Our research
Our world-leading and industry-informed research is uniquely harmonised with practical disease policy and decision-making.
[OUR RESEARCH](#)

Latest publication
Assessing the Economic Impact of Vaccine Availability When Controlling Foot and Mouth Disease Outbreaks
Thibaud Porphyre, Karl M. Rich, and Harriet K. Auty
[VIEW PUBLICATION](#)

Vets & farmers
We have a range of information for vets and farmers related to the cattle, sheep, poultry and pig sectors available for download. As well as a wide variety of other useful resources.
[VIEW RESOURCES](#)

Science-Policy Interface

“Funding the Arrows”*



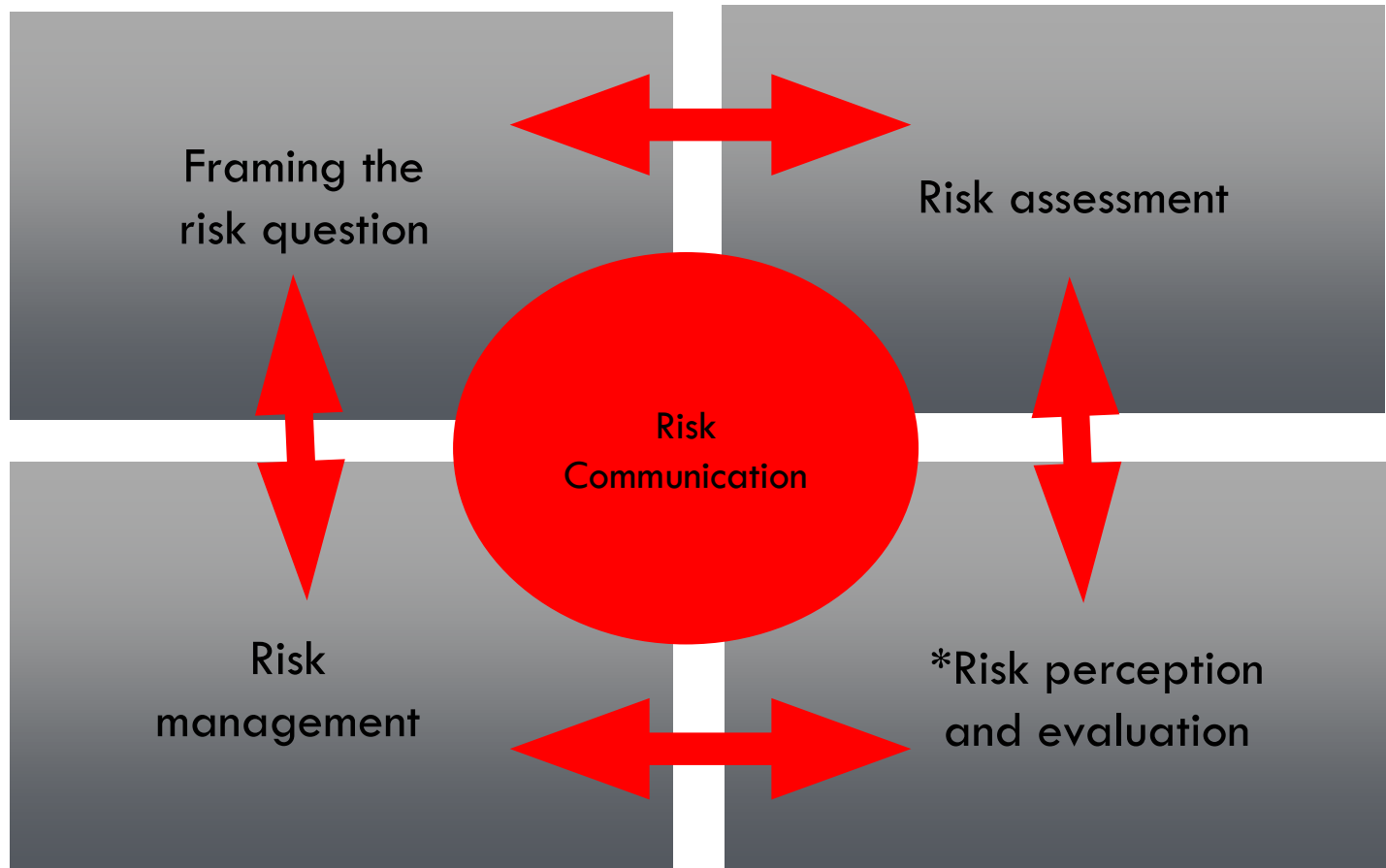
T-shaped Scientists –
necessary for
‘Design Thinking’



*Boden et al. (2014) Working at the science-policy interface. *Vet Record* p165

**Brown et al. Interdisciplinarity: How to catalyse collaboration, *Nature* 2015

Risk Governance



* International Risk Governance Council Framework

*World Health Organization. WHO guidelines on ethical issues in public health surveillance.

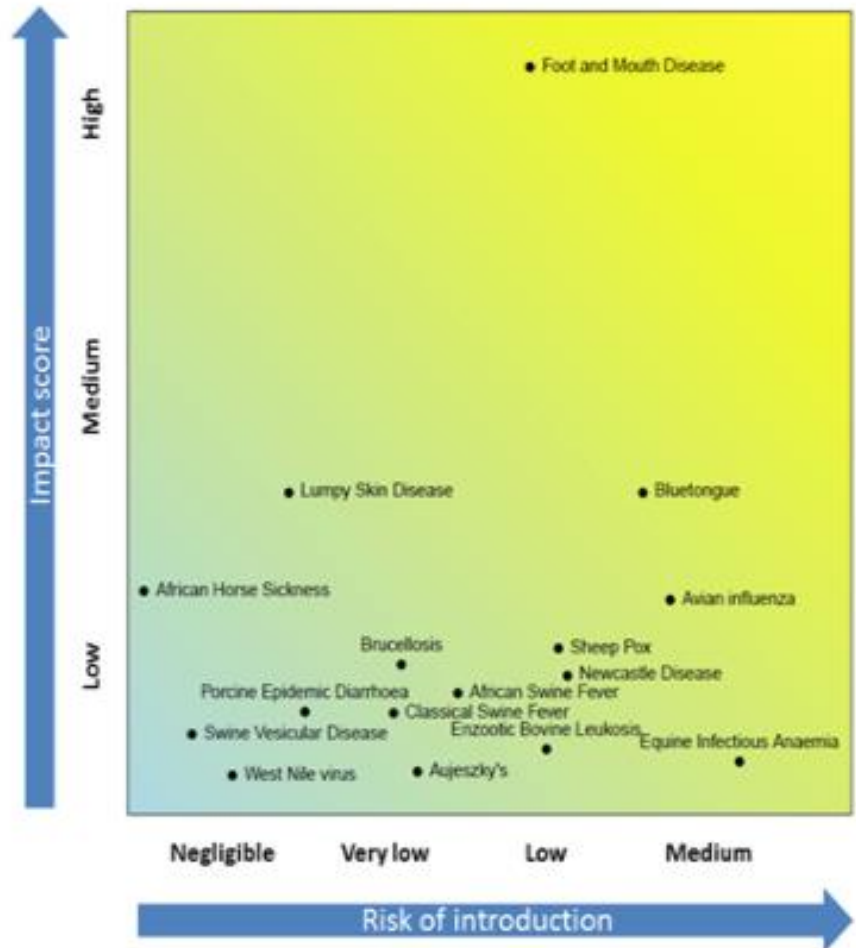
Toolkits for Risk Prioritisation

Horizon scanning for disease risks

Improving quantification of risks of incursion

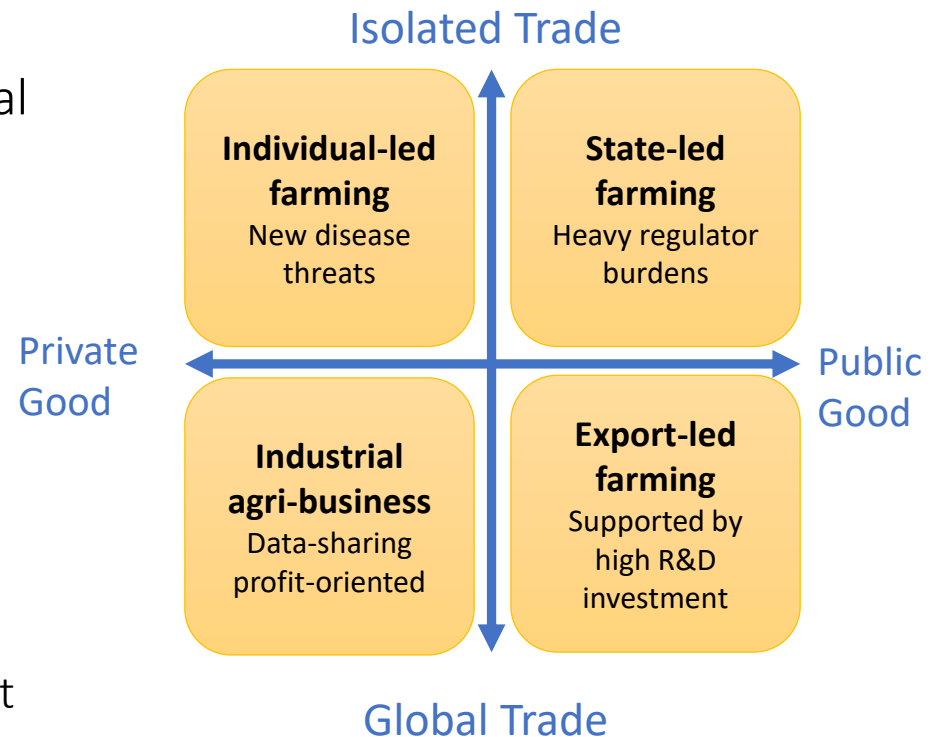
Quantifying pathogen suitability

Quantifying vector suitability



Long-term Strategy Development (Scenario Planning to 2050)

- Considers local, national & international economic, agricultural, technological, societal & legislative developments
- Scenario planning:
 - Systems thinking
 - Tests assumptions and uncertainties
 - Identifies opportunities and challenges
 - Evaluation of stakeholder impact



Boden L.A. et al. (2017) [Animal health surveillance in Scotland in 2030: Using scenario planning to develop strategies in the context of "Brexit"](#)

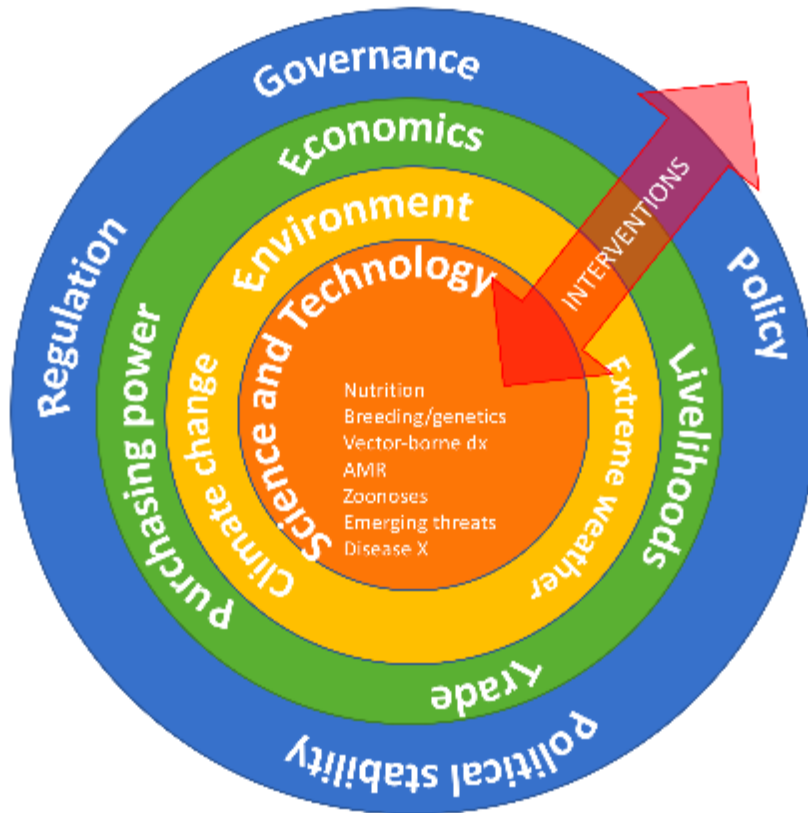
In: *Frontiers in Veterinary Science*, vol. 4, no. NOV

Future Challenges for Food Security in Pakistan

Challenge II

Detection of important zoonotic, animal or emergent infectious disease risks

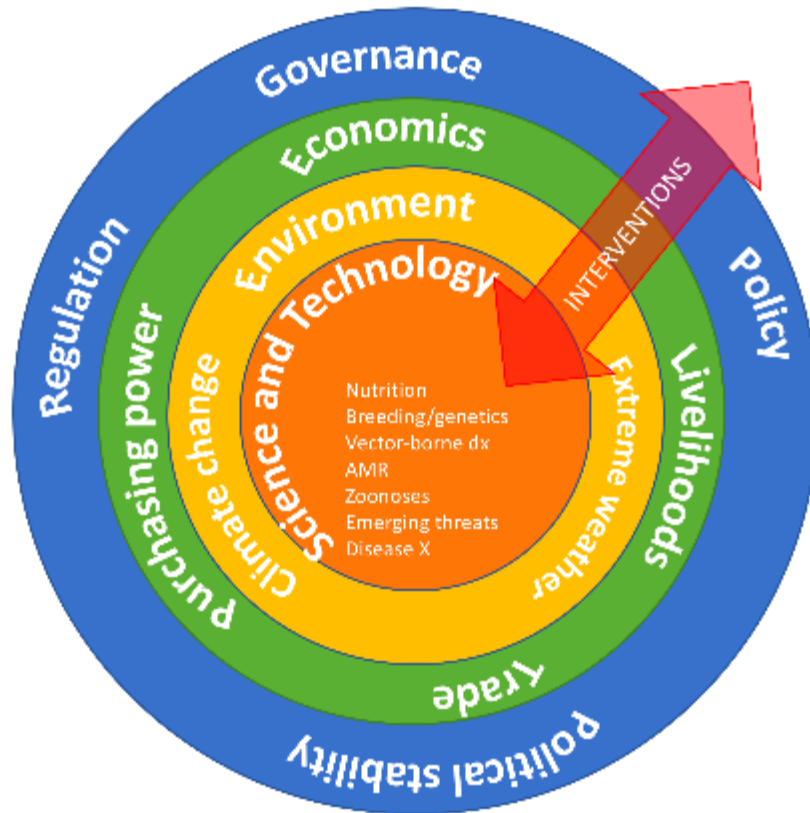
Improving Veterinary Surveillance Strategies



Reliant on:

- Veterinary surveillance infrastructure
- Data sharing between public and private partners
- Integrated approach to food system

Improving Veterinary Surveillance Strategies



- Longitudinal cohort study
- Contemporaneous assessment of human and animal health in rural, peri-urban and urban and international livestock supply chains
 - High demand for raw milk – Risks of Brucellosis, TB?
 - AMU and AMR
 - Developing rapid diagnostic tests for onsite detection
 - Establishment of dashboards for surveillance of animal diseases
- Platform for other multi-disciplinary projects

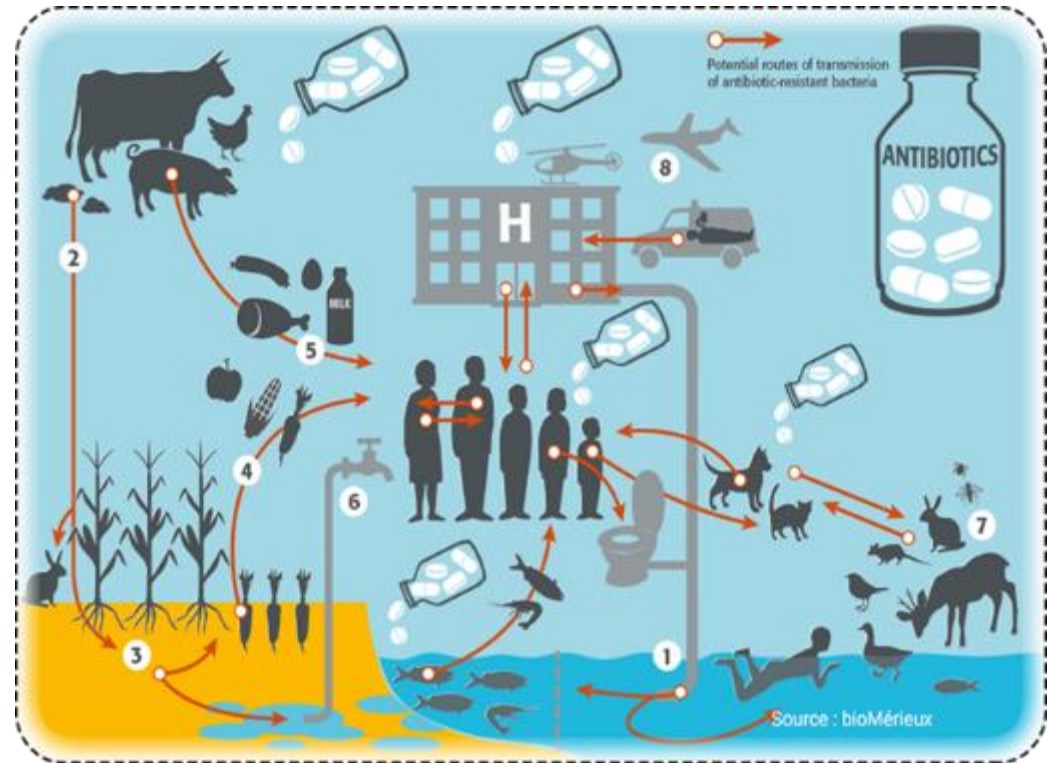
Future Challenges for Food Security in Pakistan

Challenge III Antimicrobial Resistance

AMR, Food Security and Health

- Variable data collection systems measuring different things
- Diverse production systems, market integration, health status
- Different user beliefs and behaviours
- UoE work in Pakistan:
 - BBSRC Strategic LoLa grant: 'Building Upon the Genome (BUG): using *Haemonchus contortus* genomic resources to develop novel interventions to control endemic gastrointestinal parasites'
 - Novel genetics approaches for understanding the antimicrobial resistance and vaccine strategies for tropical theileriosis*

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One Health and AMR Challenges in Pakistan

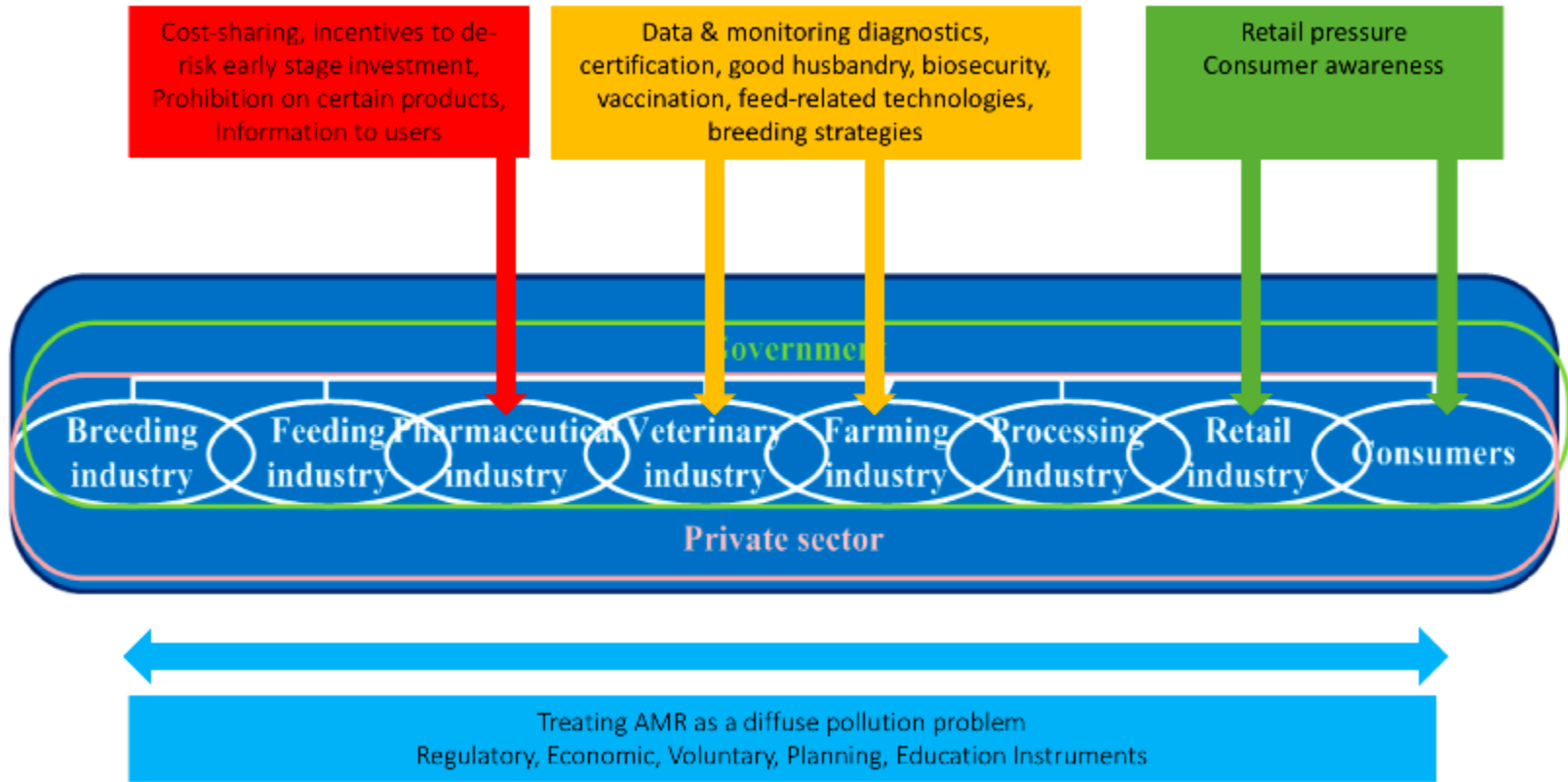
Reducing risks of communicable diseases and antimicrobial resistance through improved one health approaches and alternatives to antimicrobial usage.

Challenges

- Lack of systematic data addressing trends in AMR in Pakistan is sparse
- Few isolated studies on limited set of pathogen
- Lack of models for understanding transmission of AMR between human and animals
- Poor waste management (both hospital and general waste management) plays a significant role in the spread of infections with multi drug resistant organisms and result in AMR to the community
- Poor sanitary conditions in the big cities like Karachi providing breeding ground for the vector propagation for diseases like Malaria and Dengue.
- Lack of communication between medical and veterinary professional enhancing the emergence and re-emergence of zoonotic diseases

Where to Intervene: The Main Actors

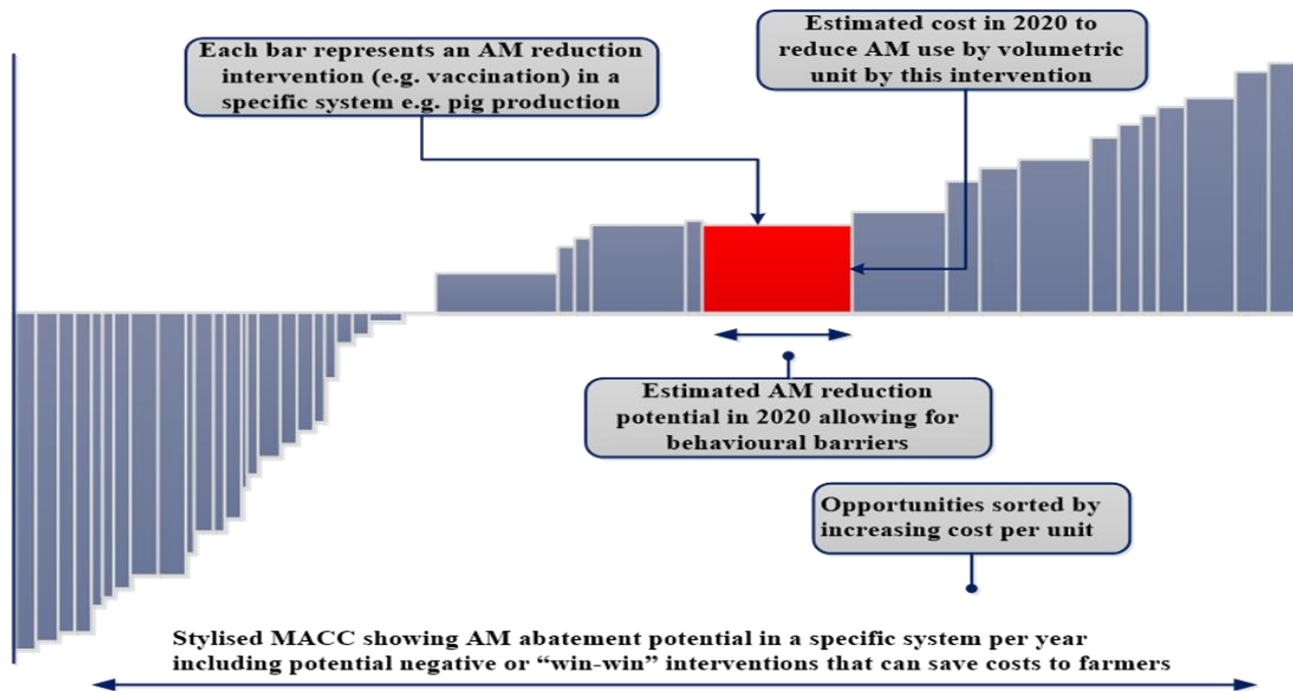
SUPPLY



DEMAND

How to Prioritise Policy Interventions

- How do measures compare...?
- What's the most cost-effective method of reducing use across the 'supply chain'?



Policy Led or Relevant Projects?

- Thinking clearly about costs and pathway to benefits (or impact?)
- Thinking about users and regulatory environment
- What policy is this relevant to and can we say anything about cost-effectiveness?
- How to collect data to answer the question?
- Integrated responses (joined-up projects)
- What do we learn from other policy areas?



University of Edinburgh

Global Academy of Agriculture and Food Security

<https://www.ed.ac.uk/global-agriculture-food-security>

The Royal (Dick) School of Veterinary Studies

The Roslin Institute

The Edinburgh Antimicrobial Resistance Forum