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Bracing for Superbugs: Strengthening environmental action in the One Health response to antimicrobial resistance

GLG meeting
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Bracing for Superbugs: Strengthening environmental action in the One Health response to antimicrobial resistance

<u>Spokesman today</u>

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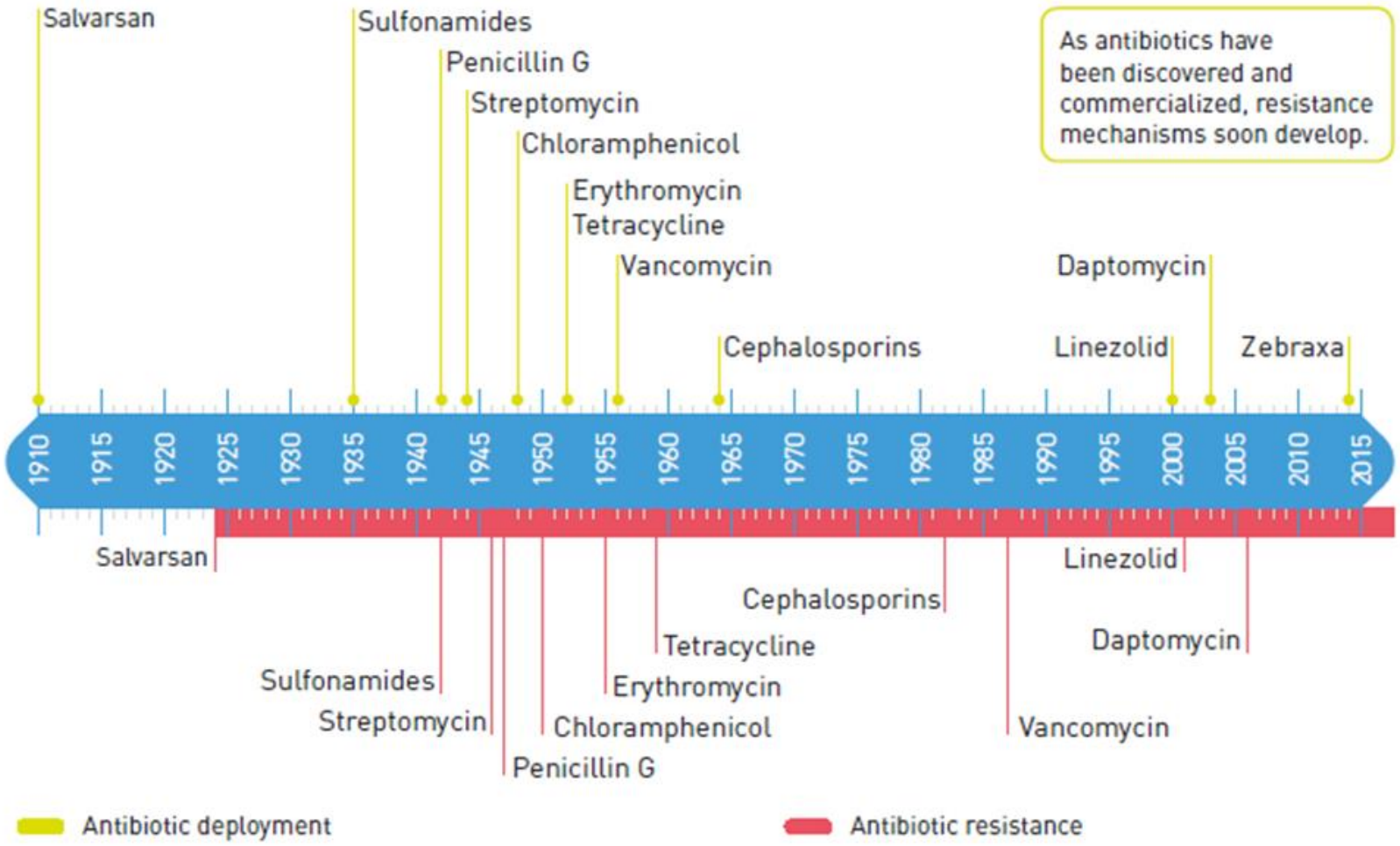
The crisis of antimicrobial resistance



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What is AMR and why does it occur? “Use it and lose it”

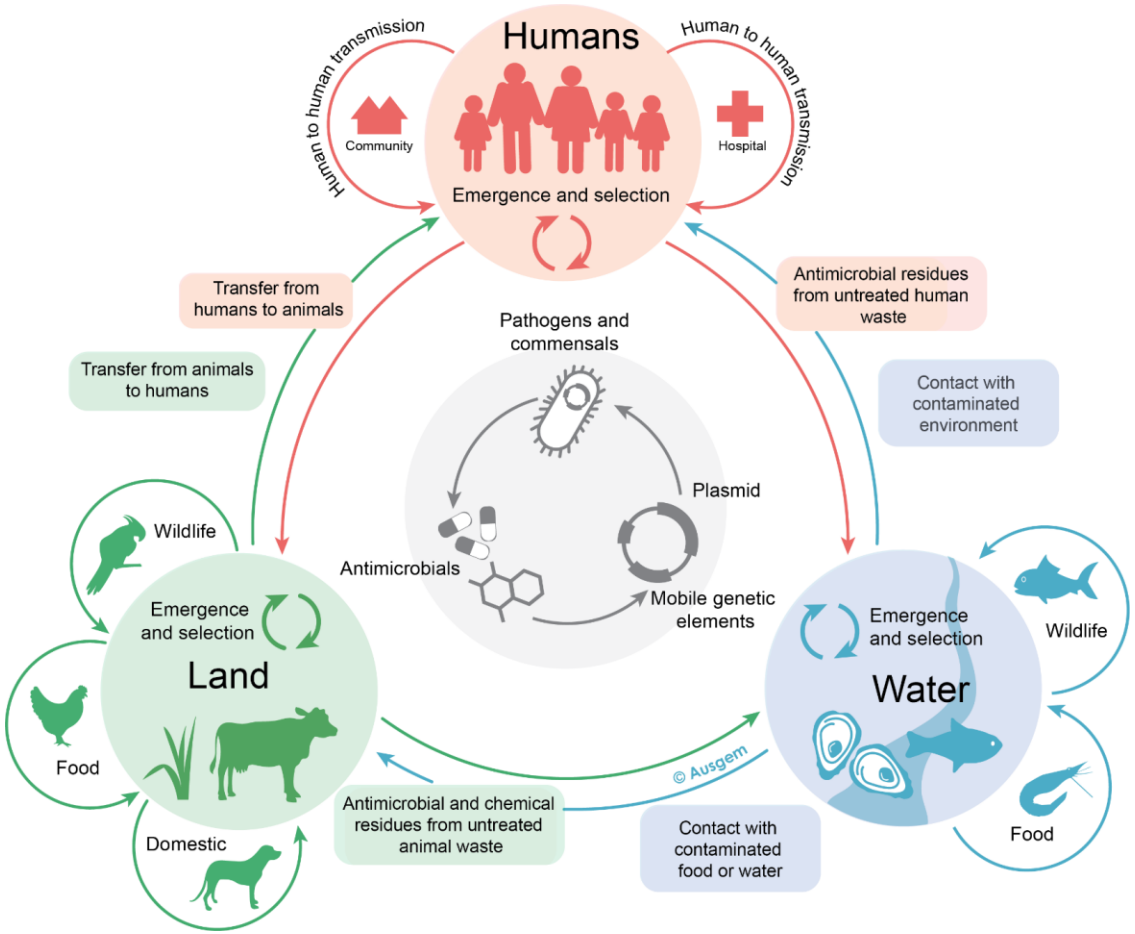

Figure adapted from The Australian Centre for Genomic Epidemiological Microbiology (ausgem.net). Courtesy of Dr Branwyn Morgan.

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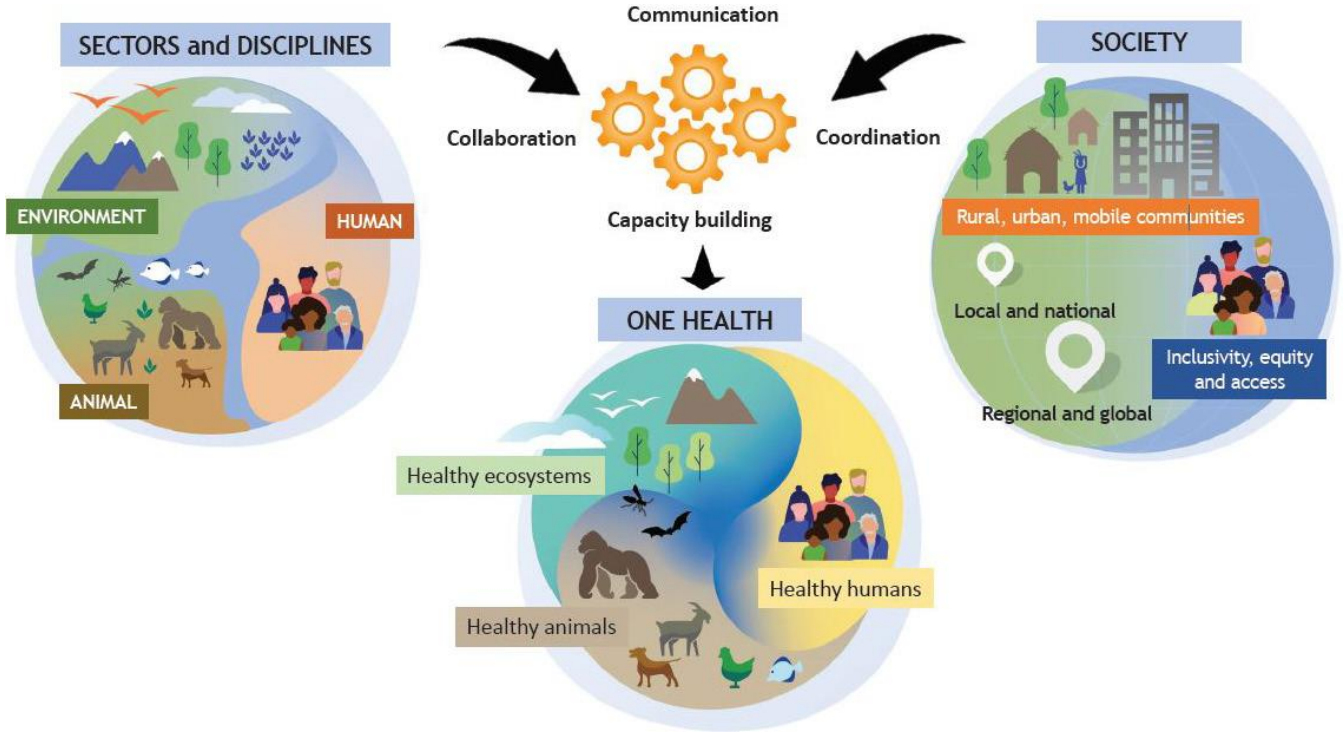
Recognise environment is key to advancing a ‘One Health’ response to AMR

A ‘One Health’ approach, which recognizes the health of humans, animals, plants, and the environment are closely linked and inter-dependent, is urgently needed to prevent and reduce the burden of AMR.



One Health definition developed by the One Health High-Level Expert Panel

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What are the concerns related to the environmental dimensions of AMR

Broadly, three-fold:

-The environmental ‘microbial world’ is the reservoir of genetic material that confers resistance to antimicrobials, and the machinery that underlies genetic transmission.

-Various anthropogenic pressures are potentiating or aggravating the problem.

-The environmental dispersal of AMR via water, air, soil is crucially important for the transmission and spread of AMR.

The environment plays a key role in development, transmission and spread of AMR

The environment and antimicrobial resistance

A variety of anthropogenic activities exacerbate the environmental problem of AMR.
E.g. Certain chemical and biological waste streams.

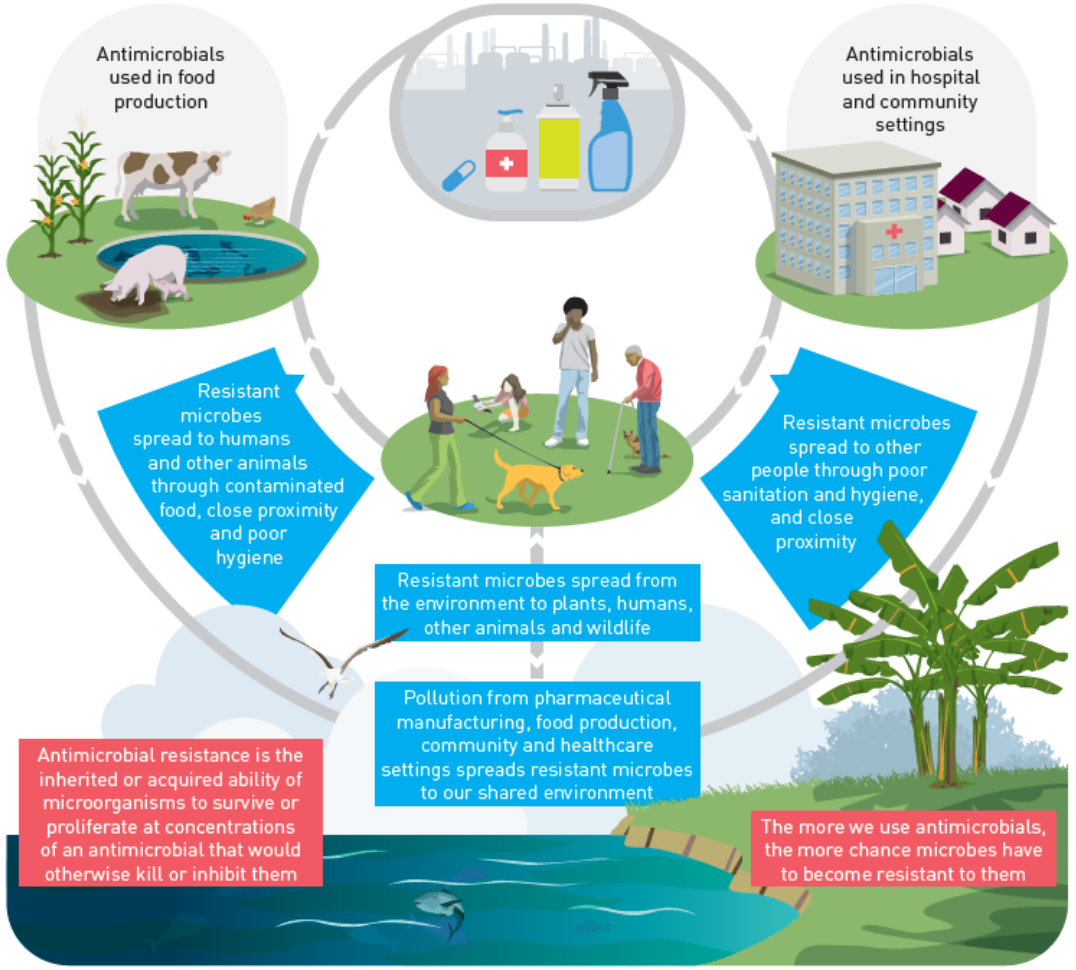

Figure 1

How antimicrobial resistance can spread (adapted from Government of Australia 2017)

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The environment as a critical means by which AMR is transmitted & spread across the One Health continuum

Waterborne transmission and spread in particular.

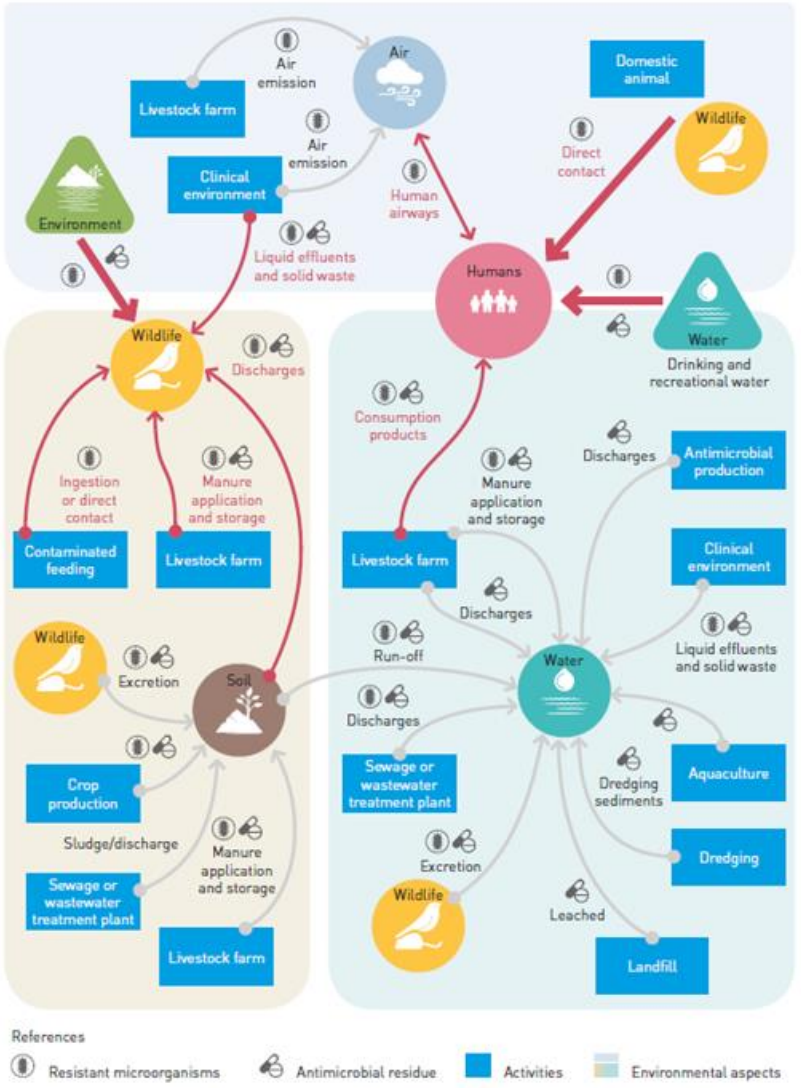
-Thus a special emphasis on the importance of WASH.

But also:

-wildlife

-airborne

-soilborne



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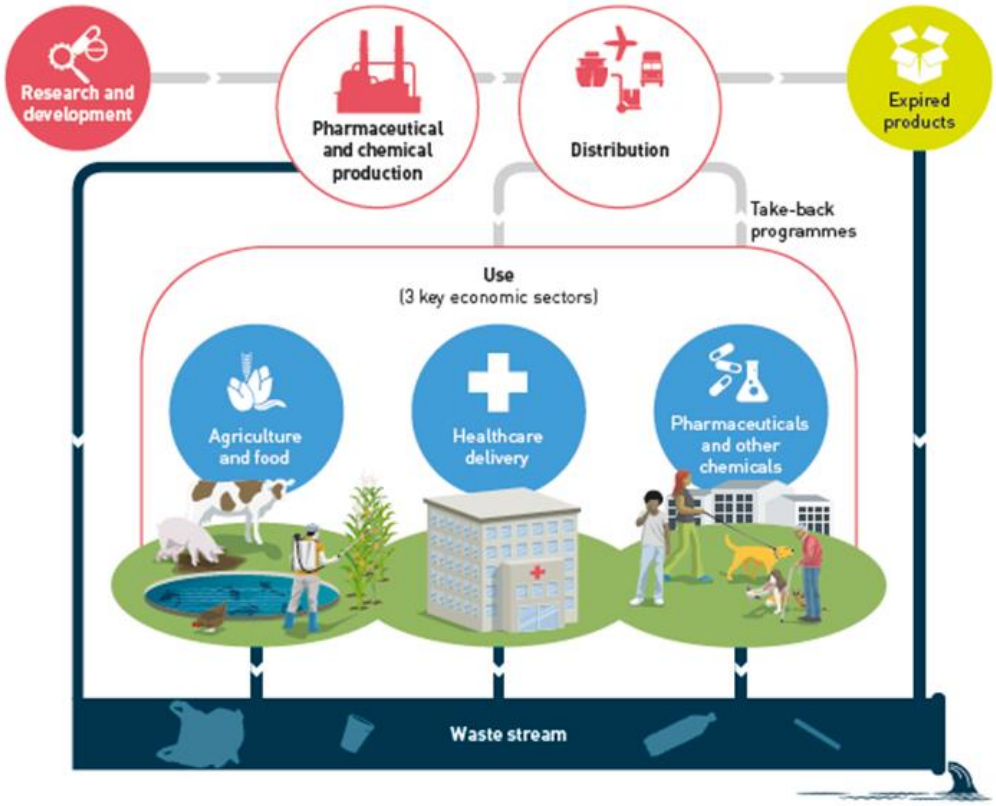
Managing sectors and their value chains that potentiate AMR in the environment



Three economic sectors and their value chains are potential drivers of AMR development and spread:

- Pharmaceuticals and other chemical manufacturing
- Agriculture and food production
- Healthcare systems

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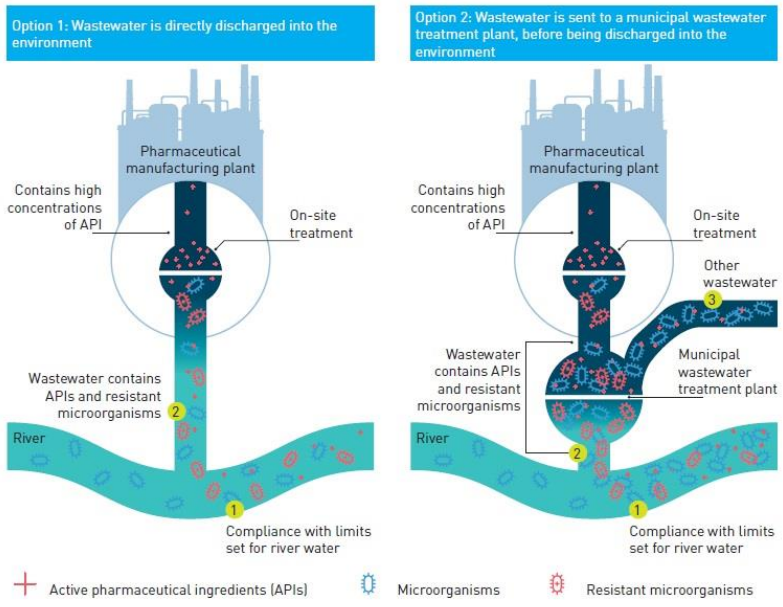
Address key value chains affecting AMR in the environment

Pharmaceutical manufacturing and other chemical value chains



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Management options include:

- Develop and enforce discharge targets/standards to minimise antimicrobial discharges to the environment.
- Embed waste management and a lifecycle approach into standard operating procedures in antimicrobial production.
- Promote waste treatment technologies that do not promote AMR discharges in the environment.
- Improve supply chain transparency (e.g., data sharing on emission levels, sites of production).
- Monitor antimicrobial residues, resistant microorganisms, ARGs and MGEs in the environment near production plants.

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Address key value chains affecting AMR in the environment

Agricultural and food value chains – Antimicrobials and manure in crop production and waste and other releases from animal production

Management options include:

- Improve the management of fertilizers of faecal origin, including creating barriers to AMR spread from operations.
- Reduce antimicrobial use in food animals by improving animal health.
- Control of non-point sources chemical and biological releases to the environment
- Increase targeted pre-treatment of waste across the farm to slaughterhouse continuum.
- Provide barriers or treatment of water entering and exiting aquaculture facilities.

Food production environments ‘hotspot’ for AMR development, and a key route of transmission to humans

The use of antibiotics and fungicides in terrestrial environments for production of plant-based foods.

The use of antibiotics and parasiticides in aquatic environments for production of finfish and crustacean.

The role of the environment in contaminating food with AMR.

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Address key value chains affecting AMR in the environment

Healthcare value chains – Antimicrobial use, waste and effluents from health care facilities

Management options include:

- Consider AMR-targeted, on-site treatment of hospital wastewater to prevent spread into the environment.
- Ensure disposal and treatment of antimicrobial medicines and hazardous waste from facilities.
- Encourage sustainable procurement and sound management and disposal of antimicrobials by healthcare systems.
- Leverage hospital stewardship and infection prevention control programmes to limit environmental contamination by AMR pollutants.

Priority actions

- Enhance environmental governance, planning and regulatory frameworks
- Identify and target priority AMR relevant pollutants
- Improve reporting, surveillance and monitoring
- Prioritize financing, innovation and capacity development

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Concerted action: global, regional, national, local

In planning and governance…

- The environment is being strengthened in the **global** governance structures e.g. GLG.
- **Regional** level ministerial conferences offer a possibility for mobilizing and strengthening further action on the environmental dimensions of AMR
- AMR **National** Action Plans should feature the environmental aspects e.g. multi-sectoral coordination committees/mechanisms, surveillance, innovation and research pillars.
- **Local** action can be extremely impactful e.g. WASH

Evidence to inform policy

Evaluation of risk, and validation of risk reduction must be done on the basis of the best science and available data, which is constantly evolving.

Key are

- Surveillance
- New technologies eg. Genomics
- Risk science
- Internationally accepted standards

Emerging issues in the field of environmental AMR

Resistance of human fungal pathogens to fungicides

- the role of pesticide use in the food and the ornamental industries

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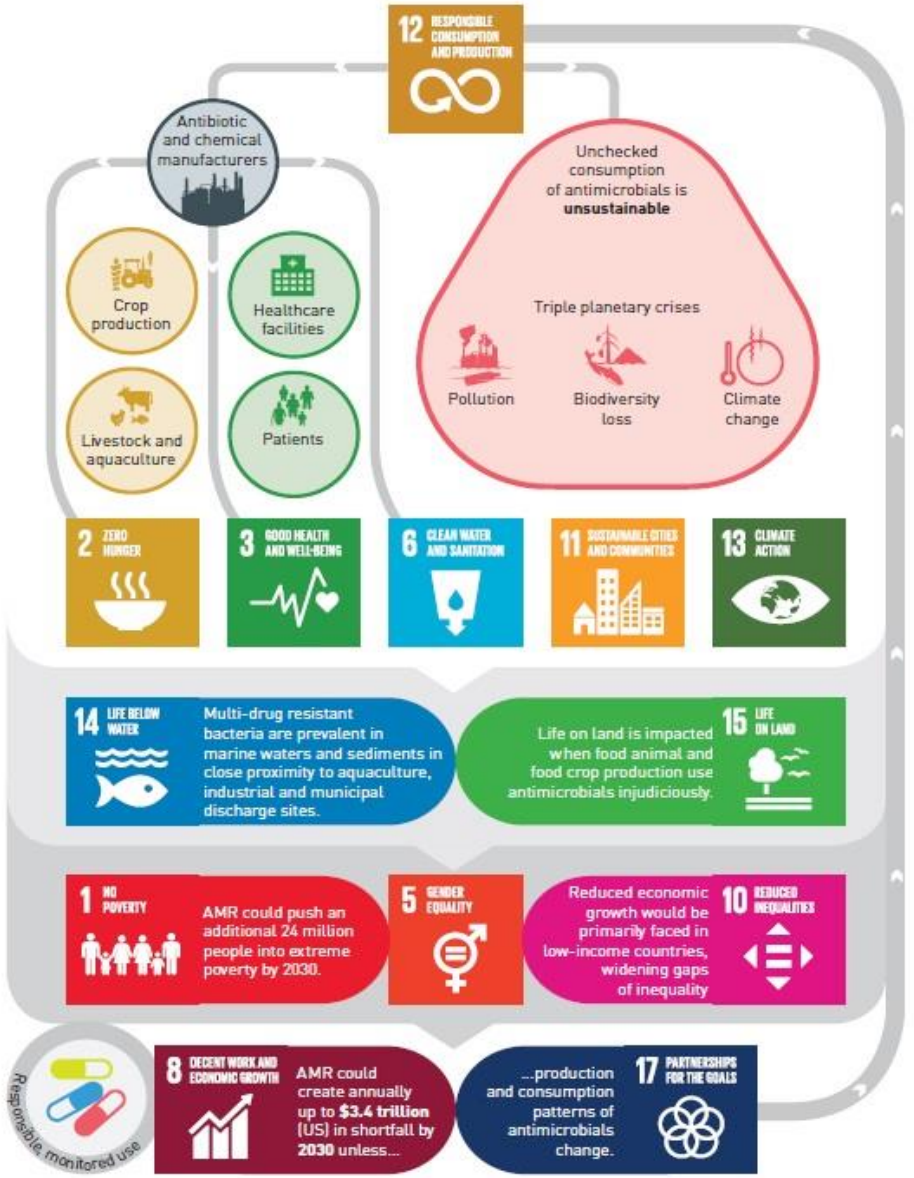
AMR and environment in the context of the SDGs

AMR can undermine the achievement of several SDG policy objectives

Delivering on the SDG policy objectives can mitigate environmental AMR



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Thank you

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