AMR linkages with waste from farms and factories

CSE Webinar – on the 'ENVIRONMENTAL AND PREVENTION AGENDA'

Nov 24, 2021

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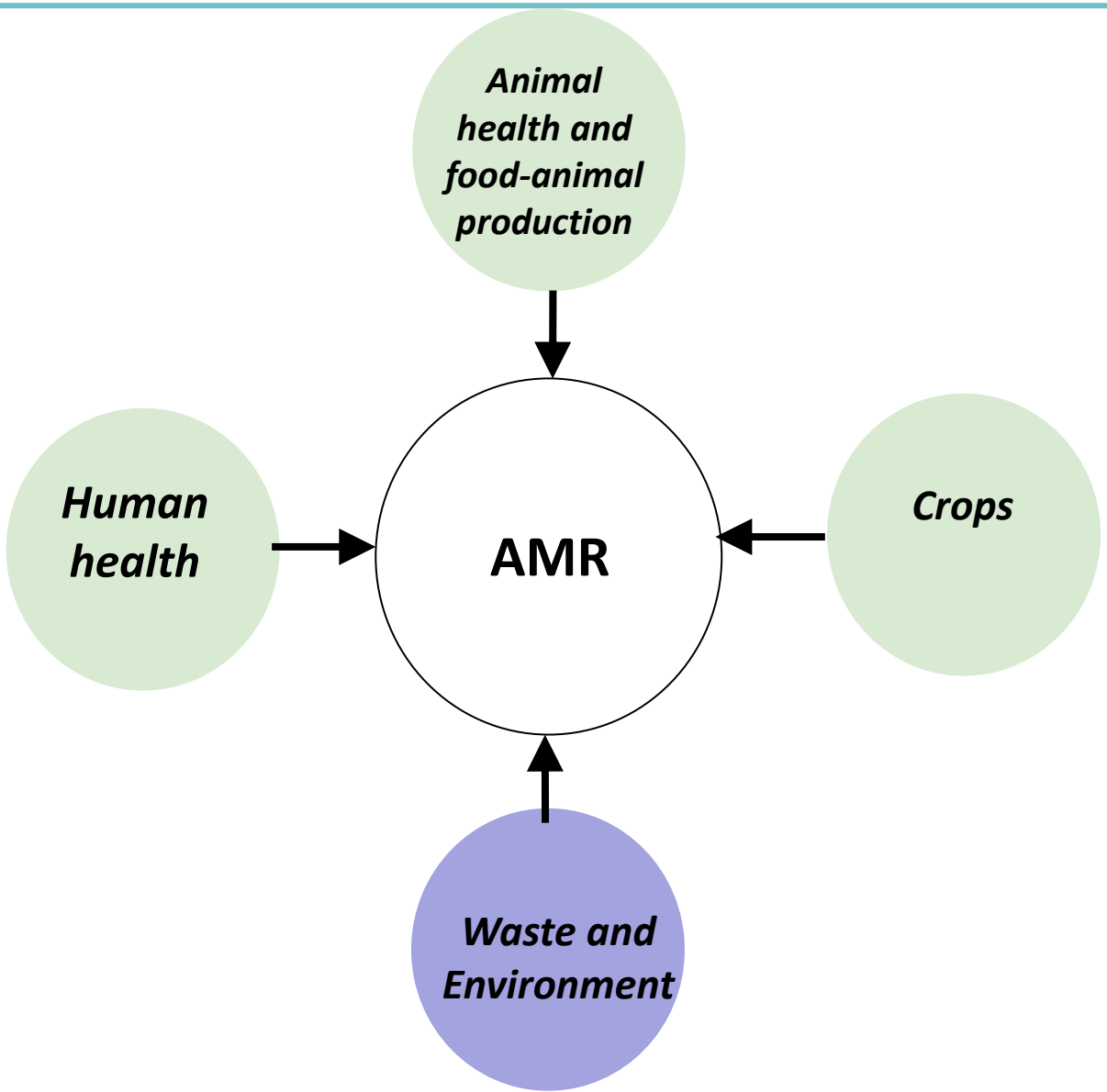
Drivers of Antimicrobial Resistance (AMR)



Structure of the environmental AMR problem

Point Sources				Non-point Sources
Farms	**Factories**	**Households/ Community**	**Healthcare Settings**	
Waste from: • Animal farms – poultry, dairy, pig, fish etc. • Agriculture farms	Effluents from: • Pharma manufacturing • Feed mills • Slaughter houses • Processing units (meat, dairy) • Effluent treatment plants	• Effluents from Sewage treatment plants • Disposal of unused, expired drugs	• Hospital sewage • Waste from veterinary care settings	Rivers, Reservoirs Groundwater Agricultural soil

• Three AMR determinants (antibiotic residues, resistant bacteria, antibiotic resistance genes) travel across multiple sectors

•Nature of waste and AMR determinants varies across sectors and local context

Globally, where do we stand today? (1/2)

- **Environment still gets least attention** compared to human and animal sectors
- **Scientific community actively engaged and building evidence on different aspects** (e.g., genes, bacteria, antibiotics)/**waste streams (**e.g., hospital waste, sewage, manure)
- The **UNEP** recently roped-in to work along with the WHO-FAO-OIE Tripartite. Developing a report on environmental impacts of AMR
- **More traction on the need to address environmental AMR, in particular waste from hotspots like pharma industry in global advocacy/policy/trade/economic discussions** (e.g., G7, Global Leaders Group on AMR). Pharma industry through AMR Industry Alliance also in the picture

Globally, where do we stand today? (2/2)

- But still, **guidance/SOPs/frameworks to help nations on policy development/ surveillance/capacity building/research agenda** is missing **(**e.g., waste management, discharge limits for different waste streams)
- **Integration/linkages between AMR with WASH (**importance of clean water, sanitation) still less discussed/advocated for, and so is the **importance of prevention**
- **Despite a recognition that there is enough evidence/understanding to act** and to not allow emerging evidence and/or complexity of the issue as a barrier for immediate action

At the country level, where do we stand today? (1/2)

- **Environmental AMR in varying degrees is part of most National Action Plans**
  - indicates **need, desire, stakeholder consensus** to address the issue
  - aligns with **overall mandate of preventing chemicals into environment**
  - focuses on multiple aspects -**surveillance, waste management, biosecurity** but still not as much as required on prevention and WASH
  - However, existing waste management policies/standards are **largely not AMR-centric**

At the country level, where do we stand today? (2/2)

- **However, there is very limited on-the-ground progress seen so far**
  - **Lack of dedicated funding** within the overall limited funds for AMR
  - **Limited know-how and capacity** due to **absence of global guidance, complexity** and **cross-cutting nature of the issue**
  - Environmental AMR issue so far is over-dependent on surveillance which is **resource-intensive and technically demanding.** The importance of **achievable and cost-effective aspects of prevention** (less use, less waste, less resources to clean up) are overlooked

Low- and middle-income countries have challenges but also an opportunity

- It is clear from the progress so far that the issue of environmental AMR **needs more financial and technical resources**. It **may also take quite a lot of time** to be in control of the situation unless we do things differently
- LMICs **cannot afford to pollute first and then spend huge amount of money to clean up.** They cannot afford **the increased treatment cost** due to AMR. They cannot afford **the livelihood and economic losses**
- Besides there is a big challenge of **producing more food**, challenge of **hygiene and sanitation**
- They have to find **solutions** which are **cost-effective, technically less demanding** and **relevant in their local context**
- The good part is that most of the **agriculture is still not intensive** (as compared to developed countries) and the **pharma manufacturing industry is limited to few countries**. So they have a chance to leap-frog and do things the right way.

Way ahead

First of all, we must prioritize and invest in the environmental AMR agenda (both at global and national level) as part of a true One-Health action. This includes more research, evidence, documentation, advocacy, funding, capacity and action.

- **Focus on prevention**
  - Prevention at farms (less disease, less use, less pollution, less clean up): biosecurity, clean water, alternatives, good animal husbandry practices, vaccination. Need to find a way to continue to produce more food with less chemicals, food systems which are less-intensive
  - Prevention at factories: better process controls, better monitoring
- **Focus on better Water, Sanitation and Hygiene (WASH)**

Way ahead

- **Manage waste well**
  - **AMR-centric approach** (bacteria, genes and antibiotics) in waste streams
  - **Low-cost effective waste management** technologies/approaches
  - **Farm waste is a resource** from the point of view of efficiency, circularity. It **saves costs**, helps **prevent environmental contamination** but most importantly, supports **agro-ecological practices based on livestock, crop integration and effective use of manures as fertilizers**
- **Build capacity**
- **Develop and implement a research agenda** based on what we know and what we do not know. **Identify hotspots**
- **Develop policy, set standards/discharge limits for hot-spots**, monitor, publish results, engage with industry

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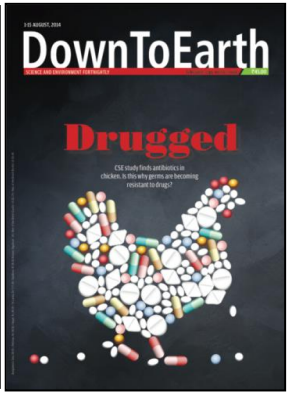
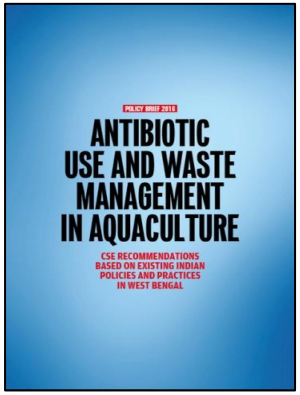
CSE's work on food systems and environment in India

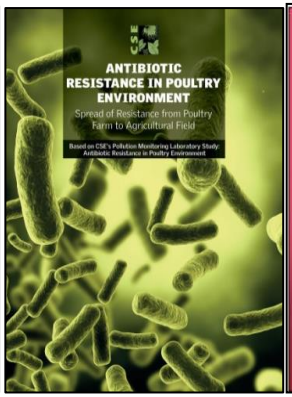
Antibiotics in honey, 2010



Antibiotic use in poultry, 2014



Antibiotic use in aquaculture, 2016



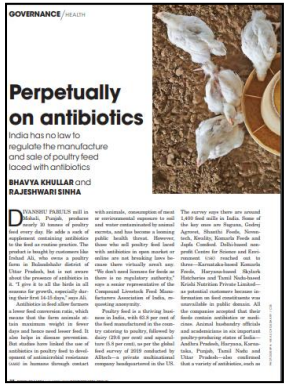
AMR in poultry environment, 2017

Antibiotic use in fast food supply chain, 2017

Disposal of pharma manufacturing waste, 2017

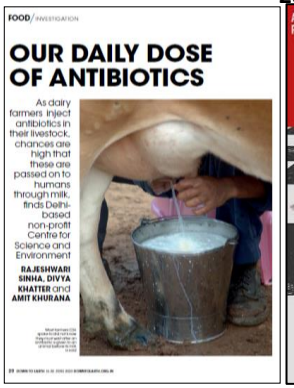
Antibiotic use in crops, 2019

Disposal of unwanted drugs, 2019

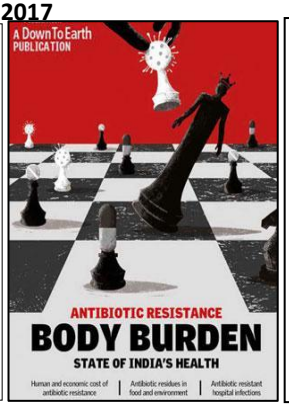


Antibiotic use in feed, 2020

Antibiotic use in fast food supply chain, 2020



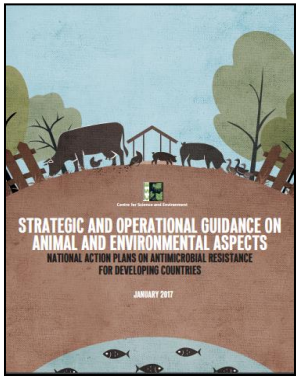
Antibiotic use in dairy, 2020



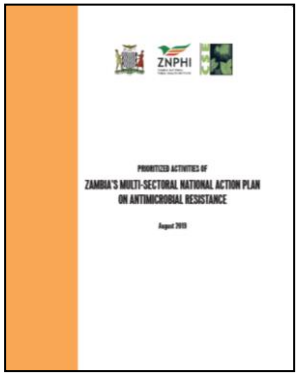
Body Burden, 2020

Use of ethnoveterinary medicines in dairy sector, 2021

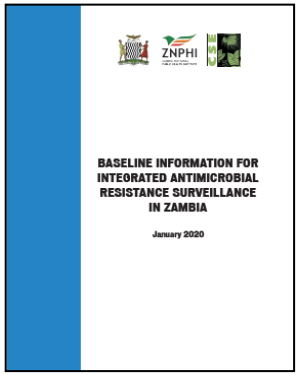
CSE's global work on food systems and environment



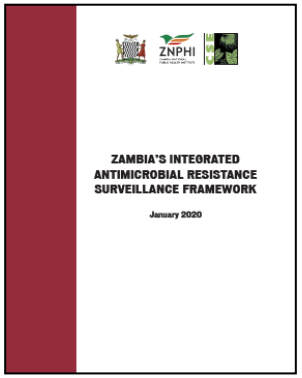
Strategic guidance for NAP for developing countries, 2016



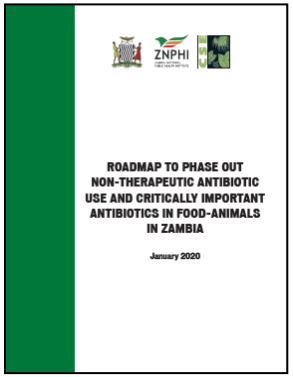
Prioritized NAP-AMR (Zambia, 2019)



Baseline information for Integrated AMR surveillance (Zambia, 2020)

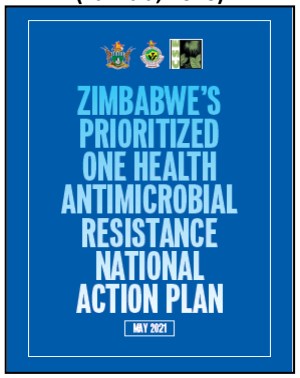


Framework for Integrated AMR surveillance (Zambia, 2020)

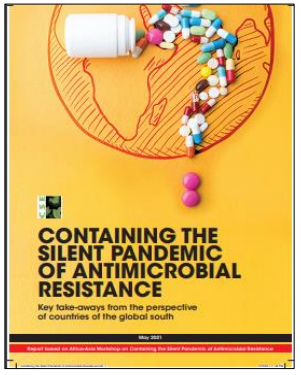


Roadmap to phase out antibiotic misuse in food-animals (Zambia, 2020)

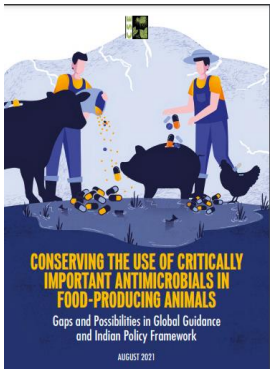
Framework for drug take-back and EPR (Zambia, 2021)



Prioritized NAP-AMR (Zimbabwe, 2021)



Containing the silent pandemic of AMR (2021)



Conserving the use of critically important antimicrobials (2021)