



## Antimicrobial Resistance and One Health

**For Prelims:** [UN Food and Agriculture Organization \(FAO\)](#), [UN Environment Programme \(UNEP\)](#), [World Health Organization \(WHO\)](#), [World Organisation for Animal Health \(WOAH\)](#), [One Health approach](#), [Antimicrobial resistance](#), [Multidrug-resistant tuberculosis](#), [National Health Policy 2017](#), [National Action Plan on AMR](#).

**For Mains:** Causes of Antimicrobial Resistance, One Health Approach, Measures to Address Antimicrobial Resistance.

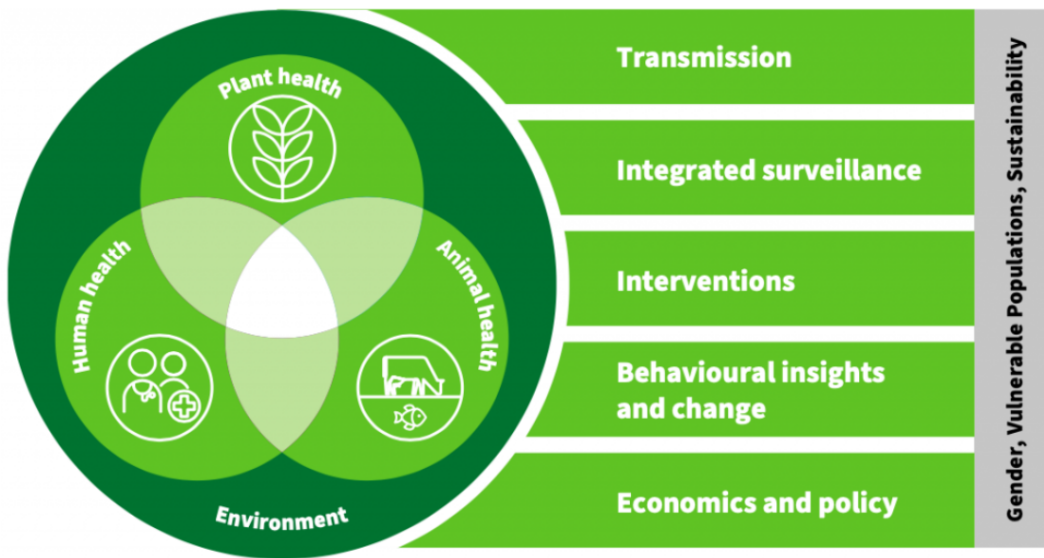
### Why in News?

Recently, four major multilateral agencies - [Food and Agriculture Organization \(FAO\)](#), [UN Environment Programme \(UNEP\)](#), [World Health Organization \(WHO\)](#), and [World Organisation for Animal Health \(WOAH\)](#), announced the launch of a priority research agenda to address the critical issue of [antimicrobial resistance \(AMR\)](#).

- The research agenda is based on the [One Health approach](#).

### What are the Major Focus Areas of the Research Agenda?



- **Major Objectives:**
  - To find out **drivers and pathways of AMR transmission** across different sectors and environment.
  - To assess and evaluate the impact of AMR on various aspects of health, economy and society.
  - To focus on **innovation and development of new or improved diagnostics, therapeutics or vaccines** to combat infections caused by resistant microorganisms.
- **Cross Cutting Themes:**
  - The research agenda identifies **3 cross-cutting themes** that need to be considered in **One Health AMR research, namely gender, vulnerable populations and sustainability**.
    - **Gender influences** how **people access and use antimicrobials**, how they are exposed to and affected by AMR, and **how they participate in and benefit from AMR research**.
    - **Vulnerable populations** refer to groups of people **who are at higher risk of exposure to or infection by resistant microorganisms** due to various factors such as age, poverty, malnutrition, displacement, marginalization or lack of access to quality healthcare.
    - **Sustainability** implies balancing the environmental, economic and social dimensions of development while ensuring human rights and well-being.
      - It also requires taking into account the **intergenerational equity and justice implications of AMR**.



One Health Priority Research Agenda on Antimicrobial Resistance

## What is Antimicrobial Resistance?

# ANTIMICROBIAL RESISTANCE

The ability of microorganisms to resist the effects of antimicrobial drugs

### CAUSES OF ↑ AMR

- Poor infection control/sanitation
- Antibiotic overuse
- Genetic mutations of microbe
- Lack of investment in R&D of new antimicrobial drugs

Microbes that develop AMR are called 'Superbugs'

### IMPACTS OF AMR

- ↑ Risk of spreading infections
- Makes infections harder to treat; prolonged illness
- ↑ Healthcare costs

### EXAMPLE

- Carbapenem antibiotics stop responding due to AMR in *K. pneumoniae*
- AMR Mycobacterium tuberculosis causing Rifampicin-Resistant TB (RR-TB)
- Drug-resistant HIV (HIVDR) making antiretroviral (ARV) drugs ineffective

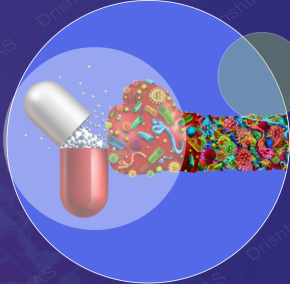
### RECOGNITION BY WHO

- Identified AMR as **one of the top 10 threats** to global health
- Launched **GLASS** (Global Antimicrobial Resistance and Use Surveillance System) in 2015

### INDIA'S INITIATIVES AGAINST AMR

- Surveillance of AMR in microbes causing **TB, Vector Borne diseases, AIDS etc.**
- **National Action Plan on AMR (2017)** with One Health approach
- **Antibiotic Stewardship Program** by ICMR

*New Delhi metallo-β-lactamase-1 (NDM-1) is a bacterial enzyme, emerged from India, that renders all current β-lactam antibiotics inactive*



## What Measures can be Taken to Address Antimicrobial Resistance?

- **Enhanced Surveillance and Monitoring:** Establish robust systems for monitoring and tracking the emergence and spread of resistant organisms.

- This includes **tracking patterns of resistance, collecting data on antibiotic usage,** and sharing information internationally to identify hotspots and take timely actions.
- **Rational Use of Antibiotics:** Promote **responsible use of antibiotics in human and animal health,** ensuring they are prescribed and used only when necessary.
  - **Encourage healthcare providers to follow appropriate guidelines** for antibiotic prescription and educate the public about the risks of unnecessary antibiotic use.
- **Infection Prevention and Control:** Implement effective infection prevention and control practices in healthcare settings (**hand hygiene, proper sanitation, and adherence to standard precautions**).
  - **Preventing infections reduces the need for antibiotics,** consequently preventing AMR.
- **Vaccination Programs:** Strengthen vaccination programs to prevent the occurrence of infectious diseases and reduce the need for antibiotic treatment.

## What is 'One Health' Approach?

- **About:**
  - **'One Health' is an integrated, unifying approach to balance and optimize the health of people, animals and the environment.**
    - It is particularly important to prevent, predict, detect, and respond to global health threats.
  - The One Health approach is particularly relevant for food and water safety, nutrition, the control of **zoonoses** (diseases that can spread between animals and humans, such as **flu, rabies and Rift Valley fever**), **pollution management, and combatting antimicrobial resistance.**
- **Recognition:**
  - In **May 2021**, The **One Health High-Level Expert Panel (OHHLEP)** was formed to advise **FAO, UNEP, WHO and WOA** on **One Health issues.**
  - This includes recommendations for research on emerging disease threats, and the development of a long-term global plan of action to avert outbreaks of diseases like [H5N1 avian influenza](#), **Zika and Ebola.**

## UPSC Civil Services Examination, Previous Year Question (PYQ)

### Prelims

**Q. Which of the following are the reasons for the occurrence of multi-drug resistance in microbial pathogens in India? (2019)**

1. Genetic predisposition of some people
2. Taking incorrect doses of antibiotics to cure diseases
3. Using antibiotics in livestock farming
4. Multiple chronic diseases in some people

**Select the correct answer using the code given below.**

- (a) 1 and 2
- (b) 2 and 3 only
- (c) 1, 3 and 4
- (d) 2, 3 and 4

**Ans: (b)**

### Mains

**Q.** Can overuse and free availability of antibiotics without Doctor's prescription, be contributors to the emergence of drug-resistant diseases in India? What are the available mechanisms for monitoring and control? Critically discuss the various issues involved. **(2014)**

**Source: DTE**

PDF Referenece URL: <https://www.drishtias.com/printpdf/antimicrobial-resistance-and-one-health>

