Non-therapeutic antibiotic use and use of critically important antimicrobials in food-animals

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Food from animals contribute about 40% of protein and 18% of calorie intake worldwide

Major food producing animals:

- **Highest contributor**
  - **Animal/Bird**
  - **Food Produce**
  - **Chicken**
    - Meat (Poultry), Egg
  - **Pig**
    - Meat (Pork)
  - **Cattle and Buffalo**
    - Meat (Cattle-Beef), milk

- **Animal**
  - **Food Produce**
  - **Goat**
    - Meat, milk
  - **Sheep**
    - Meat, milk
  - **Fish**
    - Meat
India is a leading producer of food from animals in the world

<table>
<thead>
<tr>
<th>Meat</th>
<th>Egg</th>
<th>Milk</th>
<th>Fish</th>
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<tbody>
<tr>
<td>China</td>
<td>China</td>
<td><strong>India</strong></td>
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<td>European Union</td>
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<td>Russian Fed</td>
<td>Brazil</td>
<td>Brazil</td>
<td>Egypt</td>
</tr>
<tr>
<td><strong>India</strong></td>
<td>Japan</td>
<td>Russian Fed</td>
<td>European Union</td>
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</tbody>
</table>

States producing high quantity of food from animals in India (examples)
- Andhra Pradesh
- Tamil Nadu
- Uttar Pradesh
- Haryana
- West Bengal
- Rajasthan
- Maharashtra
Antibiotic use in animals >> humans; Non-therapeutic use a big contributor

- Treatment: treatment of disease
- Prophylaxis: for prevention of disease
- Growth promotion: increased feed-to-gain efficiency

Non-therapeutic antibiotic use
All non-therapeutic use needs to be addressed collectively ...

- Routine/intermittent use
- Low/sub-therapeutic dose which can fuel greater resistance
- Mass administration to those with no signs of disease
- Largely through feed and water

- Antibiotics in feed play a dual role (growth promoter and disease prevention)
- No fine line – segregating where one role stops and other begins
- Only collective action on both would solve the purpose
- Learnings from Denmark and others also suggest collective action will work best
Antibiotics which are critically important for humans (CIAs) are used for both therapeutic and non-therapeutic purpose; some like colistin are a last-resort for humans
What are Critically Important Antimicrobials?

Medically important antimicrobials (antimicrobials used in human medicine)

Apply Criteria (C1, C2)

C1: Sole, or one of the limited available therapies, to treat serious bacterial infections in people

C2: Used to treat infections caused by bacteria (1) possibly transmitted from non-human sources, or (2) with resistance genes from non-human sources

Both criteria met

Critically important antimicrobials

Only one criterion met

Highly important antimicrobials

No criteria met

Important antimicrobials
Prioritization of Critically Important Antimicrobials

Critically important antimicrobials

Apply Prioritization factors (P1, P2, P3)

P1: Used to treat a large number of people with infections for which limited antimicrobials are available
P2: Used with high frequency in human medicine or in certain high risk groups
P3: Used to treat human infections for which an extensive evidence exists on the transmission of resistant bacteria or genes from non-human sources

Cephalosporins (3rd, 4th, 5th generation)
Glycopeptides
Macrolides and Ketolides
Polymyxins
Quinilones

Aminoglycosides, Ansamycins, Carbapenems and other penems, Glycylcyclines, Lipopeptides, Monobactams, Oxazolidinones, Penicillins, Phosphonic acid derivatives, Drugs used solely to treat tuberculosis or other mycobacterial diseases

All prioritization factors met
Highest Priority

Not all prioritization factors met
High Priority
Global guidance and initiatives
Global guidance has shaped up to phase out non-therapeutic use and CIA use

- **Guidelines on Use of Medically Important Antimicrobials in Food-Producing Animals, 2017**
  Complete restriction of antimicrobial use as growth promoters and prophylaxis.
  HPCIs should not be used for treating diseased animals

- **IACG Report, 2019**
  Use of antibiotics as growth promoters in animals should be phased out starting with an immediate end to the use of HPCIs

  **UK Swann Report, 1969**
  Antimicrobial use in food animals leads to AMR; growth promoter use should be prohibited

  **WHA resolution, 1998**
  Use of antimicrobials in food-producing animals should be reduced

  **Global Principles for the Containment of AMR in Animals Intended for Food, 2000**
  CIA use for growth promotion should be terminated; their use for disease prevention should not be a substitute for good animal health management

  **Code of Practice to Minimize and Contain AMR, 2005**
  Responsible use of veterinary antimicrobial drugs in food-producing animals does not include their use for growth promotion; off-label use of antimicrobial growth promoters should not be permitted

  **Global Action Plan on AMR, 2015**
  Called on Member States to develop policies on use of antimicrobials in food-producing animals; phase out their non-therapeutic animal use

  **FAO Action Plan on AMR, 2016**
  Focuses on prudent use of antimicrobials and its monitoring in food and agricultural systems, improvement of awareness and promotion of good practices in food and agriculture
Country-level initiatives to limit non-therapeutic antimicrobial use – feed first for growth promotion and then disease prevention!

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Action</th>
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</thead>
<tbody>
<tr>
<td>EU countries</td>
<td>2006</td>
<td>Ban on all growth promoter use in food animals, ban on preventive mass medication in animals to come into enforcement from 2022</td>
</tr>
<tr>
<td>China</td>
<td>2015</td>
<td>Ban on use of select antibiotics in food animals, Ban on colistin as feed additive for animals</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>2013</td>
<td>All kinds of antibiotics are banned in animal feeds as growth promoter</td>
</tr>
<tr>
<td>Malaysia</td>
<td>2013</td>
<td>Prohibition of select antibiotics in feed and feed additives for the purposes of treatment, prevention and growth promotion in food-producing animals, colistin banned starting January 2019</td>
</tr>
<tr>
<td>Thailand</td>
<td>2015</td>
<td>Ban on antimicrobial growth promoters, no registration of any antimicrobial/premix to be used as growth promoter, prohibition of medicated feed in aquaculture</td>
</tr>
<tr>
<td>Indonesia</td>
<td>2018</td>
<td>Ban on antimicrobial growth promoters in animal feed</td>
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<tr>
<td>Vietnam</td>
<td>2018</td>
<td>Ban on use of antimicrobials for use in animal feed as growth promoter</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>2018</td>
<td>Ban on antimicrobial growth promoters in animal feed</td>
</tr>
<tr>
<td>Singapore</td>
<td>-</td>
<td>Prohibition on use of antimicrobials as growth promoters in feed</td>
</tr>
</tbody>
</table>
Overall status vis-à-vis growth promoter use

- **110 out of 155** reporting countries (to the OIE survey) had stopped use of antimicrobials for growth promotion by 2017, with or without legislation.
  - 45 out of these 110 do not have a direct legislation to ban growth promoters; but doing it through others such as import control, feed manufacturing control etc.
  - Out of 45 remaining, 18 either had a regulatory framework that provided a list of antimicrobials which could be used as growth promoters or those which should not be used.
India scenario (policy and practice)
CSE studies

2010

2014

2017

2016

2017
Evidence consolidating through numerous studies...(few examples)

- Multidrug resistance in *Salmonella* isolates from poultry samples in Mumbai that showed **100% resistant against three CIAs** - Azithromycin, Erythromycin, Amoxicillin *(Bandyopadhyay 2019)*

- **Colistin resistant bacteria** were found in food samples including meat, mutton, fish, fruits and vegetables collected from food outlets in Chennai *(Ghafur et al, 2018)*

- Another study in Punjab shed light on the difference in resistance profiles between layer and broiler farms; **broiler farms more likely to harbor resistant strains**. The resistance was more in farms which used antibiotic growth promoters *(Brower et al, 2017)*

- A Bureau of Investigative Journalism study highlighted the **indiscriminate use of colistin for growth promotion and disease prevention** in chicken *(Bureau of Investigative Journalism, 2018)*
Antibiotic laden feed easily available online; labelled for growth promotion; includes CIAs/HPCIs (examples)

<table>
<thead>
<tr>
<th>Company</th>
<th>Brand name</th>
<th>Antibiotic(s)</th>
<th>Information on label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venky’s</td>
<td>Tylomix</td>
<td>Tylosin</td>
<td>Increases the egg production, hatchability and reduces the feed consumption per hatching egg</td>
</tr>
<tr>
<td>Vetline</td>
<td>Coligro 100</td>
<td>Colistin sulphate</td>
<td>For prevention and treatment of bacterial infections</td>
</tr>
<tr>
<td>Progro-Vet</td>
<td>Colistin</td>
<td>Colistin sulphate, Doxycycline</td>
<td>Antibiotic growth promoter - Better feed conversion and hence increased weight gain in broilers</td>
</tr>
<tr>
<td>Vetneeds Labs</td>
<td>Zincstin</td>
<td>Colistin, colistin sulphate, Bacitracin</td>
<td>Antimicrobial growth promoter feed premix</td>
</tr>
<tr>
<td>Dovicol</td>
<td>Colistin</td>
<td>Colistin sulphate, Doxycycline</td>
<td>Antimicrobial performance promoter feed premix – improves weight gain and egg production</td>
</tr>
<tr>
<td>Ceprostin plus</td>
<td>Ciprofloxacin, Enrofloxacin HCl, Colistin sulphate</td>
<td>Poultry feed supplement – for prevention from infections</td>
<td></td>
</tr>
<tr>
<td>Aadya Biological</td>
<td>K-Roxser</td>
<td>Roxithromycin</td>
<td>Poultry feed supplement, recommended for routine administration</td>
</tr>
<tr>
<td>Sinto Farm/ Lee Faris</td>
<td>Linco 11</td>
<td>Lincomycin</td>
<td>For increased weight gain and prevention and treatment of necrotic enteritis</td>
</tr>
<tr>
<td>V S Chemical Industries</td>
<td>Neoxy-7</td>
<td>Neomycin, Oxytetracyline</td>
<td>Improves feed conversion and overall performance, prevents bacterial infections</td>
</tr>
<tr>
<td>Vetcure Remedies</td>
<td>Colivet-100</td>
<td>Colistin sulphate</td>
<td>For prevention and treatment of bacterial infections</td>
</tr>
<tr>
<td>Levocol Plus</td>
<td>Levofloxacin, Colistin sulphate</td>
<td>For enhanced growth and production, reduced mortality</td>
<td></td>
</tr>
<tr>
<td>Biomir Venture LLP</td>
<td>CIPRO-MIR-FS</td>
<td>Ciprofloxacin, Metronidazole</td>
<td>Growth promoter and for prevention of bacterial diseases</td>
</tr>
</tbody>
</table>
NAP-AMR calls for restricting non-therapeutic use through multiple approaches

“Restrict and phase-out non-therapeutic use of antimicrobials such as their use as growth promoters and disease prevention in animals”

“Restrict and gradually eliminate the use of restricted antibiotics, which are critically important for humans in non-human sectors especially food-producing animals”

“Restrict antibiotics in animal feed, feed premix”

“Ensure registration and use of registered products only; regulate their importation, direct distribution and online marketing; ensure appropriate labelling”

“Ensure prescription sale of antibiotics and their use under supervision”

“Ensure labelling of food from animals produced with or without routine use of antibiotics”

“Support small and mid-size poultry, dairy and fish farmers to reduce use of antibiotics, avoid non-therapeutic use and move to safer alternatives”

“Foster development of antimicrobial policies and evidence-based standard treatment guidelines for food animals”
Joint declaration endorsed by 12 ministries

Delhi Declaration on Antimicrobial Resistance
- an inter-ministerial consensus

We, the ministers and policy-makers from various Ministries under the Government of India, assembled at the Inter-Ministerial Consultation on Antimicrobial Resistance, pledge to adopt a holistic and collaborative approach towards prevention and containment of antimicrobial resistance (AMR) in India, and:

**Acknowledge** that resistance of microorganisms to antimicrobials is a matter of serious concern; and is mainly due to inappropriate use in human, animal, food and agriculture sectors. Within AMR, resistance to antibiotics is the greatest and most urgent risk that requires focussed and immediate attention;

**Recognize** that emergence and spread of AMR is negating many twentieth century achievements, particularly reduction in illness and death from infectious diseases; and note with concern that without effective One Health and other multisectoral cooperation and actions, AMR is projected to cause millions of deaths worldwide (and in India) with massive\n
**Acknowledge** that resistance of microorganisms to antimicrobials is a matter of serious concern; and is mainly due to inappropriate use in human, animal, food and agricultural sectors.

Conmits to:

“Taking steps to ensure that national and state action plans on AMR include the development and strengthening of appropriate and effective surveillance, monitoring and regulatory frameworks on the preservation, use and sales of antimicrobial medicines for humans and animals”
DADF Advisory of 2014 disallows antibiotic use in feed as growth promoters

“Antibiotics should **not be allowed in feed and feed supplements as growth promoters**

The use of antibiotics for prophylactic, metaphylactic and therapeutic purpose may be based on **prescription of veterinarians** and/or under their supervision

Use of **alternative antibiotic-free growth promoters** such as prebiotics, probiotics and phytotherapeutics should be encouraged

A **licensed antibiotic** should reach a **registered user** through a registered distributor of veterinary medicine

The livestock and poultry farms should follow **good farm management practices** to control infection and stress among the flock. **Biosecurity** guidelines should be followed by making it available to all poultry farms

The State governments should **educate** their veterinarians, farmers and poultry entrepreneurs on the use of antibiotics, their withdrawal period, ill-effects of indiscriminate use of antibiotics and antimicrobial resistance”
DADF’s livestock policy says no to residues; poultry farm manual recommends no antibiotics in feed

“Livestock origin food and food products have to be free of contaminants, toxins, pathogens, pesticides and antibiotic residues, harmful additives and adulterants”

“The use of antibiotic growth promoters are NOT RECOMMENDED in poultry feed. The most important reason being AMR due to antibiotic residues in animal tissues and products.”
BIS also recommends no antibiotics in feed

- **Poultry feed standard** (IS 1374:2007) recommends:
  - Antibiotics with **systemic action** should not be used as growth promoters; these include chloramphenicol, doxycycline, tetracycline, nitrofuran, furazolidone
  - **Phase-out of gut-antibiotics**

  - Prohibit use of a set of antibiotics in fish-feed manufacturing units
  - The prohibited antibiotics include Nitrofurans (furaltadone, furazolidone, furylfuramide, nifuratel, nifuroxime, nifurprazine, nitrofurnatoin and nitrofurazone), **Neomycin**, Chloramphenicol, Nalidixic acid, Sulphamethoxazole, Dapsone, Sulfanoamide drugs (except approved sulfadimethoxine, sulfabromomethazine and sulfaethoxypyridazine), **Fluoroquinolones**, Glycopeptides
Standards exist to monitor antibiotic residues in food from animals: eggs, fish, edible tissues and fat from animals

- In 2018, FSSAI has specified maximum permissible limits for **70+ antibiotics** in eggs, milk, edible animal tissues (including fish) and fat derived from animals. These include Colistin, Erythormycin, Neomycicn, Enrofloxacin

- Modified list of antibiotics not permitted to be used at any stage of **processing of meat and meat products, poultry and eggs, sea foods** including shrimps, prawns or any variety of fish and fishery products
  - Furalaltadone, Furazolidone, Nitrofurnatoin, Nitrofurazone, Chloramphenicol Sulphamethoxazole, Metronidazole, **Glycopeptides**

- For four other antibiotics, separate tolerance limits are prescribed in **fish, fishery products and sea foods**. These are:
  - Tetracycline
  - Oxytetracycline
  - Trimethoprim
  - Oxolinic acid
Coastal Aquaculture Authority (CAA) – regulates feed and antibiotics in coastal aquaculture

- **CAA registers antibiotic-free aquaculture inputs** categorized as chemical, disinfectant, drugs, feed additive, feed adult, feed larval, immunostimulant and probiotic; Shrimp hatchery operators and farmers can use only the Registered Antibiotic-free Aquaculture Inputs

- **CAA has banned** a list of antibiotics and other pharmacologically active substances for use in shrimp aquaculture. These are: Chloramphenicol, Nitrofurans including: Furaltadone, Furazolidone, Furylfuramide, Nifuratel, Nifuroxime, Nifurprazine, Nitrofurantoin, Nitrofurazone, **Neomycin**, Nalidixic acid, Sulphamethoxazole, Aristolochia spp and preparations thereof, Chloroform, Chlorpromazine, Colchicine, Dapsone, Dimetridazole, Metronidazole, Ronidazole, Ipronidazole, Other nitroimidazoles, Clenbuterol, Diethylstilbestrol (DES), Sulfonamide drugs (except approved Sulfadimethoxine, Sulfabromomethazine and Sulfaethoxypyridazine), **Fluroquinolones, Glycopeptides**

- The maximum residue limits for the above are specified as ‘**Nil**’

- Provides MRLs for four other antibiotics, the same as specified by FSSAI
Antibiotics to be sold under prescription; withdrawal period specified and to be labelled for animal use

- **Schedule H1 to limit OTC sale of drugs, 2014 (D&C Act)**
  - H1 list includes **46 antibiotics**, such as third- and fourth-generation cephalosporins, carbapenems, antituberculosis drugs, and newer fluoroquinolones
  - Drugs covered by it to carry a prominent **Rx symbol in red and contain a box with red borders** with a printed warning on their packaging – **Red line campaign**
  - Can only be sold with the prescription of a registered medical practitioner

- **Subrule 3A of Rule 97 in Drugs and Cosmetics Rules, 2012**
  - Specifies the **withdrawal period**, or the timeframe for poultry, livestock and marine products to be kept off antibiotics before they enter the food chain
  - The container of a medicine for treatment of food producing animals shall be **labeled with the withdrawal period of the drug** for the species on which it is intended to be used
In a case related to use of antibiotic growth promoters in feed, the presence of antibiotic in feed was well recognized as drug and not feed additive.

“If upon a drug or medicine, label is put that it is not a drug or medicine, it will not make that drug or medicine, something other than drug or a medicine.”

“The question of whether commodity has been intended to be used as a drug or it has not been intended to be used as a drug, may not be relevant.”

In 2011, the then Inspector of Drugs, Deoghar seized Ciproplus B WS feed supplement powder (manufactured by M/s-Intercorp Biotech limited, Delhi) as it contained Ciprofloxacin HCl and issued a letter to the manufacturer asking about the drug manufacturing licence.

The manufacturer appealed in the various courts of India against the observation but it was dismissed.
National Health Policy, 2017 also says no to growth promoters

- The problem of AMR calls for a rapid standardization of guidelines regarding:
  - Antibiotic use
  - Limiting the use of antibiotics as over-the-counter medication
  - Banning or restricting the use of antibiotics as growth promoters in animal livestock
How can states go about it?
## Guidance framework: antibiotic use and AMR surveillance

### Responsible Antibiotic Use in Food Animals

<table>
<thead>
<tr>
<th>THEMATIC AREAS</th>
<th>Policy/law/ regulations/ standards/ programmes</th>
<th>Implementation tools- Infrastructure/ capacity/systems/ resources</th>
<th>Advocacy/awareness and education/ training/curriculum</th>
<th>Record keeping/ database generation/ collation/ dissemination and research/survey</th>
<th>Review/monitoring /feedback</th>
<th>Supply of antibiotics</th>
<th>Production Systems</th>
<th>Consumers</th>
<th>Reduce need for antibiotics</th>
<th>Veterinarians and veterinary services</th>
<th>Farms and farmers</th>
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### Surveillance of Antibiotic Use, Residues and Resistance

<table>
<thead>
<tr>
<th>THEMATIC AREAS</th>
<th>Antibiotic use in food animals</th>
<th>Antibiotic resistance in animals and food from animals</th>
<th>Antibiotic residues in food from animals</th>
<th>Environmental surveillance of residues and resistance</th>
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### Environment Management to Contain Antimicrobial Resistance

<table>
<thead>
<tr>
<th>THEMATIC AREAS</th>
<th>Registration/ licensing (based on environment risk assessment)</th>
<th>Biosecurity/sanitation and hygiene/good manufacturing Practices</th>
<th>Waste management</th>
<th>Research</th>
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Short-term (S): <1 yr; Medium-term (M): 1-3 yrs; Long term (L): 3-5 yrs; Continues throughout: (S-M-L)
Responsible antibiotic use in food animals

Supply of antibiotics

- Policy and regulatory framework on responsible antibiotic use with focus on (S)
  - Approval and authorisation of antibiotics for animals
  - Ban/phasing out of non-therapeutic use such as for mass disease prevention and growth promotion
  - Restricting use of critically important antibiotics for humans
  - Antibiotic use under supervision and prescription
  - Mitigating livelihood impact on small holder farmers
## Responsible antibiotic use in food animals

### Supply of antibiotics

<table>
<thead>
<tr>
<th>Policy/Law/regulations/standards/programmes</th>
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<tbody>
<tr>
<td>- Regulation to restrict antibiotics in animal feed and premix, registration of feed and premix, prescription and use of only registered products (S)</td>
</tr>
<tr>
<td>- Regulation on import of feed, feed premix and antibiotics for animal use (S)</td>
</tr>
<tr>
<td>- Labelling law for feed, premix (S)</td>
</tr>
<tr>
<td>- Labelling law for antibiotics for specie-specific use (S)</td>
</tr>
<tr>
<td>- Regulation on online marketing and direct distribution of antibiotics, premix, antibiotic feed or any other products with antibiotics (S)</td>
</tr>
<tr>
<td>- Law to ensure licensing of manufacturer, distributor and sellers of antibiotics, feed, premix and other inputs (S)</td>
</tr>
<tr>
<td>- Law to ensure prescription sale, including penalty for unauthorized sale (S)</td>
</tr>
<tr>
<td>- Plan to set reduction targets for antibiotic use by a certain date and with a review process (S)</td>
</tr>
</tbody>
</table>
### Responsible antibiotic use in food animals

#### Supply of antibiotics

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<tr>
<th>Implementatio n tools - infrastructure/ capacity/ systems/ resources</th>
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</thead>
<tbody>
<tr>
<td>Authority for approving veterinary drugs and market authorization <em>(S)</em></td>
</tr>
<tr>
<td>Systems to enable data collection of antibiotic production, sale and import <em>(M)</em></td>
</tr>
<tr>
<td>Necessary enforcement systems through agencies, customs, infrastructure, human resource including those required for auditing/inspecting companies providing inputs (e.g. feed), ensuring prescription sale etc. <em>(M)</em></td>
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<th>Advocacy/ awareness and education/ training/ curriculum</th>
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<tr>
<td>Awareness and training of regulators, customs officials, distributors and sellers to ensure approved sale, documentation etc. <em>(S-M-L)</em></td>
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<tr>
<th>Record keeping/ database generation/ collation/ dissemination and research/ survey</th>
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<tr>
<td>National online database of licensed antibiotic producer, importer, traders, retailers including defaulters <em>(S)</em></td>
</tr>
<tr>
<td>Online national/regional/sub-regional database on antibiotic production, sale, import <em>(M)</em></td>
</tr>
<tr>
<td>Online dissemination of updated policy, regulation and data including list of approved and unapproved antibiotics <em>(S)</em></td>
</tr>
<tr>
<td>Annual report of antibiotic sale correlated with consumption and resistance data <em>(M)</em></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Periodic review/mapping of antibiotic production, import, sale as per sector <em>(S-M-L)</em>; Annual report on antibiotic sale <em>(S-M-L)</em></th>
</tr>
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*Review/ monitoring/ feedback*
Responsible antibiotic use in food animals
Reduce need for antibiotics

<table>
<thead>
<tr>
<th>Policy/Law/regulations/standards/programmes</th>
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<tbody>
<tr>
<td>• Develop guidelines for biosecurity <em>(S)</em></td>
</tr>
<tr>
<td>– Plan/programme for internal and external biosecurity and its enforcement</td>
</tr>
<tr>
<td>– Programme to support small-holder farmers to implement biosecurity</td>
</tr>
<tr>
<td>• Programme to research, develop, promote access to alternatives such as vaccination, probiotics etc. <em>(S)</em></td>
</tr>
<tr>
<td>• Plan for research and development of appropriate animal breeds. Which are, for example, resilient <em>(S)</em></td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Implementaton tools - infrastructure/capacity/systems/resources</th>
</tr>
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<tbody>
<tr>
<td>• Develop systems to ensure adoption and implementation of appropriate biosecurity measures at the farm level <em>(M)</em></td>
</tr>
<tr>
<td>• Systems to register antibiotic free alternative products and their use <em>(S)</em></td>
</tr>
<tr>
<td>• Support for programmes on development and adoption of vaccines <em>(M)</em></td>
</tr>
<tr>
<td>• Investment and research in development of appropriate animal breeds with disease resilience <em>(M)</em></td>
</tr>
</tbody>
</table>
**Responsible antibiotic use in food animals**

**Reduce need for antibiotics**

<table>
<thead>
<tr>
<th>Advocacy/ awareness and education/ training/ curriculum</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Awareness and training of farmers, registered practitioners, veterinarians and other stakeholders on need for biosecurity, judicious antibiotic use and importance of alternatives <em>(S-M-L)</em></td>
</tr>
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<tr>
<td>• National online database for approved and unapproved vaccines and other alternatives <em>(S)</em></td>
</tr>
<tr>
<td>• A list/database/rating of farmers/producers successfully adopting biosecurity and using alternatives and not antibiotics <em>(M)</em></td>
</tr>
</tbody>
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<th>Review/ monitoring/ feedback</th>
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<tbody>
<tr>
<td>• Periodic review of use and success of alternatives, with reference to antibiotic use and resistance data at the farm/sub-regional/regional/national level <em>(S-M-L)</em></td>
</tr>
</tbody>
</table>
## Responsible antibiotic use in food animals

**Veterinarians and veterinary services**

### Policy/Law/regulations/standards/programmes

- Law for licensing/registration of veterinarians *(S)*
- Law to delink antibiotic prescription and incentives *(S)*
- Programme for accessible, affordable and quality diagnostic services to support judicious use of antibiotics *(S)*
- Programme for targeted, livestock specific veterinary services to provide free advisory services to farmers *(M)*

### Implementation tools - infrastructure/capacity/systems/resources

- Set up licensing authority for veterinarians and those involved in fisheries *(S)*
- Develop capacity and infrastructure to ensure veterinary diagnostic services *(M)*
- Develop system to dis-incentivize antibiotic prescription by veterinarian *(S)*
Responsible antibiotic use in food animals
Veterinarians and veterinary services

Advocacy/ awareness and education/ training/ curriculum

- Awareness, training and education of veterinarians *(S-M-L)*
- Necessary AMR focus in curriculum and continuous professional medical education *(S-M-L)*

Record keeping/ database generation/ collation/ dissemination and research/ survey

- National online database of registered veterinarians, and those who prescribe more antibiotics and without testing *(M)*
- An updated list of diagnostic services available *(S)*

Review/ monitoring/ feedback

- Periodic monitoring of records at veterinary levels *(S-M-L)*
### Responsible antibiotic use in food animals

#### Farms and farmers

**Policy/law/regulations/standards/programmes**

- Law for **licensing and monitoring of commercial farms** and farmers based on country-level scenario) *(M)*
- Programme to **incentivize/dis-incentivize farmers** based on extent of antibiotic use *(S)*

**Implementation tools - infrastructure/capacity/systems/resources**

- Set up **licensing authority** for farms and registration of farmers *(S)*
- Enabling system to **dis-incentivize/incentivize antibiotic use** at farm level *(M)*

**Advocacy/awareness and education/training/curriculum**

- **Targeted education** on AMR and judicious antibiotic use for farmers *(S-M-L)*
- Farmer training in **agro-ecological/alternative/participatory farming practices** *(S-M-L)*

**Record keeping/database generation/collation/dissemination and research/survey**

- National database of registered farms and farmers including those who are non-compliant or use more antibiotics *(M)*

**Review/monitoring/feedback**

- Periodic monitoring of records at farm levels *(S-M-L)
# Responsible antibiotic use in food animals

**Consumers**

## Policy/Law/ regulations/ standards/ programmes

- **Labelling law** for food from animals produced with or without antibiotics *(S)*

## Implementation tools - infrastructure/ capacity/ systems/ resources

- **Systems to ensure compliance** of labelling laws *(S)*

## Advocacy/ awareness and education/ training/ curriculum

- **Consumer awareness** on antibiotics in food and AMR, labelling of food from animals raised without antibiotics and role of sustainable diets *(S-M-L)*
- **Awareness and promotion of Institutional procurement of food** raised without antibiotics (such as through a score card system used to incentivize/dis-incentivize food procurement) *(S-M-L)*

## Record keeping/ database generation/ collation/ dissemination and research/ survey

- **Public database of farmers/producers** raising farm animals without antibiotic use *(M)*
- **Database of farmers/producers** not in compliance to labelling laws *(M)*

## Periodic assessment of initiatives with those of antibiotic use data *(S-M-L)*

Review/ monitoring/ feedback
Surveillance of antibiotic use, residues and resistance

Antibiotic use

### Policy/law/regulations/standards/programmes

- Assessment of existing laws before formulation of new laws \(\text{(S)}\)
- Legal provision to obtain farm-level antibiotic use data \(\text{(S)}\)
- Regulation to ensure prescription audit of veterinarians/authorized practitioners \(\text{(M)}\)

### Implementation tools - infrastructure/capacity/systems/resources

- Systems to enable collection and collation of farm-level antibiotic use data \(\text{(M)}\):
  - Harmonized system for data collection and analysis
  - Ensure farmer’s responsibility to provide data
  - Factor-in priority markets/sectors

### Advocacy/awareness and education/training/curriculum

- Awareness campaigns for farmers for self-policing and keeping records \(\text{(S-M-L)}\)
- Awareness campaigns for vets to prescribe antibiotics judiciously and keep records \(\text{(S-M-L)}\)
- Training programme on documentation for farmers and veterinarians \(\text{(S)}\)
- Training needs assessment of those conducting surveillance, development of training material etc. for data collection and management followed by enabling environment to collect data \(\text{(S)}\)
- Advocacy at community/institutional level based on antibiotic use data reports \(\text{(S-M-L)}\)
**Surveillance of antibiotic use, residues and resistance**

**Antibiotic use**

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<td>• Online systems for collating and analyzing prescription data and farmer use data. This should include antibiotics and classes, weight as unit, total antibiotic consumption in different food sector, therapeutic and non-therapeutic use (M)</td>
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<td>• Surveys at farm level for data collection across different sectors (M)</td>
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<td>• Setting up of data standards, ensuring the quality assurance of data (S)</td>
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<td>• Establishment of national repository, publishing of annual reports and public dissemination of data to ensure transparency (M)</td>
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Surveillance of antibiotic use, residues and resistance

Antibiotic residues

**Policy/legislation/regulations/standards/programmes**

- Antibiotic residue monitoring policy/programme in food from animals *(S)*
- Standards for antibiotic residues in food from animals such as chicken, eggs, milk, fish *(S)*

**Implementation tools - infrastructure/capacity/systems/resources**

- Develop comprehensive residue monitoring framework which enables surveillance of approved and unapproved antibiotic use *(S)*
  - Export oriented residue monitoring framework could be considered for adaptation based on domestic antibiotic use
- Ensure availability of funds, infrastructure, resources for data collection *(S)*

**Advocacy-awareness and education/training/curriculum**

- Awareness campaigns on importance and need of residue monitoring *(S-M-L)*
- Training needs assessment for those conducting surveillance *(S)*
- Development of training material and protocols for residue testing and data management followed by enabling environment *(S)*
- Capacity building and training programmes *(M)*
- Advocacy at community/institutional level based on antibiotic residue data reports *(S-M-L)*
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## Surveillance of antibiotic use, residues and resistance

### Antibiotic resistance

#### Policy/law/regulations/standards/programmes

- **National AMR surveillance programme** to monitor resistance in animals and food from animals across all sectors *(S)*
- **Law compelling farmers and food processors** to provide samples for analysis and share their internal data on resistance *(S)*
- Establish ambitious and achievable **resistance reduction targets** *(S)*

#### Implementation tools - infrastructure/capacity/systems/resources

- Commission an **expert advisory group/steering committee** to decide on key elements such as networking experts/labs, develop, terms of reference, priorities, linkages and international collaboration *(S)*
- Identify, establish and strengthen **national reference laboratories** who decide upon standards, protocols, organisms, data management mechanisms *(M)*:
  - Ensure quality and harmonization with national/international data and establish linkages with resistance in humans and environment
  - Enable collaboration across labs to provide support, build access to WHO, FAO and OIE labs
Surveillance of antibiotic use, residues and resistance

Antibiotic resistance

Implementation tools - infrastructure/capacity/systems/resources

- Develop and strengthen lab infrastructure, professional capacity, standardization of sample collection and testing protocols and assure quality both internally and externally through External Quality Assurance Scheme. *(M)* - sector specific; *(L)* - integrated quality assurance
- Ensure surveillance systems for harmonization across all sectors such as animal, human and environment. Integrated surveillance could begin with a pilot initiative *(S-M-L)*

Advocacy/awareness and education/training/curriculum

- Awareness campaigns on importance and need of resistance surveillance across stakeholders *(S-M-L)*
- Training needs assessment for those conducting surveillance *(S)*
- Development of training material and protocols for resistance data collection and management followed by enabling environment for resistance surveillance *(S)*
- Capacity building and training programmes including integrated programs with the WHO, FAO, OIE collaborating centers *(M)*
- Advocacy at community and institutional level based on antibiotic resistance data reports *(S-M-L)*
### Surveillance of antibiotic use, residues and resistance

**Antibiotic resistance**

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<td>- Develop early warning system <em>(S)</em></td>
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Antibiotic use (mis) in crops: gaps in policy and practice

In India, antibiotics (streptomycin and tetracycline, 9:1 mixture) are approved for ten crops - apple, bean, citrus, potato, tomato, chili, rice, tobacco, tea and cotton; much stronger control in in several countries (EU)

Key Issues (policy and practice):

• Antibiotics are used for unapproved crops - cauliflower, cabbage, spinach, cucurbits, mustard, brinjal, fenugreek, onion, lady finger, radish, coriander, chenopodium, carrot

• Overuse and misuse a common practice – more salt; more sprays; even on healthy plants; without diagnosis (fungal/bacterial disease differentiation difficult);

• State agricultural institutes recommend antibiotic use in unapproved crops to farmers: promotes misuse

• CIBRC wrongly registers antibiotics as fungicides that gives a freehand to companies to promote antibiotics for fungal infections which are more common: leads to overuse

• Antibiotics for crops are not recognized as ‘Drugs’ as they are used in plants, and not in animals or humans. Hence they are not covered under schedule H1 and exempted for licensing for imports: leads to unchecked sale and use; Estimates of antibiotics imported for use in crops not readily available

• Streptomycin is a CIA and tetracycline is a highly important for use in humans
Thank you

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Why ban colistin right away?

- **Resistance to colistin is rapidly spreading** around the world; emerging in India hospitals
- **7th most frequently used out of 35 antibiotics used for growth promotion** – OIE

- Inter-governmental organizations are pushing to ban the use of colistin for growth promotion (IACG, WHO) and also therapeutic use in animals (WHO).

- Countries have initiated regulatory actions for use of colistin in food-producing animals. China, Argentina and Brazil have banned the use of colistin in animals.

- In India, colistin is rampantly used in food animals for growth promotion and disease prevention. Huge quantities of colistin are produced and imported in India and it is available over-the-counter without a prescription
The global distribution and spread of the mobilized colistin resistance gene *mcr-1*