

**OIE Virtual Workshop for
Veterinary Education
Establishments (VEEs) in India, 7-9
June 2021, Veterinary College,
Bengaluru, India**

**Session 6: Using VEEs to
combat antimicrobial
resistance (AMR)**

**Title: National Action Plan
(NAP) and status of
implementation of the NAP
on AMR in the livestock
sector**

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(ICAR)**



WORLD ORGANISATION FOR ANIMAL HEALTH

Protecting animals, preserving our future

National Action Plan on Antimicrobial Resistance



National Action Plan on Antimicrobial Resistance



Coordinated by Ministry of Health & Family Welfare, Government of India

DR. JYOTI MISRI

Global leaders including India have adopted a political declaration at the 71st UN General Assembly on 21 Sep, 2016 for a collaborative global response to the threat of AMR. India has finalized its National Action Plan on Antimicrobial Resistance (April, 2017). NAP-AMR summarizes the current situation regarding AMR and its containment in India.

NAP-AMR proposes a roadmap to guide the country in tackling this public health challenge.



SIX PRIORITIES of the NAP-AMR

1.

Improve awareness and understanding of AMR through effective communication, education and training

2.

Strengthen knowledge and evidence through surveillance

3.

Reduce the incidence of infection through effective infection prevention and control

4.

Optimize the use of antimicrobial agents in health, animals and food

5.

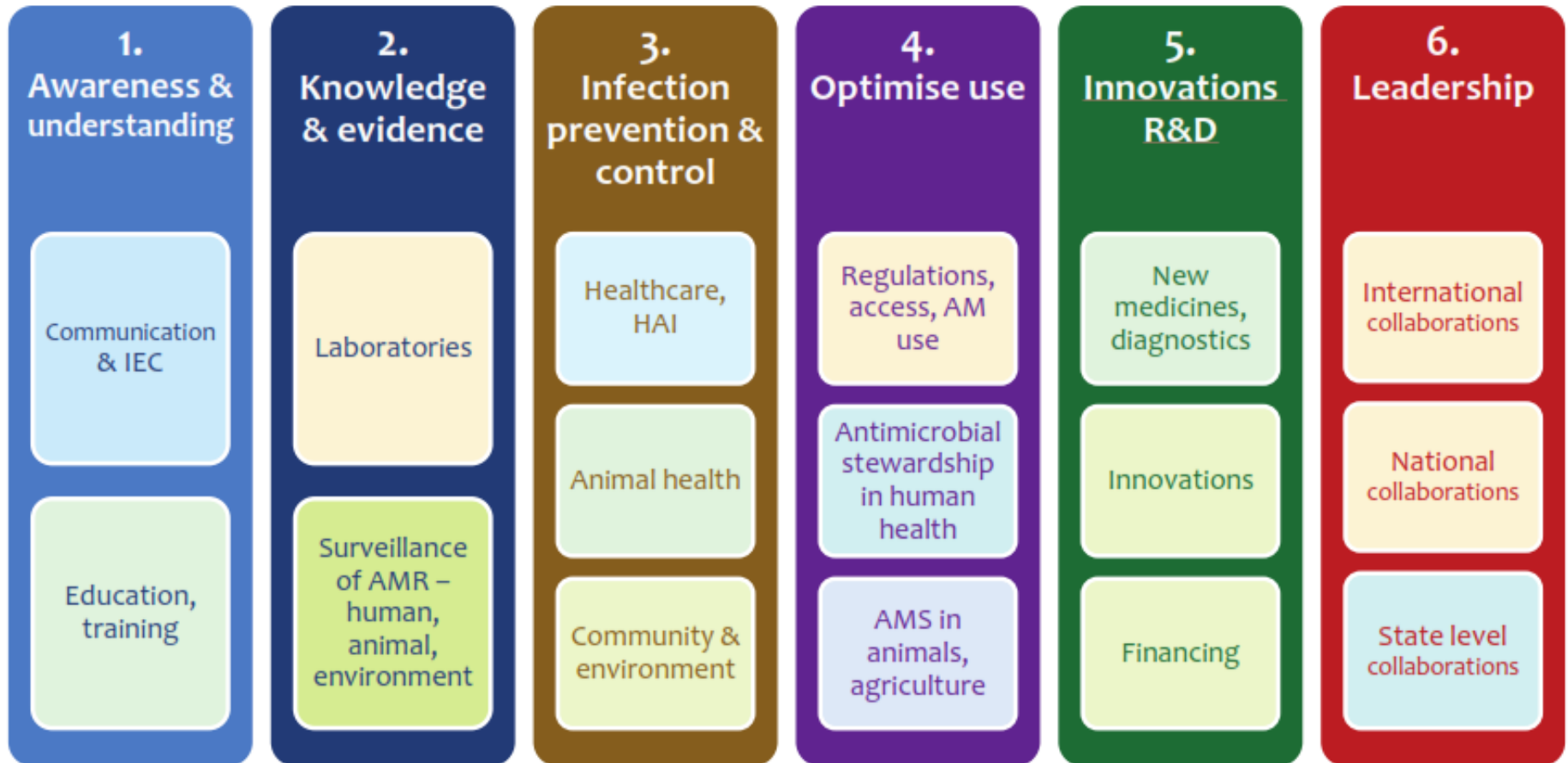
Promote investments for AMR activities, research and innovations

6.

Strengthen India's leadership on AMR

ICAR role mentioned in the NAP-AMR to address the priorities

Focus areas of NAP-AMR strategic priorities



Strategic Priority 1

Focuses on improving awareness and understanding of AMR through effective communication, education and training.

It has 2 focus areas –

1. Communications and information, education, communication (IEC) resources to raise awareness amongst all stakeholders
2. Education and training to improve the knowledge and behaviour of professionals in all sectors.

Strategic priority 2

Aims to strengthen knowledge and evidence through surveillance of AMR

It has 2 focus areas :

1. Strengthening laboratories in human, animal, food and environment sectors
2. Ensuring surveillance of antimicrobial resistance in human, animal, food and environment sectors.

Strategic priority 3

Attempts to:

- reduce the incidence of infection through effective infection prevention and control in healthcare
- reduce the burden of infection, in animal health and food
- reduce spread of AMR and antimicrobials through animals and food, and in community and environment
- reduce the spread of AMR and antimicrobials in the environment

Strategic Priority 4

Shall optimize the use of antimicrobial agents in health, animals and food through :

- strengthening regulations
- ensuring access and surveillance of antimicrobial use
- antimicrobial stewardship in healthcare, animal health and agriculture.

Strategic Priority 5

Aims to promote investments for :

- AMR activities, research and innovations
- new medicines and diagnostics
- innovations to develop alternative approaches to manage infectious diseases
- sustainable financing to ensure adequate resources for containment of AMR

Strategic priority 6

Focuses on strengthening India's leadership on AMR through :

- International collaborations - to ensure India's contributions towards global efforts to contain AMR
- National collaborations - to facilitate collaborations among vertical disease control programmes and national stakeholders
- State level collaborations - to ensure action at the ground level against AMR.

State Action Plans for Containment of AMR



**Guidance for developing
State Action Plans for
Containment of
Antimicrobial Resistance
(SAPCAR)**



National Centre for Disease Control
Ministry of Health and Family Welfare, New Delhi

July 2018

Kerala (KARSAP),
Madhya Pradesh (MP-
SAPCAR) and
Delhi (SAP-CARD) have
developed state action
plans
for containment of AMR.
Other states are in the
process.

**Madhya Pradesh
State Action Plan for Containment of
Antimicrobial Resistance
(MP-SAPCAR)**



**Kerala
Antimicrobial Resistance
Strategic Action Plan**

One Health response to AMR Containment



**State Action Plan to
Combat Antimicrobial Resistance in Delhi
(SAP-CARD)**



DR. JYOTI MISRI

ICAR scientists are providing inputs for the SAPCARs

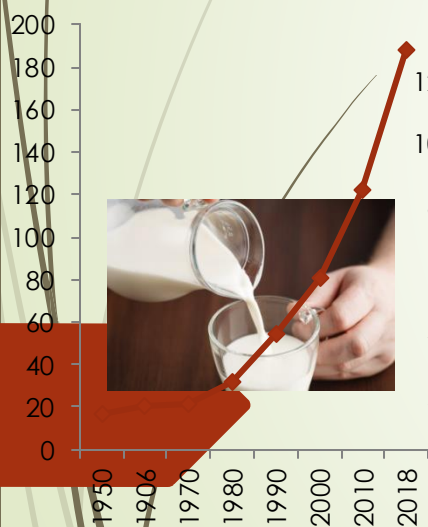
India: Livestock scenario

Total Milk Production: 187.75 million tonnes

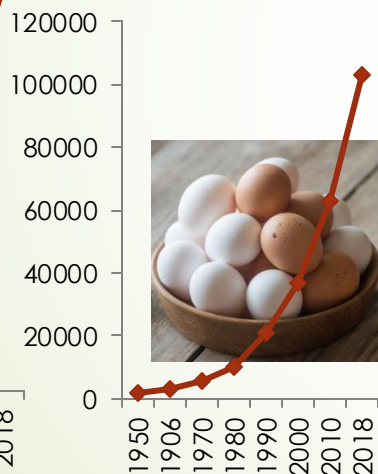
Total Egg production: 103.32 billion eggs

Total meat production: 8.11 million tonnes

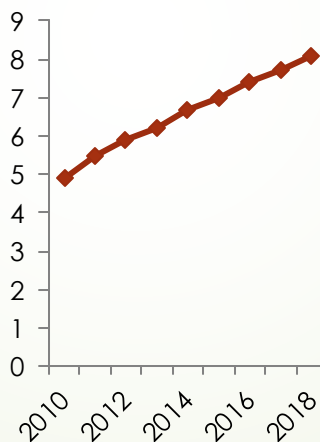
MILK (Million tonnes)



Eggs (Millions)



Meat (Million Tonnes)



	INDIA (million)
Cattle	192.52
Buffaloes	109.52
Sheep	74.26
Goats	148.58
Pigs	9.06
Camels	0.25
Horses & Ponies	0.34
Mules	0.08
Donkeys	0.12
Yaks	0.06
Total livestock	535.82
Poultry	855.81

Per capita availability of milk: 394 grams per day

Per capita availability of eggs: 79 eggs per annum



Infection Prevention and Control in Veterinary Sector

Diseases in livestock and poultry affects animal productivity and survival leading to economic loss.

Veterinary Hospitals /Poly-clinics: 12076

Veterinary Dispensaries : 25571

Veterinary Aid centres/ Mobile dispensaries: 28168

Infection Prevention : 1) Effective Vaccination programmes
2) Good Animal Husbandry Practices

Disease Control : Use of Antimicrobials
(antibiotic, antifungal, antiparasitic drugs)



Global Trends in Antimicrobial Use in Food Animals

AMU in chicken, cattle, and pigs (which account for 93.75% of all food animals)

Estimated global antimicrobial sales in 2017: 93,309 tonnes

Expected global antimicrobial sales in 2030: 104,079 tonnes 11.5% increase

AMU in 2017

Pigs 45%
Cattle 22%
Chickens 33%



Pigs	193 mg/PCU
Cattle	42 mg/PCU
Chickens	68 mg/PCU

Asia consumes the largest amounts of antimicrobials

2017: 57,167 tonnes

2030: 63,062 tonnes

Top 5 countries

1. CHINA

2. Brazil

3. USA

4. Thailand

5. India

CHINA (1st)

2017: 45%

2030: 43%

INDIA (5th)

2017: 2.2% (2053 tonnes)

2030: 2.1% (2186 tonnes)



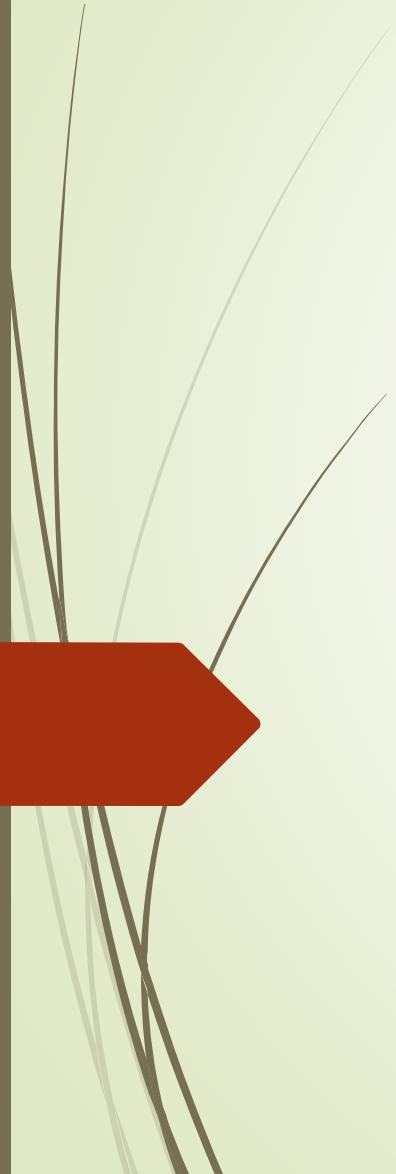
Indian Network for Fishery and Animals Antimicrobial Resistance (INFAAR)

Objective: to generate nation wide, structured, quality data through surveillance and research on AMR, specific to livestock and fisheries sectors for strengthening knowledge and better understanding of AMR

Structure:

INFAAR is a national network of veterinary laboratories (livestock and fisheries laboratories) conceptualized to strengthen surveillance of antimicrobial resistance in India.

ICAR Veterinary Research Institutes (9)
ICAR Fisheries Research Institutes (8)
Veterinary colleges (3)



FAO-ICAR meeting on
establishment of a national
network of veterinary labs for
AMR at Kolkata
7-8 March 2017
(INFAAR Conceptualized)

FAO-ICAR meeting to identify
research priorities in veterinary
sector for AMR at Kochi
27-28 March 2017

**FAO-ICAR meeting to finalize
research priorities on AMR in
animal health at Bangalore
5-6 July 2017**

**FAO-ICAR meeting on
Operational Mechanisms for
INFAAR at Mumbai
14 July 2017
(INFAAR Operationalized)**

Establishment
of
Indian Network
for Fisheries
and Animals
Antimicrobial
Resistance
(INFAAR)



Development of uniform Standard Operating Procedures (SOPs) for Antibiotic Susceptibility test (AST; Phenotypic and Genotypic) in Animal and Fisheries sectors

'Release of the SOPs for
Network
Programme on AMR in
Fisheries, 24th March, 2018
at ICAR-NBFGR, Lucknow

SOP validation under
INFAAR-Fisheries
Component.
Nov-Dec, 2020

Finalization of
National SOP on
AST for Veterinary
sector on
1st Feb, 2020 at
Visakhapatnam

ICAR-Veterinary
Research
Institutes
IVRI,
NDRI,
NIVEDI,
CARI
CIRG,
CSWRI,
DPR,
NRCE,
ICAR for NEH

ICAR-Fisheries
Research institutes
NBFGR
CIFT
CIFA
CIBA
CMFRI
CIFRI
CIFE
DCFR

**INFAAR
operation**

Advisory Board
constituted by
DG, ICAR to
guide INFAAR

**6 meetings held
Feb, 2018 to
Feb, 2021**

- **Collection of samples from terrestrial and aquatic animals**
- **Isolation of target bacteria**
- **Determination of AMR**
- **Reporting Results**

2018-2019

2019-2020

2020-2021

2021-contd

Annual Review Meeting of INFAAR

Sep 2018 Goa; Sep 2019, Kolkata; Sep 2020-Virtual

Data on AMR
in animal
sector is
being
continuously
generated
and reviewed

INFAAR: Work Plan for Animal Science Institutes

❖ Target Samples:

- Rectal swab (pigs, sheep and goat)
- Cloacal swab (poultry)
- Milk (cattle, buffalo)
- Nasal swab (pig)
- Sample size:
 - (Estimated prevalence of ESBL *E. coli* and MRSA as 13% and 5%, respectively)
 - 248 samples including 132 milk to be processed in four phase during a year
 - Rectal swab/cloacal swabs and milk samples screened for isolation and characterization of *E. coli*
 - Milk and nasal swab samples screened for *S. aureus* and CoNS
 - **Next phase sampling:** Skin scrapping, tracheal swab, pus and blood
 - **Targeted pathogens:** *E. coli* and *Staphylococcus*
 - *Klebsiella*, *Salmonella*, *Pseudomonas*, *Enterococci* and *Campylobacter*



Capacity Building Programmes

FAO – ICAR workshop on Laboratory based surveillance of AMR in human health and veterinary sectors at Bangalore, 18 & 19 Jan, 2017.

FAO-ICAR training programme on WHONET for AMR at ICAR-NBFGR, Lucknow; 17 & 18 Aug, 2018

FAO-ICAR training on "WHONET software for data Management of Antimicrobial Resistance (AMR)" at ICAR-CIFT, Cochin on 19 Sep, 2018

INFAAR- ATCLASS Assessors Training on FAO Assessment Tool for Laboratories and Antimicrobial resistance Surveillance Systems (FAO ATCLASS) 21-25 Jan, 2019 at ICAR-CIFT, Kochi

ICAR-FAO Online training on antibiotics and AMR for INFAAR members, 22-23 June 2020.

Virtual Training on Quality Management System in AMR Laboratories for the Indian Network for Fisheries and Animals Antimicrobial Resistance (INFAAR), 24 Sep 2020

Virtual Training on BacLink component of the WHONET 5 for INFAAR members, 23 Feb 2021



Awareness Programmes on AMR

All the Veterinary Research Institutes, Fisheries Research Institutes and Veterinary colleges are actively engaged in creating awareness on AMR among the different stakeholders.

World Antimicrobial Awareness Week (WAAW)
Is being continuously celebrated by INFAAR members

WAAW - 2017.

WAAW- 2018

WAAW- 2019

WAAW- 2020

**ICAR-CIFT organized a National Seminar on
“AMR in Indian Fisheries: Measures of Mitigation”
from 7-8 November, 2019.**



Participation of ICAR scientists in Regional Consultations on AMR

FAO-NACA Regional Consultation and Related Study on Antimicrobial Resistance (AMR) Risk to Aquaculture in Asia, and Preliminary Consultation on Monitoring of AMR in Bacterial Pathogens in Aquaculture at Bangkok, Thailand 4-7 Sep 2018.

The 2nd Consultation Meeting on Regional AMR Monitoring and Surveillance Guidelines Volume 3: “Monitoring and surveillance of AMR in aquaculture” 22-25 June 2020

Second Consultation Meeting on the Regional Monitoring and Surveillance Guideline Volume 5: Monitoring antimicrobial use at the farm level, 26-28 April 2021.



Antimicrobial use (AMU):

Action points

AMU information is vital to devise strategies to control the use of antibiotics in aquaculture. There is dearth of authentic published data on the quantity and type of antibiotics being used in livestock data.

- Standard Protocol needs to be developed for strengthening AMU surveillance so as to realistically quantify the use of antimicrobials (antibiotics, antivirals, antifungals and antiparasitic drugs) in the livestock sector.

FAO and OIE are jointly developing a Regional Monitoring and Surveillance Guideline Volume 5: Monitoring antimicrobial use at the farm level. This voluntary guideline which will be released in 2021-22 can be used a template for initiating India specific AMU surveillance programmes



Antimicrobial resistance (AMR)

Knowledge Gaps

- There is paucity of scientific data in India on the extent of AMR in the livestock sector (INFAAR has been generating AMR data in terrestrial and aquatic animals over the last 3 years).
- Lack of data on the prevalence of genes conferring resistance (ARGs) to antimicrobials.
- Knowledge gaps in the epidemiology of antimicrobial resistance at the human- animal interface



Antimicrobial resistance (AMR)

Action points

- State Action Plan for Containment of AMR (SAPCAR) by all the states in line with the NAP need to come into force. State level AMR reference laboratories need to be set up in every state that should act as the nodal point for coordinating AMR surveillance, performing antibiotic residue analysis and collating information on AMR and AMU in livestock sector in each state.
- Infrastructure of laboratories in all the states needs to be strengthened (Universities, Veterinary colleges, Animal disease diagnostic labs) with trained personnel, necessary equipment and adequate consumables for performing Antibiotic Susceptibility Testing (AST).
- Standard Operating Protocols (SOPs) developed INFAAR may be adopted by the states for better comparison of AMR data at the National level.
- Networking all the Veterinary laboratories in the country with medical laboratories so as to create a 'One Health' perspective of AMR in line with the WHO-FAO-OIE approach.



Collective efforts of veterinarians, researchers, policy makers, farmers, drug manufacturers, general public is needed to fight the challenges of AMR in the animal sector.

THANK YOU