

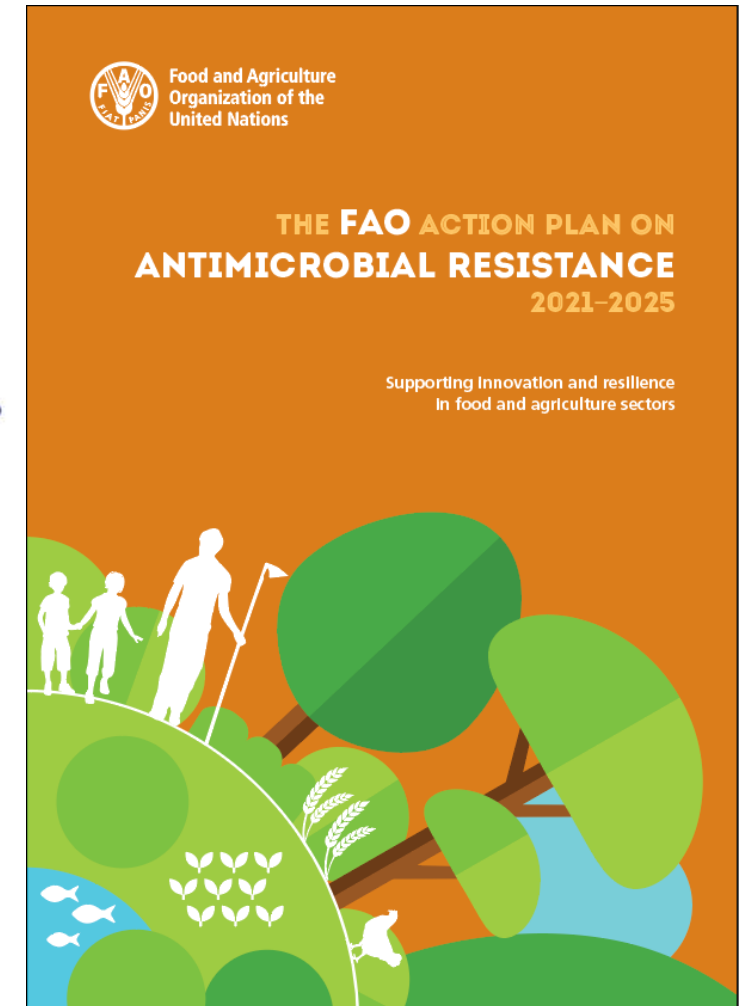
FAO's work on AMR/AMU in aquaculture

30 October – 1 November 2024

Singapore

Muhammad Usman Zaheer
DVM, MPhil, PhD, Diplomate ACVPM, M.A.C.E

Regional AMR Surveillance and One Health Specialist
FAO Regional office for Asia and the Pacific



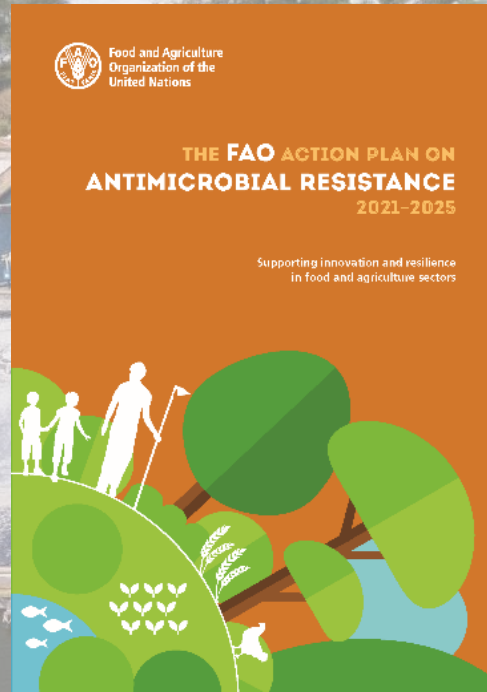


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Progressive
Management
Pathway for
Aquaculture
Biosecurity

FAO's work on AMR is anchored in



Guidelines
for Sustainable
Aquaculture
(GSA)



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**FAO's work
on AMR is
anchored in**





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**VISION: Food & agriculture sectors,
dependent livelihoods & economies, are made
resilient to the impacts of AMR**

FAO Action Plan on AMR 2021-2025 Five Objectives

*Food and agriculture sectors,
dependent livelihoods and economies
are made resilient to the impacts of AMR*

Strengthening **governance**
and allocating **resources**
to accelerate and sustain progress

Promoting **responsible use**
to keep antimicrobials working



Increasing stakeholder
awareness and **engagement**
to foster change

Strengthening **surveillance**
and **research** to support
evidence-based decisions

Enabling **good practices** to prevent
infections and control the spread
of resistant microbes



**AMR Working Group Leadership Team:
multidisciplinary and multi-sectoral**

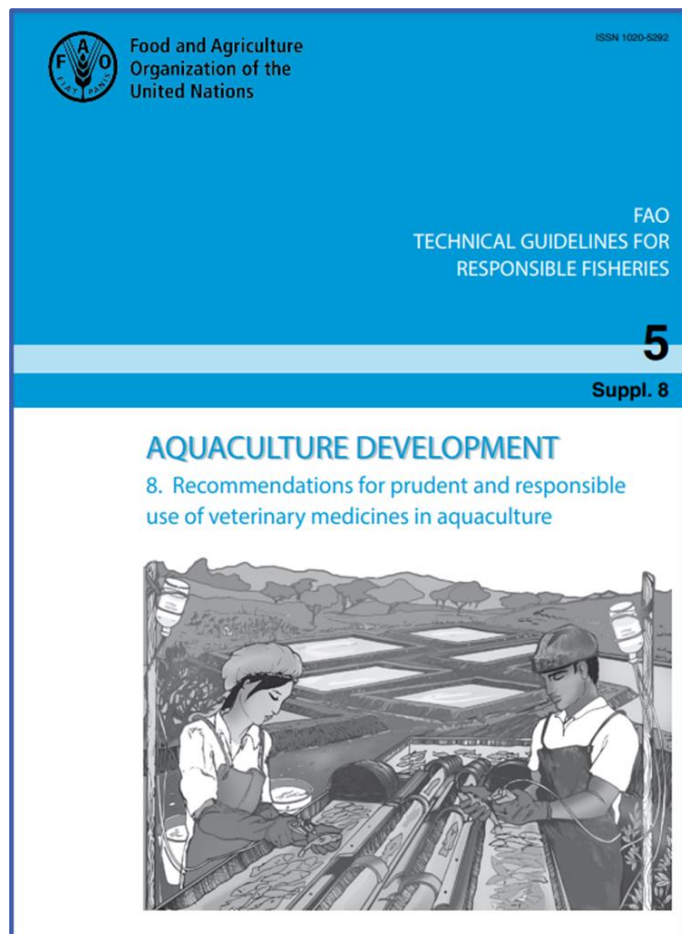


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Code of Conduct for Responsible Fisheries (CCRF) Technical Guidelines: Recommendations for Prudent and Responsible Use of Veterinary Medicines in Aquaculture



REVIEWS IN Aquaculture

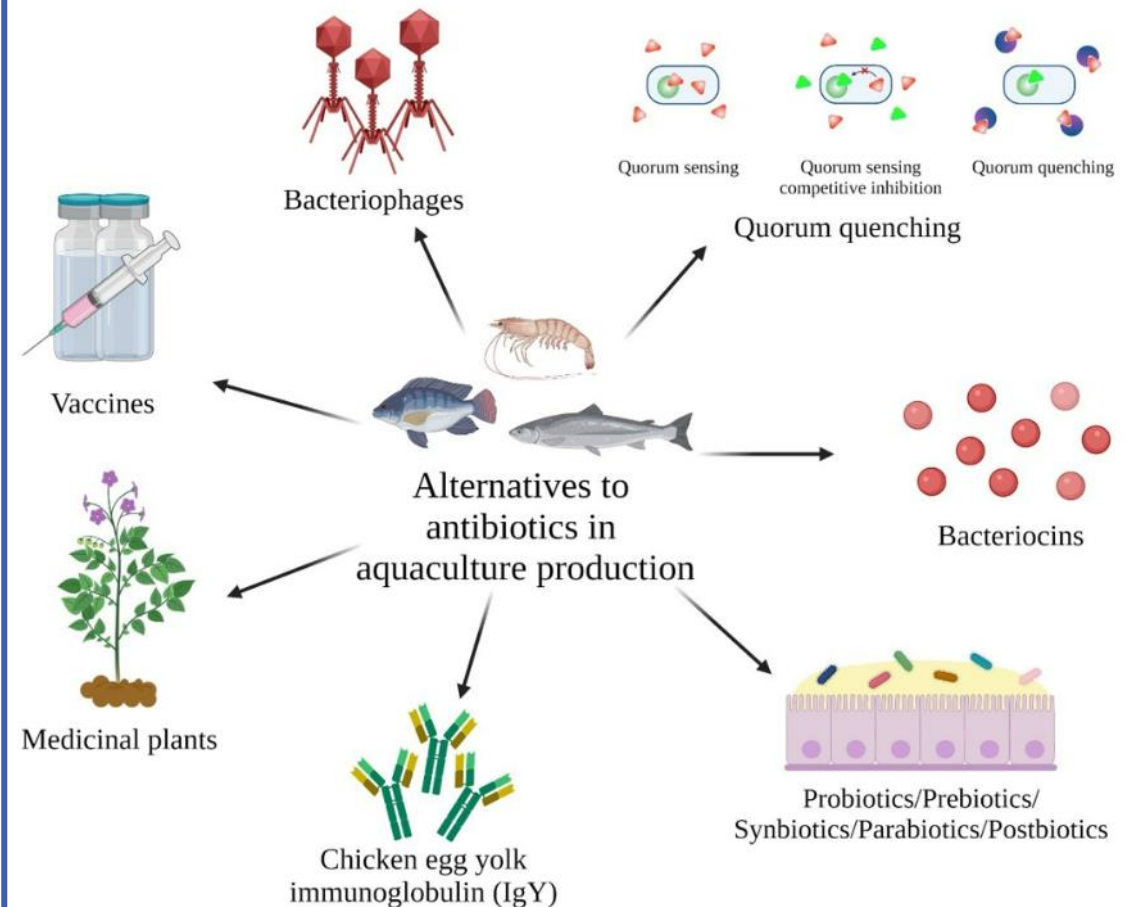


REVIEW | [Open Access](#) |

Review of alternatives to antibiotic use in aquaculture

Melba G. Bondad-Reantaso , Brett MacKinnon, Iddya Karunasagar, Sophie Fridman, Victoria Alday-Sanz, Edgar Brun, Marc Le Groumellec, Aihua Li, Win Surachetpong, Indrani Karunasagar, Bin Hao, Andrea Dall'Occo, Ruggero Urbani, Andrea Caputo ... [See fewer authors](#) ^

First published: 24 February 2023 | <https://doi.org/10.1111/raq.12786> | Citations: 9



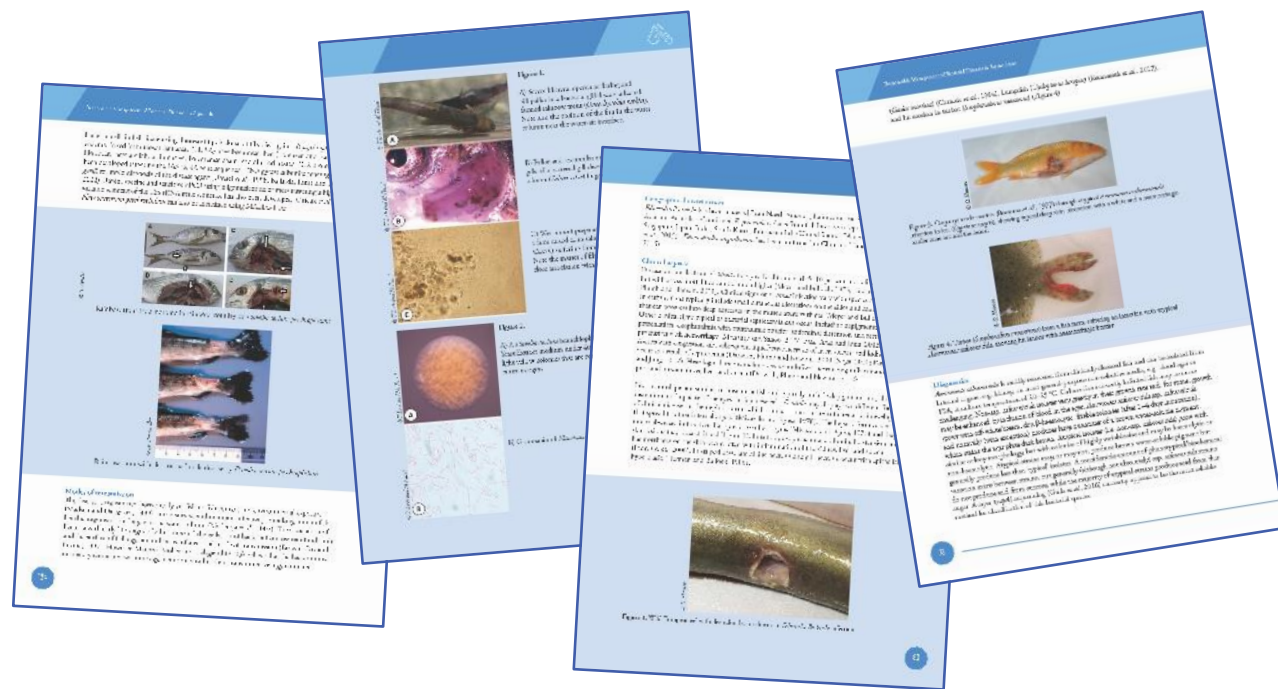


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Ongoing work on **Responsible Management of Bacterial Diseases in Aquaculture**



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Responsible Management of Bacterial Diseases in Aquaculture

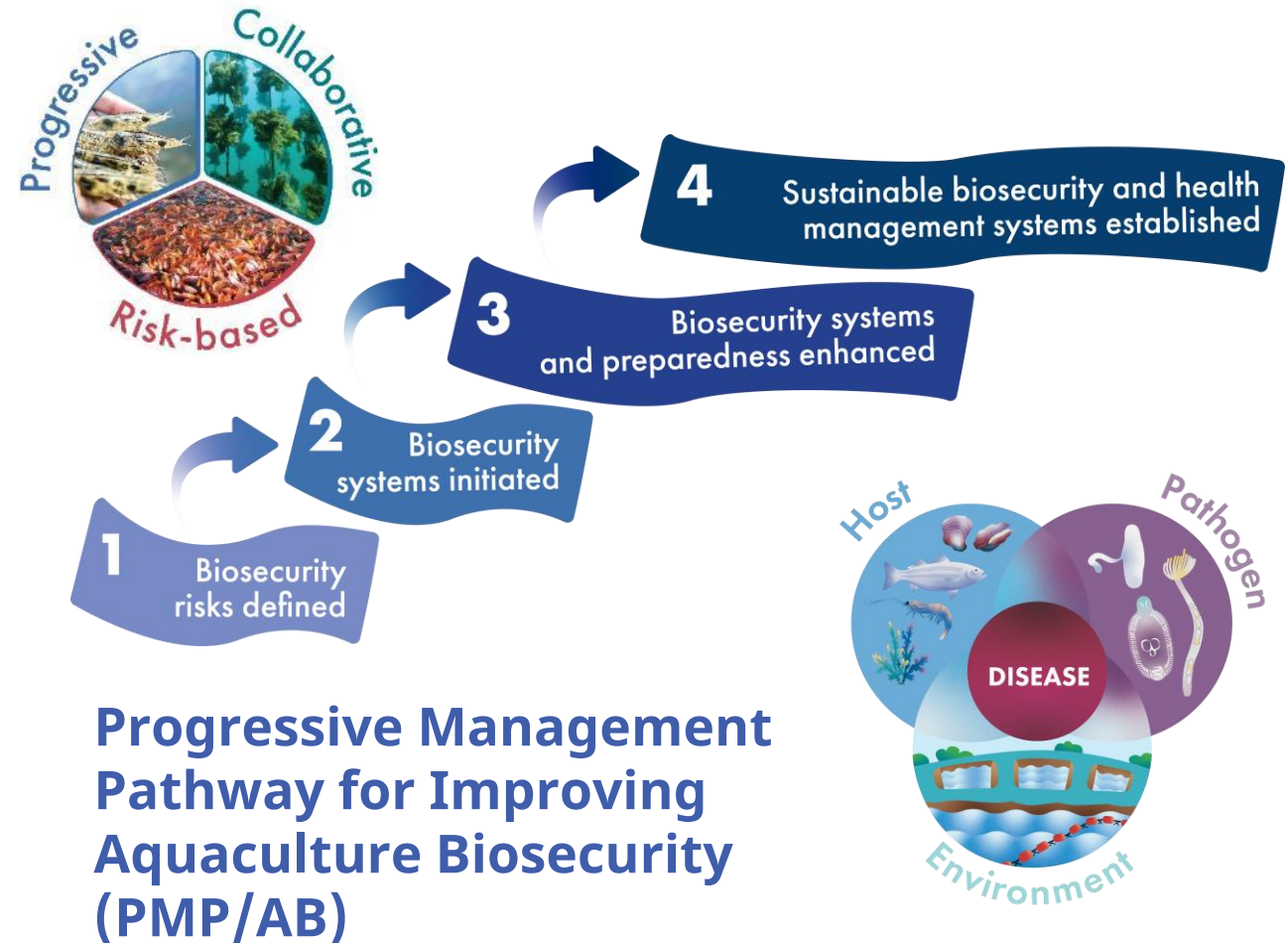


MISSISSIPPI STATE
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Insights on Adaptive Management of Bacterial Diseases in Aquaculture

Prevention	Control
BAP/GAP/BMP	Antibiotics
Enhancing gut immunity/influencing intestinal microbiome	Alternative to antibiotics: bacteriophages, quorum quenching, bacteriocins, chicken egg yolk immunoglobulin and medicinal plants.
Optimising immune status (vaccination)	
Use of SPF/SPT seeds, use of clean seeds	





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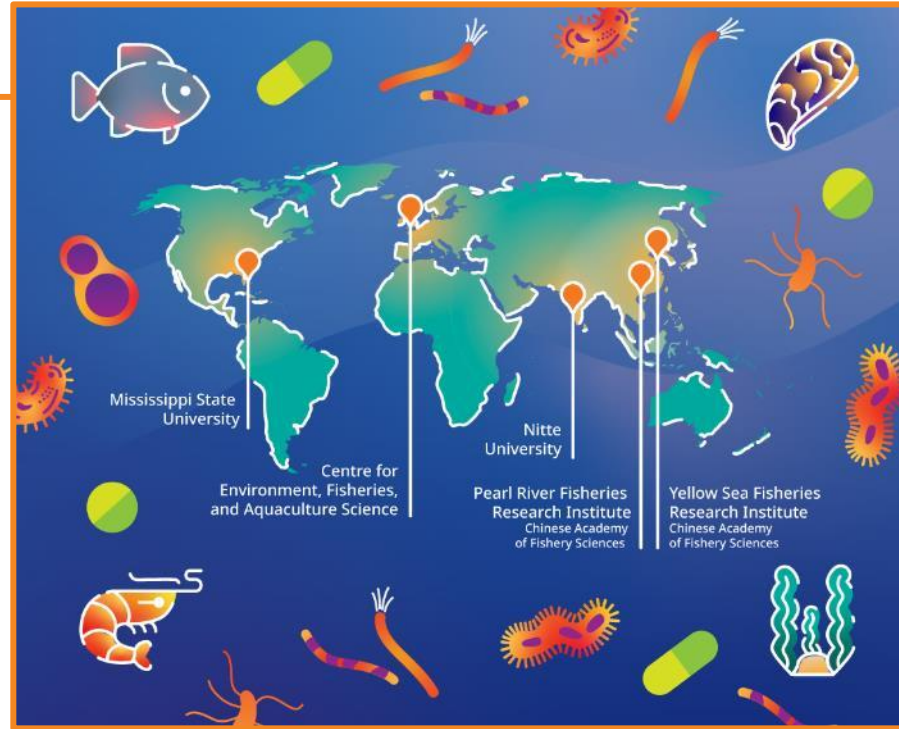
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Highlights of FAO's efforts in combatting AMR and improving aquaculture biosecurity

Launch of the FAO Reference Centers for AMR and Aquaculture Biosecurity

26 June 2023

Rome, Italy



REDUCE THE NEED FOR ANTIMICROBIALS ON FARMS FOR SUSTAINABLE AGRIFOOD SYSTEMS TRANSFORMATION INITIATIVE (RENOFARM)



LAUNCH IN CHONGQING, CHINA, APRIL 2024



TARGETS

- **100 countries participate** in the initiative, with their NAPs for AMR fully implemented in Food and Agriculture.
- **50% of animal/plant health workers** from participating countries are trained.
- **80% of all participating countries** contributing data to InFARM.

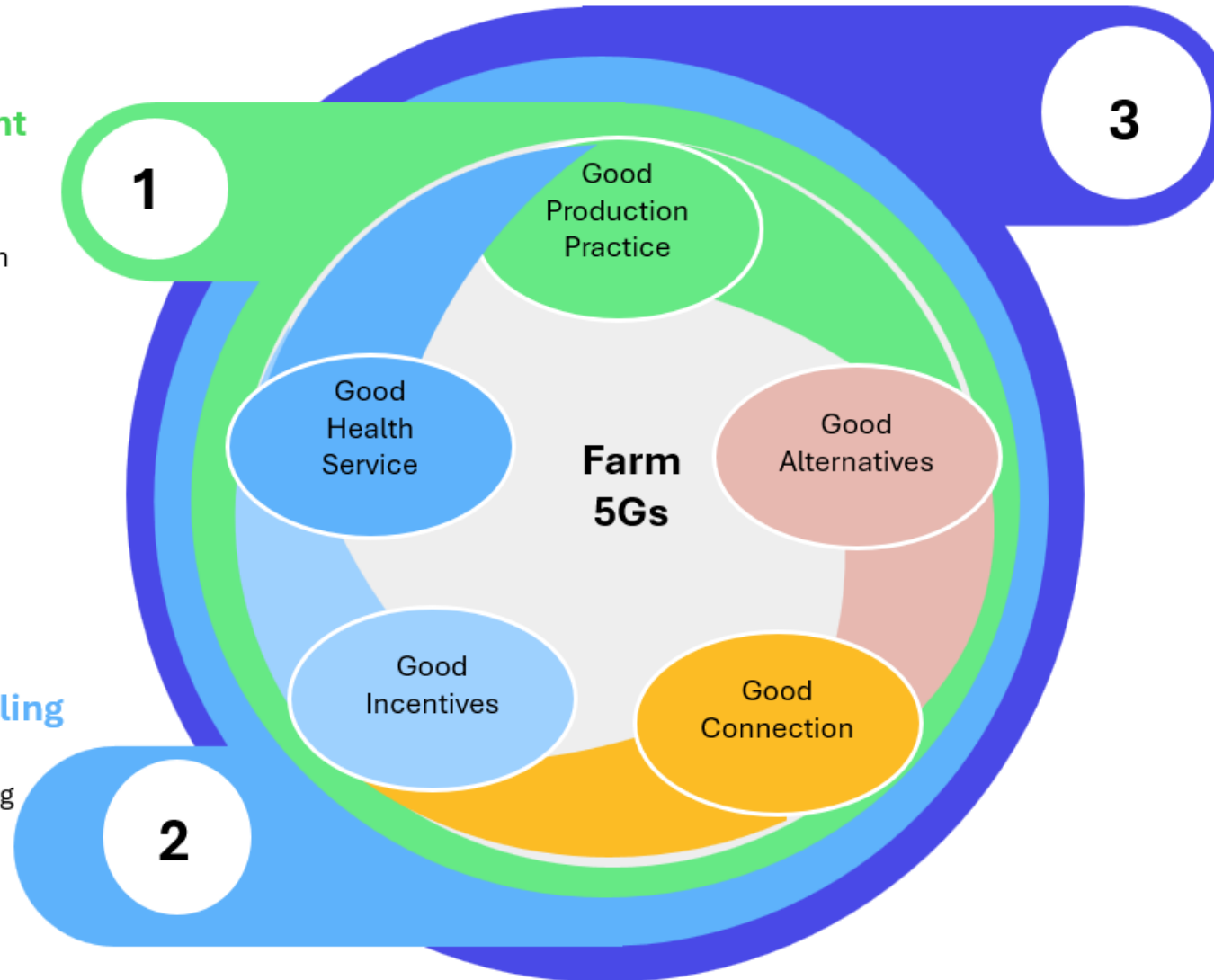
RENOFARM WORKSTREAMS

Agri-environment

- Value chain
- HAE interface
- AMR transmission pathway

National enabling actions

- Policy and planning
- Capacity development
- Agri-food system transformation



International enabling actions

- International standard & framework
- Governance and investment
- Knowledge sharing

RENOFARM Will offer

01 Twinning programs between members

05 Knowledge Sharing Platforms (VLC, One Health Knowledge Nexus, Repository, CoP)

02 Mainstream RENOFORM with FAO flagship initiatives (HandinHand OCOP, PPA)

06 RENOFORM toolbox

03 Training and capacity building programs

07 Advisory services and technical support to members

04 Technical support from FAO Reference centers

08 Opportunity for Joint programs and projects

Benefits from RENOFARM

01

Member-focused support on 5Gs farm, 3 supporting workstreams, or 5 accelerators

04

Knowledge and experience sharing in a network of institutions and individuals

02

Tailored roadmap on reduction of the need for antimicrobials on farms

05

Enhanced impact of AMR work in agrifood systems

03

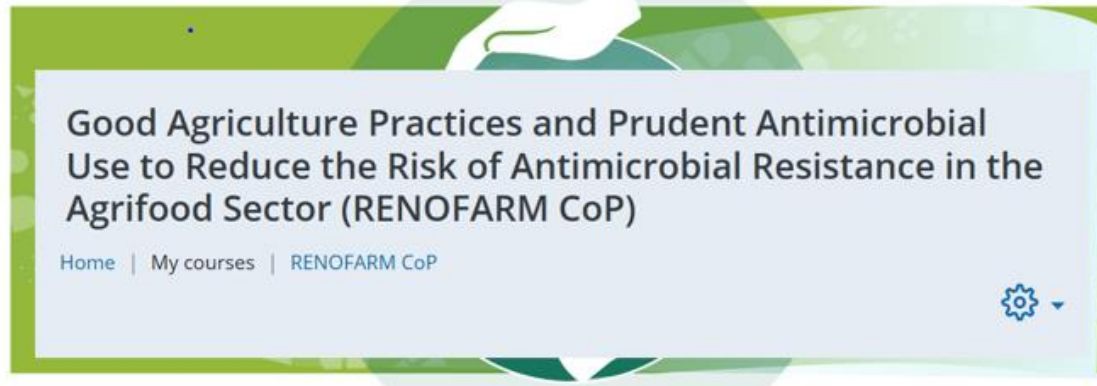
Cost-effective and sustainable way addressing AMR in agrifood systems

06

Collaborative resource mobilization and transformational influence in AMR work in agrifood systems

Better farms, Safer products, Happier farmers

JOIN US NOW!





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SUSTAINABLE
DEVELOPMENT
GOALS



FAO Progressive Management Pathway for Antimicrobial Resistance (FAO-PMP-AMR)

Working for  #ZeroHunger



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SUSTAINABLE
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GOALS

What should be the end goal of the Food and Agricultural components of the National Action Plans?

**Prudent use of
antimicrobials in the
agricultural sectors**

**Full monitoring,
prevention and control
of AMR in food and
agriculture sectors**

FAO Progressive Management Pathway for AMR (FAO-PMP-AMR)



Structure



AWARENESS & ENGAGEMENT

AWARENESS RAISING

- Conducting Awareness Assessment
- Implementing Awareness Raising Campaigns
- Publishing Annual Reports on AMR & AMU

TRAINING & EDUCATION

- Training Courses for Food & Agriculture Producers
- Training Courses for Health Professionals
- Include AMR & AMU in Education Programs



SURVEILLANCE & RESEARCH

ANTIMICROBIAL USE MONITORING

- Distribution of Antimicrobials
- AMU data collection
- AMU reporting to WOH
- End-user monitoring

ANTIMICROBIAL RESISTANCE SURVEILLANCE

- Laboratory Capacity
- AMR Surveillance
- AMR Reporting Unit
- AMR Reporting Quality
- AMR Reporting to InFARM
- Extended Surveillance on Animal Health
- Environmental spill-over of Antimicrobials
- Extended Surveillance on Plant Health



GOOD PRACTICES

GOOD PRACTICES

- Guidance to prevent and reduce spread of infections & pests
- Implementation of good practices
- Coaching on good practices



RESPONSIBLE USE

REDUCE ANTIMICROBIAL CONTAMINATION

- Antimicrobial stewardship
- Antimicrobial residues in food
- Antimicrobial residues in feed
- Environmental pollution of antimicrobials
- Farm waste management associated to AMU

IMPLEMENT RESPONSIBLE USE

- AMU regulation
- Prescription control of antimicrobials
- Manufacturing and quality control of antimicrobials
- Distribution and commercialization of antimicrobials
- AMU benchmarking



GOVERNANCE & RESOURCES

MULTISECTOR COORDINATION GROUP

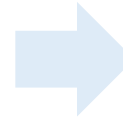
- MCG Establishment
- MCG Operations

NATIONAL ACTION PLAN

- Strategic Plan
- Operational Plan

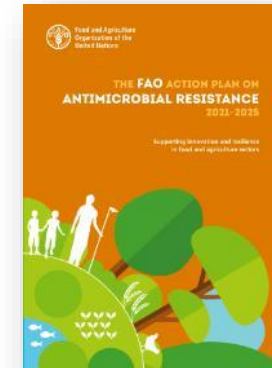
SUSTAINABILITY

- Regulatory Framework
- Financial Sustainability
- AMR & AMU Research



Fully aligned with

- FAO action plan 2021-2025
- Global action plan 2015



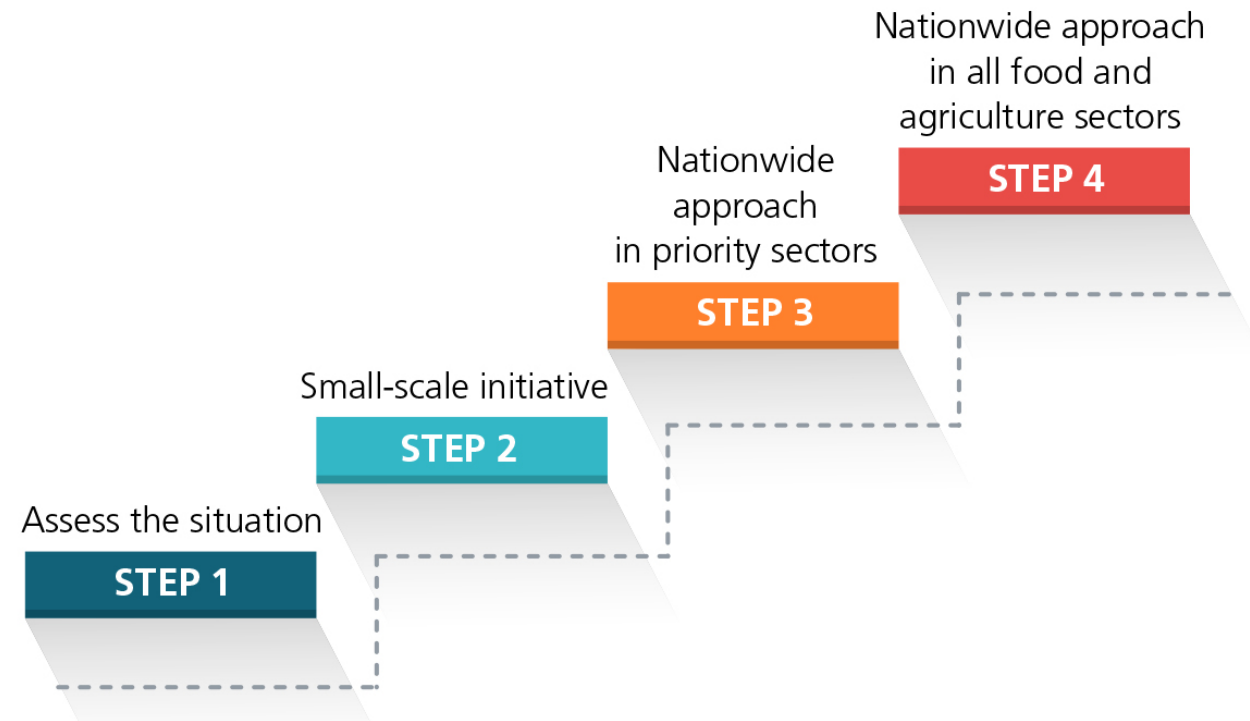
- **38 TOPICS COVERED UNDER FIVE FOCUS AREAS**
- **AGRIFOOD ENVIRONMENT, AQUACULTURE, PLANT/CROP PRODUCTION, LEGISLATION INCLUDED**

FAO Progressive Management Pathway for AMR (FAO-PMP-AMR)



Each topic has **4 STEPS** to allow:

- a stepwise approach to reach each specific goal
- gradual progress/improvement facilitated
 - from small initiative to nationwide activities
 - from key sectors to One Health sectors involved
- includes international guidance and tools to help countries with achieving those activities
- Fully complementary with FAO and international tools (GLASS, TrACSS, JEE, FAO-ATLASS, WOAHPVS, etc.)

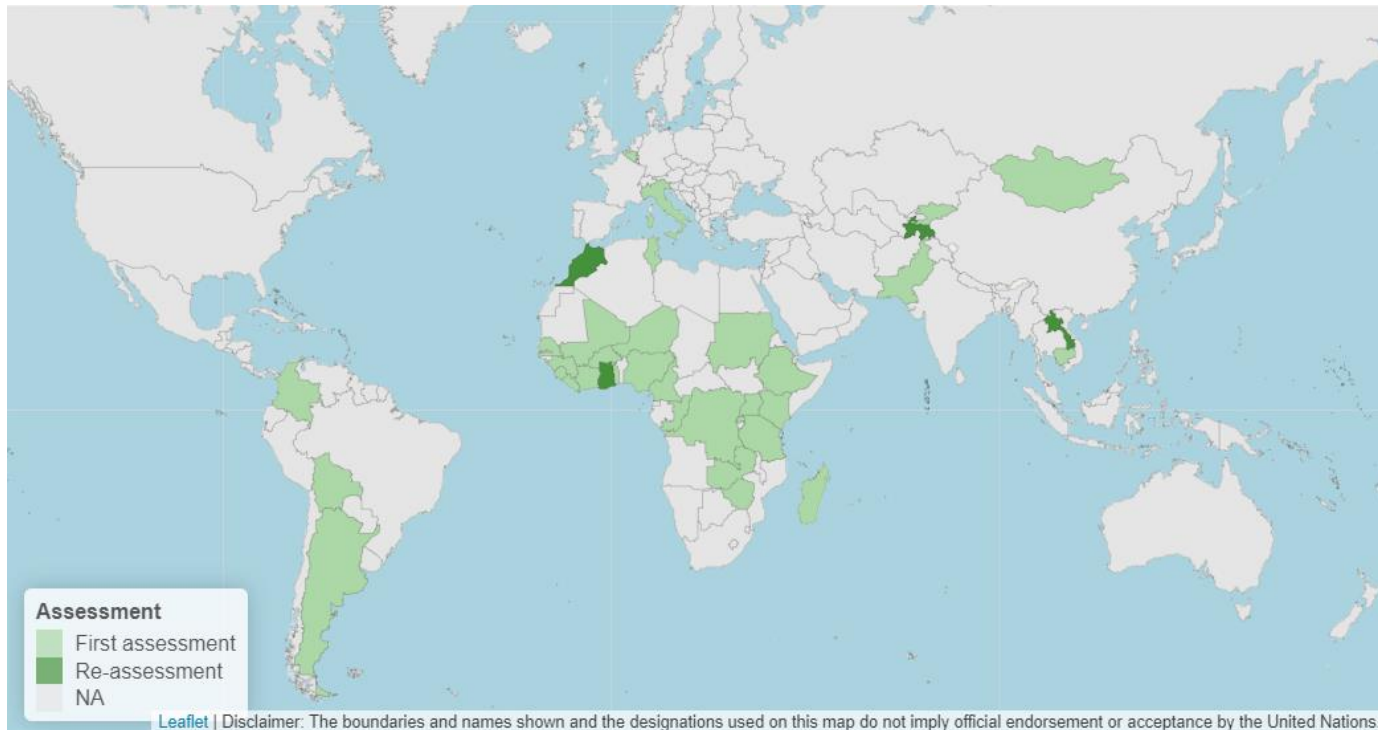


FAO Progressive Management Pathway for AMR (FAO-PMP-AMR)



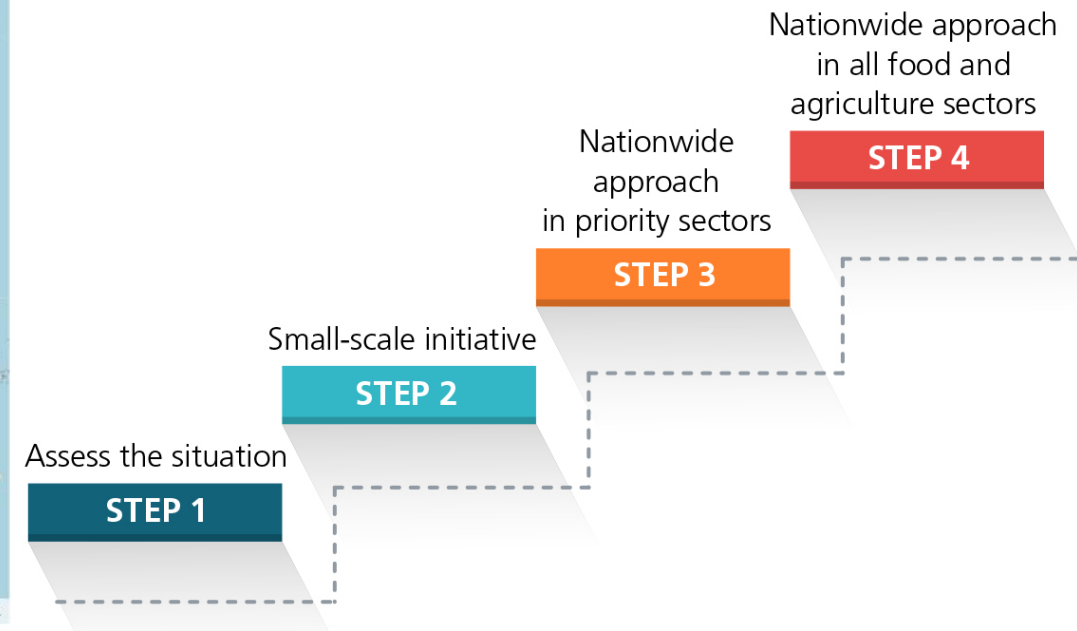
Global progress

- ✓ 43 assessments carried out
- ✓ 39 countries supported to assess their NAPs/strategy on AMR
- ✓ 62 facilitators were trained across regions
- ✓ 4 countries reassessed the progress



Further development and update in 2024

- Tool version 3.0 ready for use shortly
 - ✓ 5 focus areas
 - ✓ Strengthened agrifood environment and plant health components
- FAO-PMP-AMR user's manual
- FAO-PMP-AMR e-learning





REVIEWS IN Aquaculture



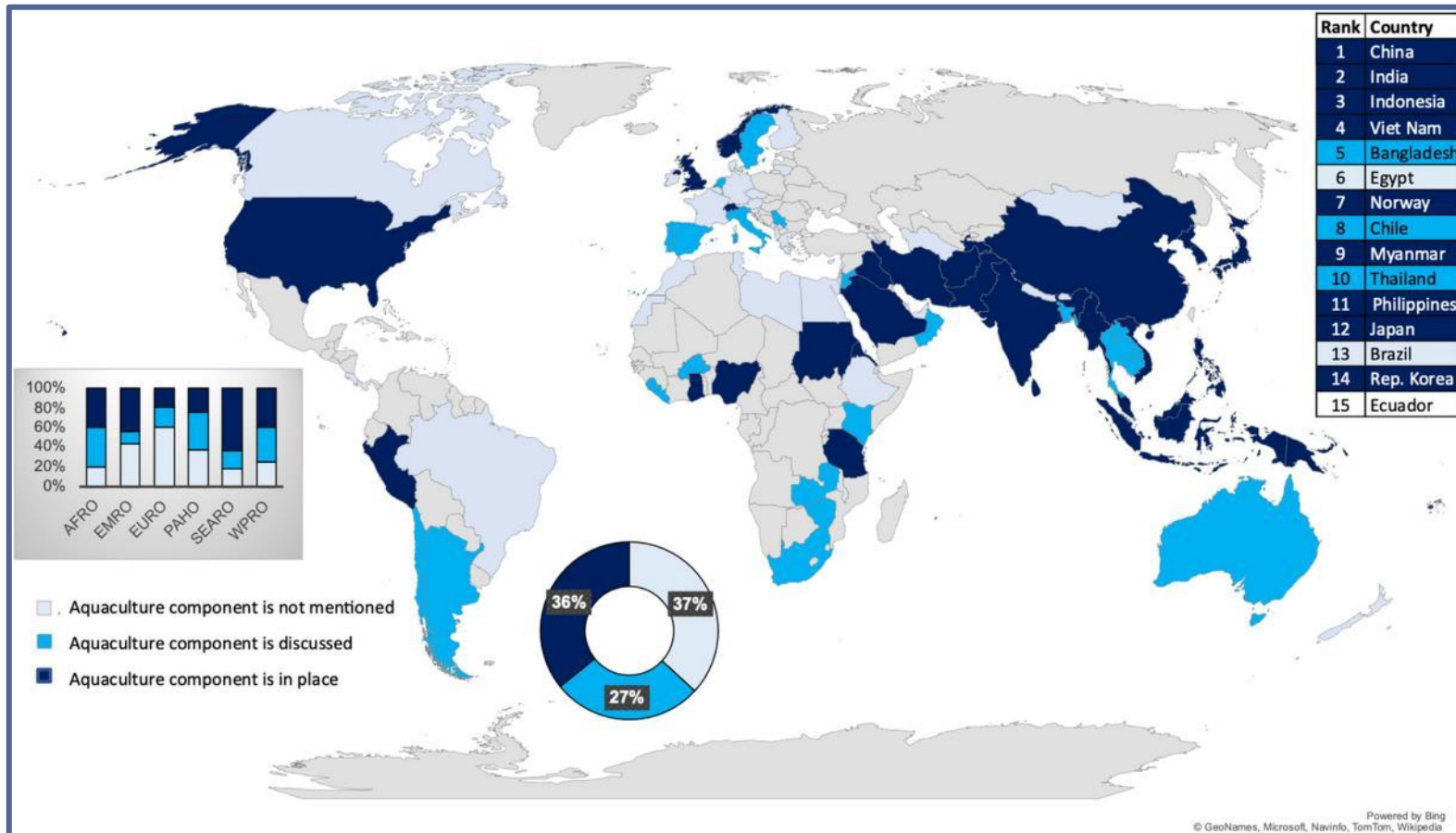
REVIEW | [Open Access](#) |

Antimicrobial resistance in aquaculture: A global analysis of literature and national action plans

Andrea Caputo, Melba G. Bondad-Reantaso ✉, Iddya Karunasagar, Bin Hao, Patricia Gaunt, David Verner-Jeffreys, Sophie Fridman, Alejandro Dorado-Garcia

Review of 95 National Action Plans on AMR and the 15 top aquaculture-producing aquaculture countries.

Almost 40% do not acknowledge aquaculture as a critical component where AMR should be further investigated and contained along the entire supply chain.

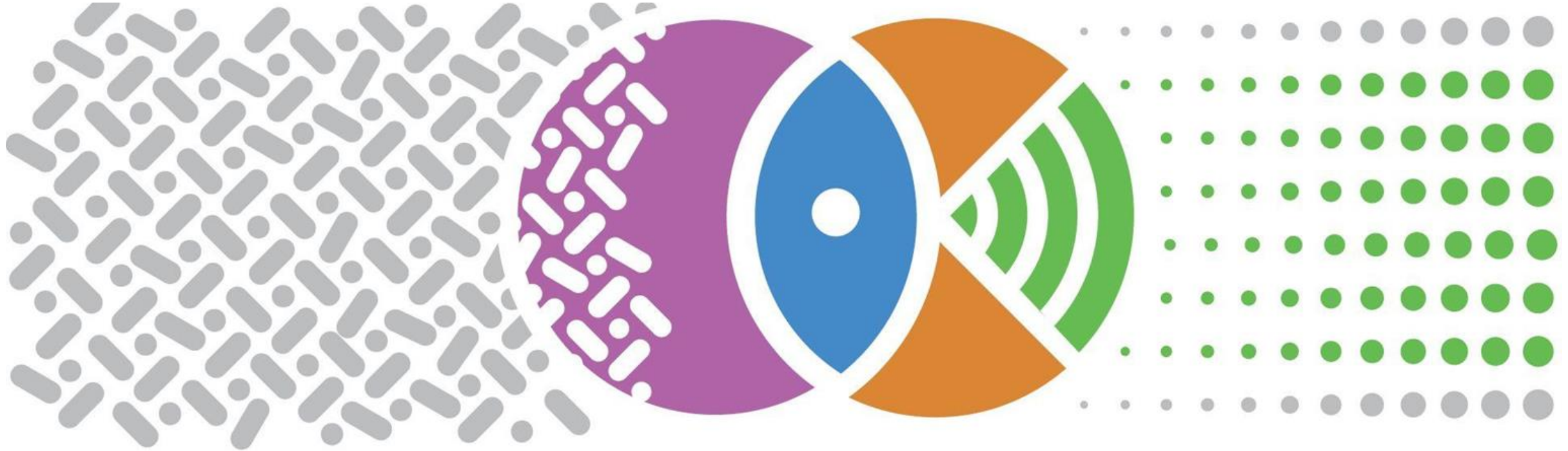


<https://onlinelibrary.wiley.com/doi/10.1111/raq.12741>



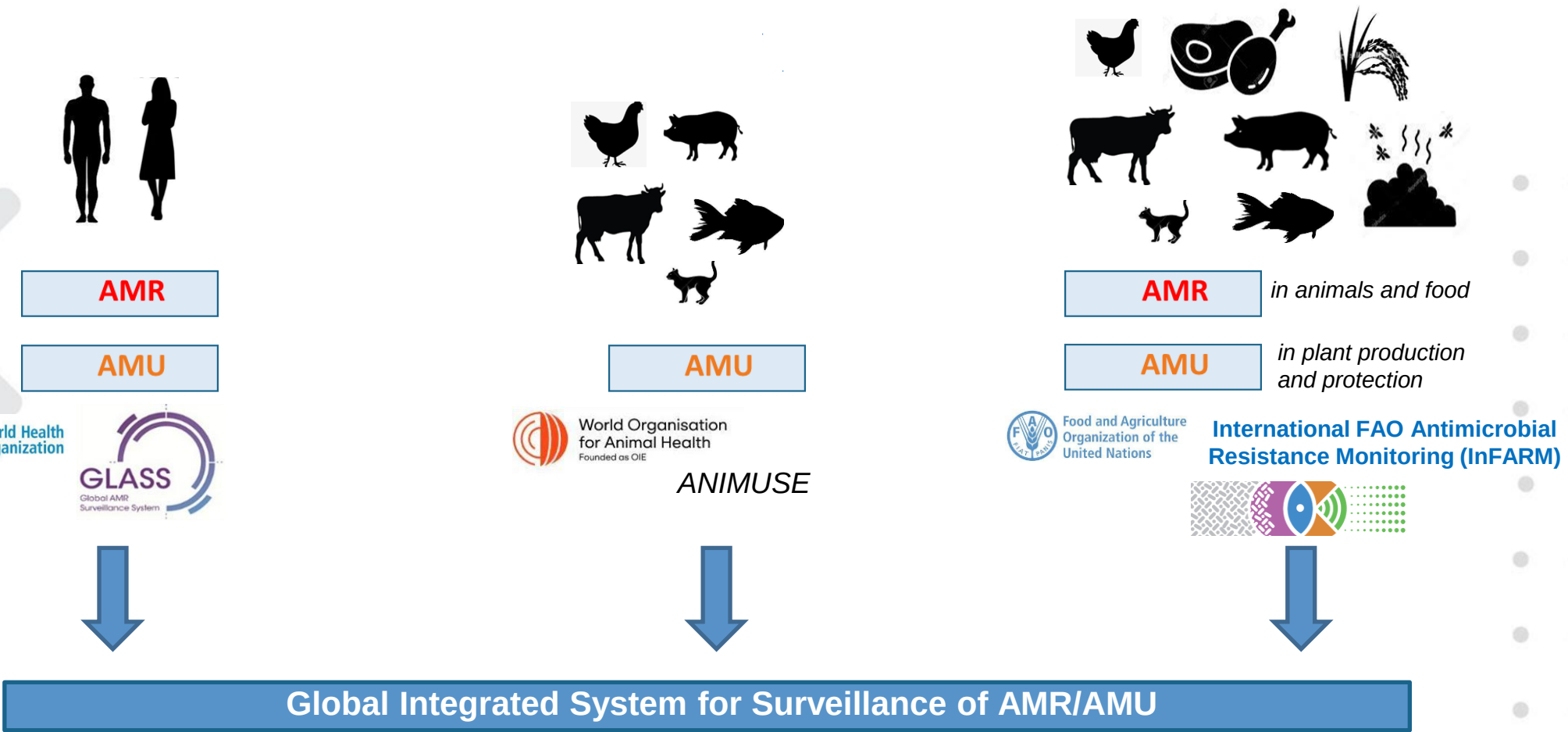
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International FAO
Antimicrobial Resistance
Monitoring (InFARM) System



InFARM system and IT Platform

Quadripartite Global Surveillance Architecture



What is InFARM?



InFARM is a **global information system** consisting of an IT platform and related FAO activities that assist countries in collecting, collating, analysing, visualizing, and effectively utilizing their AMR monitoring and surveillance data primarily from livestock, fisheries, and aquaculture, along with their associated food products

The InFARM system is initially designed to host and present **AMR data** generated through phenotypic antimicrobial susceptibility testing (AST) from:

- **priority bacterial species of public health significance**, including zoonotic and foodborne pathogens and commensal indicator bacteria from animals and food sources; and
- **bacterial pathogens causing impacts in animal health and productivity.**

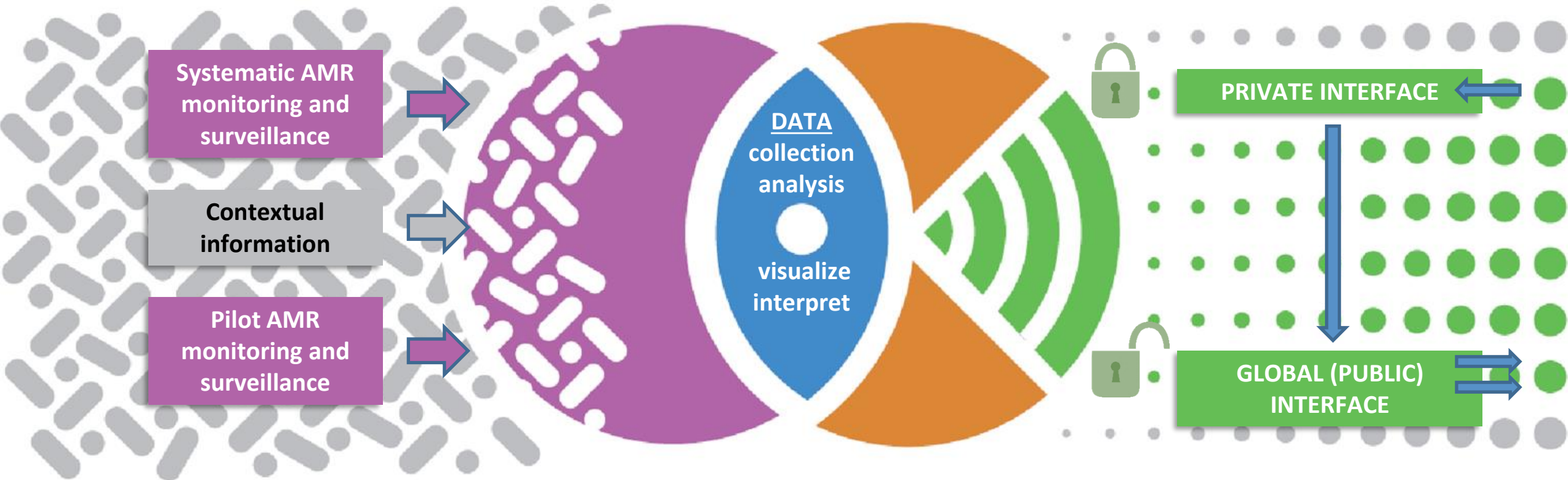
The implementation of InFARM adheres to **international standards**:

- FAO and WHO. 2023. *Foodborne antimicrobial resistance – Compendium of Codex standards. First revision*. Codex Alimentarius Commission. Rome.
<https://www.fao.org/documents/card/en/c/cb8554en>
- WOA. 2024. Codes and Manuals. In: *WOA*. Paris. [Cited 29 February 2024].
<https://www.woa.org/en/what-we-do/standards/codes-and-manuals/>



The InFARM design

The International FAO Antimicrobial Resistance Monitoring (InFARM) System



InFARM Framework

Tailor AMR monitoring and surveillance to national priorities, allowing for continuous improvement and expansion as resources allow.

InFARM Monitoring and Surveillance Programmes

Animal Health Purposes

Diseased terrestrial animals

Diseased aquatic animals

Identify and monitor AMR profiles and trends in bacterial pathogens

Public Health purposes

Healthy terrestrial animal
(potentially expanded to cover their production environment)

Healthy aquatic animals
(potentially expanded to cover their production environment)

Food at processing and/or point of sale

Identify and monitor the zoonotic and foodborne transmission

Purpose and target population

Sample source and microorganisms

Scale of activities and representativeness

Monitoring and Surveillance periods and reporting cycles



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DEVELOPMENT
GOALS



FAO Assessment Tool for Laboratories and AMR Surveillance Systems (FAO-ATLASS)

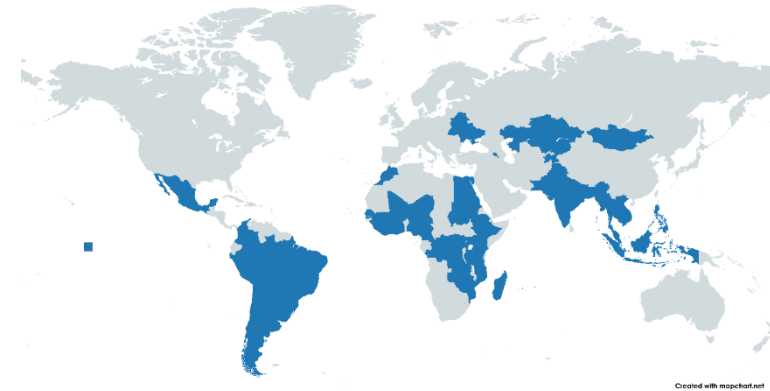
Working for  #ZeroHunger



FAO-ATLASS general scope

1. Map national AMR surveillance systems in the food and agriculture

- ✓ Organization of AMR surveillance
- ✓ Laboratory networks and analytical capacities and capabilities
- ✓ Linkage with AMR surveillance in other sectors under One Health approach

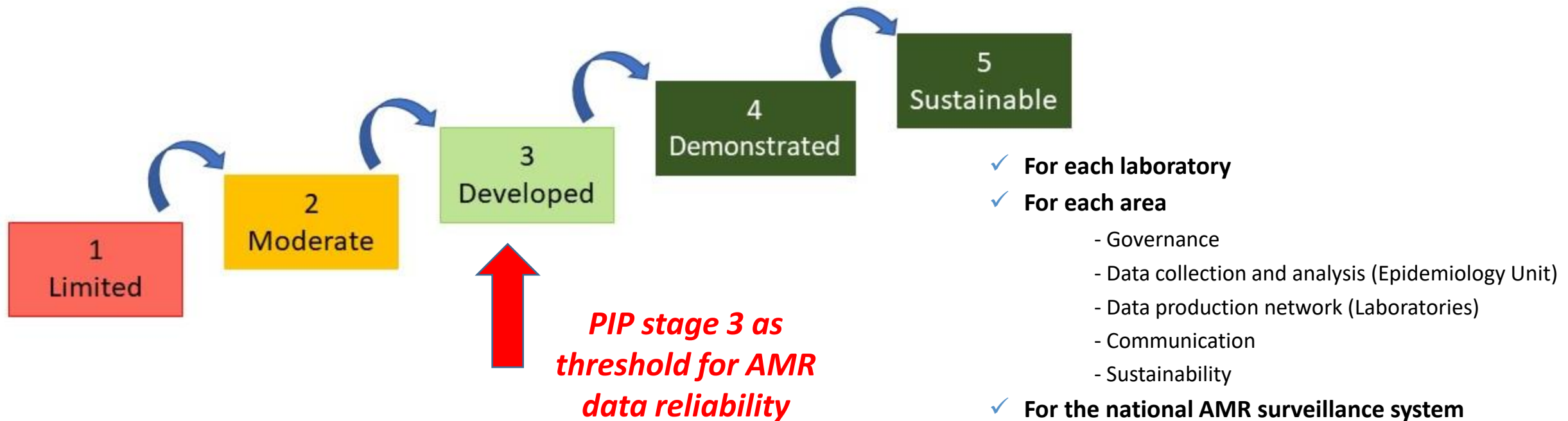


2. Assess systematically the AMR surveillance systems under the food and agriculture sectors to

- ✓ **Monitor AMR surveillance capacities** at national, regional, and global level **over time**
- ✓ Provide **evidence base for action** and **advocacy** for strengthening AMR surveillance



Outputs of FAO-ATLASS : Quantified information



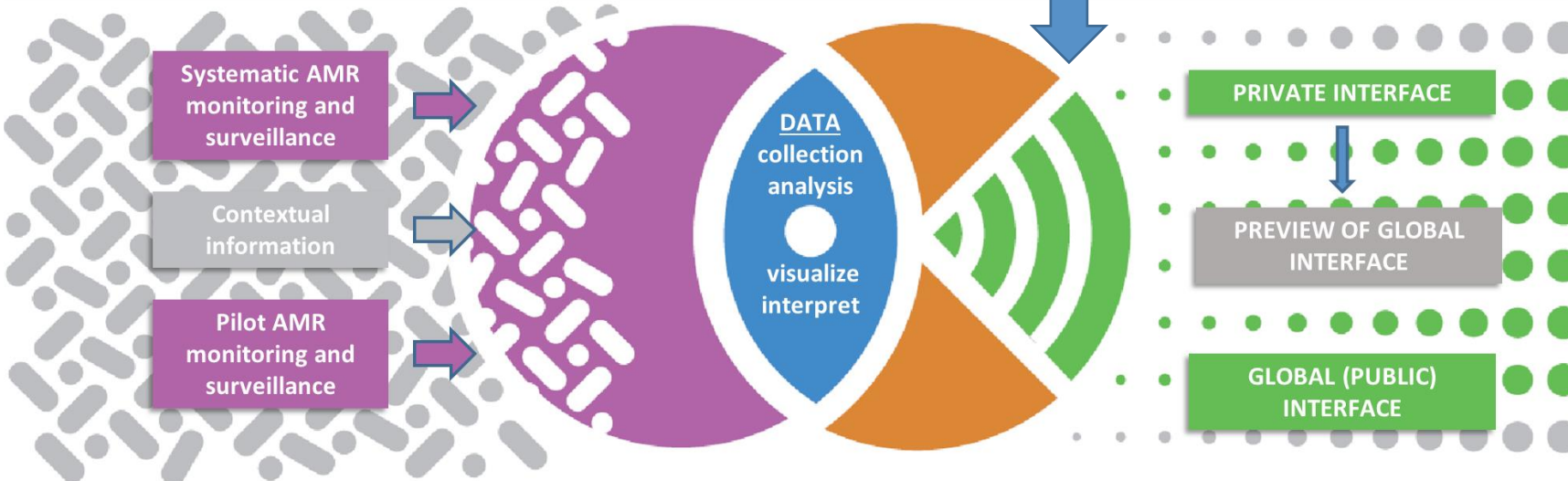
The recommendations allow countries to identify steps for improvement, prioritize actions and monitor progress over time.

The International FAO Antimicrobial Resistance Monitoring (InFARM) data platform

FAO-ATLASS



- PIP stages
- FAO-ATLASS database
- Automatic reports/visualizations





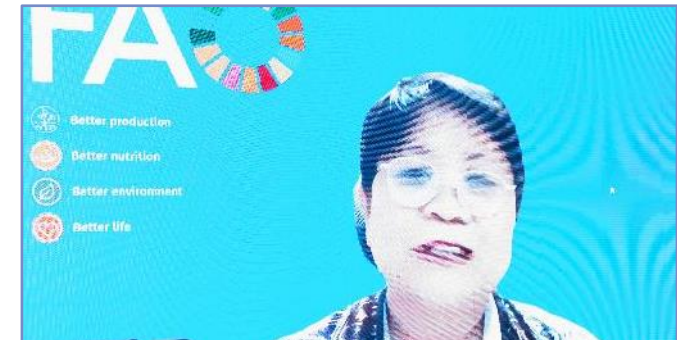
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Understanding AMR in Aquaculture

16–18 May 2024 | Qingdao, China





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Fish-Vet+ Dialogue II: One Health and Biosecurity

18–19 June 2024 | FAO Headquarters, Rome

©FAO/Riccardo De Luca



Regional Compass: FAO RAP Strategy for AMR in the Asia-Pacific Region



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Funded by
UK Government



Ministry of Food and
Drug Safety
Republic of Korea



Funded by
the European Union



USAID
FROM THE AMERICAN PEOPLE

1

Understand the organizational, technical, political, and socio-cultural **context**



2

Develop and/or apply tools and frameworks to **address identified gaps**



3

Provide **training and support** to build needed capacities in food and agriculture



4

Facilitate **coordination and partnerships** that can reinforce effective AMR mitigation in food and agriculture



5

Enable **sustained** implementation

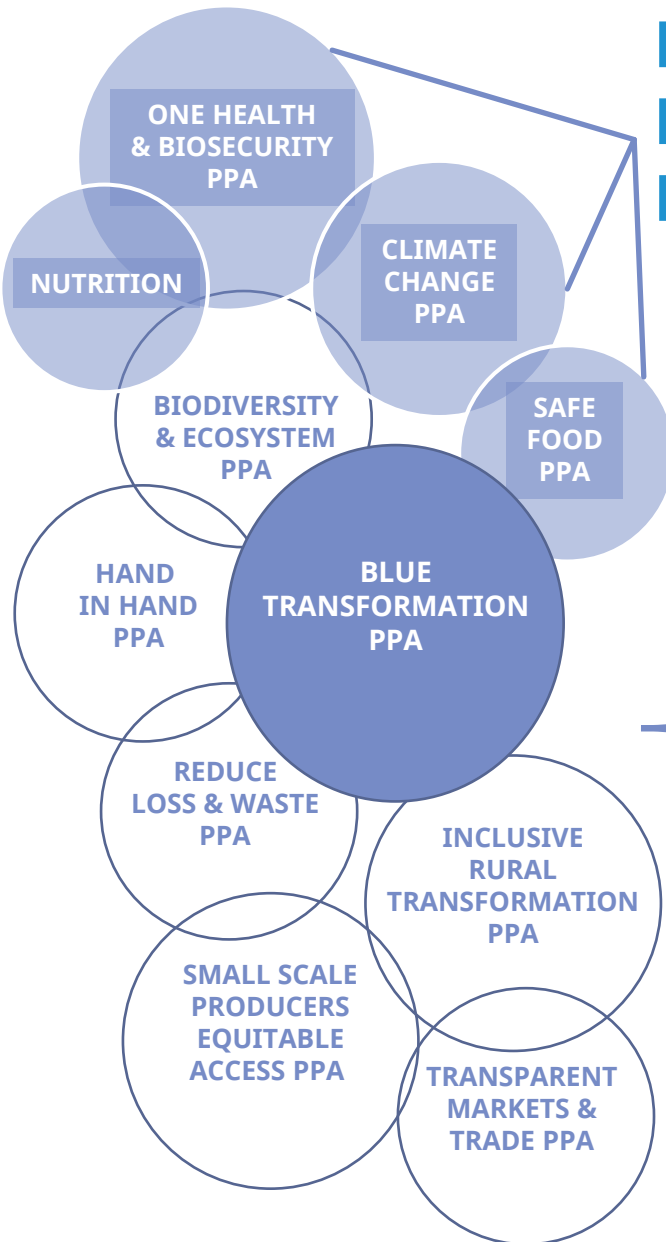


Highlights from FAO Regional Office for Asia and the Pacific

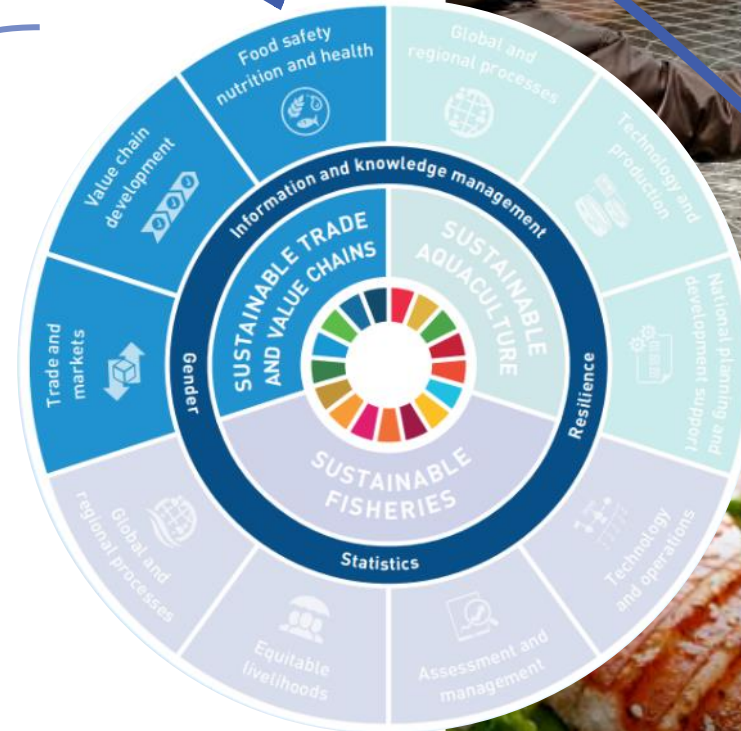


SOPs Design ISO Sampling Calibration Training
Analytics
PT Integration
Genomics Biosafety
Epidemiology

FOOD SAFETY NUTRITION & HEALTH



Priority Programme Areas



- Embedded in FAO SF
- SF linked to budget allocations
- SF reporting and monitoring
- SF PPAs Specific goals and outcomes



Thank you

Muhammad Usman Zaheer

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World Organisation
for Animal Health



Co-funded by
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The
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