Food and Agriculture Organization of the United Nations

Congress of FAO Reference Centres for Antimicrobial Resistance: meeting report

Hybrid meeting

15–16 March 2023

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Acknowledgements

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Acronyms and abbreviations

AMR	antimicrobial resistance
AMU	antimicrobial use
ANSES	Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail
APHA	Animal and Plant Health Agency (United Kingdom)
Cefas	Centre of Environment, Fisheries and Aquaculture Science (United Kingdom)
CU Vet	College of Veterinary Medicine, Chulalongkorn University
DTU	Denmark Technical University
FAO	Food and Agriculture Organization of the United Nations
FBIS	Federal Budget Institute of Science
FFS	Farmer Field School
InFARM	International FAO Antimicrobial Resistance Monitoring system
IPD	Institut Pasteur Dakar
IT	information technology
MIA	medically important antimicrobial
MSPP	Multi-Stakeholder Partnership Platform
OSU	Ohio State University
PMP	Progressive Management Pathway
ReACT	Action on Antibiotic Resistance
RENOFARM	Reduce the Need for Antimicrobials on Farms for Sustainable Agrifood Systems Transformation initiative
SENASICA	Servicio Nacional de Sanidad, Inocuidad y Calidad Agroalimentaria
VMD	Veterinary Medicine Directorate (United Kingdom)
WAAW	World Antimicrobial Resistance Awareness Week

Executive summary

The Food and Agriculture Organization of the United Nations (FAO) has established a solid network of FAO Reference Centres for Antimicrobial Resistance (AMR) to support its efforts in turning the tide on AMR by implementing the FAO Action Plan on AMR 2021–2025 following a One Health approach. Building on previous virtual annual meetings, together with FAO, the FAO Reference Centre for AMR in the United Kingdom of Great Britain and Northern Ireland offered to host the first in-person congress for colleagues from all Reference Centres for AMR in 2023, to strengthen and share expertise and agree areas of collaboration for 2023 and 2024.

The congress aimed to bring together representatives from all FAO AMR Reference Centres to:

- fortify the network of mutually supportive AMR Reference Centres;
- discuss emerging issues related to AMR in food and agriculture and identify opportunities for partnerships and joint action;
- map the activities of the Reference Centre network to align with the FAO Action Plan on AMR;
- identify activities to raise awareness of the technical expertise offered by the AMR Reference Centre network;
- discuss the contributions of the AMR Reference Centre network and collaboration with FAO on flagship AMR programmes/priorities, focusing on laboratory and surveillance aspects; and
- exchange information on and discuss emerging AMR issues in agrifood systems.

The main agenda for discussion was:

- The FAO Action Plan and a key initiative update: FAO presented key updates on implementation of the FAO Action Plan, as well as global initiatives led by FAO and the Quadripartite collaboration.
- Reference Centre update: FAO updated participants on the AMR Reference Centres, including the designation of a new FAO Reference Centre for AMR in the Russian Federation and the redesignation of four other Centres in 2023. The group discussed network coordination.
- AMR laboratory community of practice: FAO, together with representatives from the UK Animal and Plant Health Agency (APHA), updated and shared insights into the vision and workplan to establish the FAO AMR laboratory community of practice and sought inputs from the Reference Centres on its development and operationalization. FAO envisages the community of practice providing a forum in which members – people who share a passion for and commitment to generating high-quality AMR data to guide treatments for surveillance purposes, to improve research outputs and to create innovative solutions for AMR laboratory diagnostics – can interact regularly, share information and experiences, engage in peer-to-peer learning and have an opportunity to develop personally and professionally.
- Surveillance, laboratory and research: FAO presented an array of its past, current and future activities at country level to build capacity to generate, collect, analyse and use high-quality data on AMR, antimicrobial use (AMU) and antimicrobial residues in agrifood sectors. These include, but are not limited to:
    - training and the provision of guidelines and protocols;
    - reagents and equipment;
    - laboratory information management systems and data management software;
    - the FAO Assessment Tool for Laboratories and AMR Surveillance Systems (FAO-ATLASS); and
    - technical advisory networks/groups.

FAO requested support for further collaboration on and delivery of joint initiatives, including:

- The Reduce the Need for Antimicrobials on Farms for Sustainable Agrifood System Transformation (RENOFARM) initiative: The RENOFARM initiative and workplan were introduced to support the targets of the 2022 Muscat Ministerial Manifesto on AMR and the sustainable transformation of agrifood systems. Support was requested for a pilot of the RENOFARM initiative in Ghana, Indonesia and Nigeria, in line with existing activities being undertaken by the UK and Danish Reference Centres in Nigeria. These activities were supported by the Fleming Fund and presented an opportunity for further collaboration and broader alignment with the RENOFARM initiative. In addition, FAO presented its work on good feeding practices (alternatives to the use of medically important antimicrobials [MIAs] as growth promoters) and called on the Reference Centre network to help promote this information. The Reference Centres were invited to engage in the consultation (at an expert meeting on 23 July 2023) to discuss alternative feed, feed ingredients, additives and practices to reduce the use and need for antimicrobials and to phase out or ban the use of MIAs as growth promoters. The Reference Centre for AMR in Mexico expressed its interest in investing in this topic and committed to further bilateral discussions.
- Good practice and responsible use of antimicrobials: FAO presented its global and regional activities to implement pillars 3 and 4 of the FAO Action Plan on AMR. Three main areas were discussed and highlighted for follow-up: i) the harmonization of training activities between FAO and Reference Centres; ii) treatment guidelines tailored to the country situation and priority pathogen list; and iii) training and coaching programmes to plug gaps in the implementation of guidelines on treatment and good practices. The need to map and align training and support with country-specific needs was identified as a priority, and a commitment was made to discuss the topic on future bimonthly calls, to which regional FAO AMR focal points were invited.
- The AMR Multi-Stakeholder Partnership Platform (MSPP): The action groups and workplan of the MSPP were presented for feedback on structure and potential areas of interest. Questions on membership of and participation in action groups were resolved, providing more information on structure and eligibility.
- The International FAO Antimicrobial Resistance Monitoring (InFARM) system: FAO presented the InFARM initiative, its key specifications and workplan. A global rollout and call for data were planned for 2023 (postponed until April 2024), and it was suggested that FAO Reference Centres could act as a bridge between FAO and government/national labs on piloting and data sharing. The discussion addressed concerns around particular specifications and areas of data protection. The Reference Centre for AMR in France is already part of the pilot phase to develop the platform by sharing data and providing feedback.
- Governance: FAO presented its work on AMR legislation, including FAO AMR Lex,[1] the Quadripartite One Health legislative assessment, and FAO methodology to analyse AMR-relevant legislation in agrifood systems to support national AMR governance and surveillance.
- Awareness and communicating impact: FAO presented its communication and stakeholder engagement activities, including behavioural change insights, communication products developed with Action on Antibiotic Resistance (ReAct) (a three-zone biosecurity protocol in Indonesia), and World Antimicrobial Awareness Week (WAAW). A brainstorming session on awareness raising and behavioural change highlighted the potential use of gamification of AMR for education, pre-service education, university curricula on AMR and use of social media as opportunities to raise awareness.

At the end of the congress, there was a session to consolidate the workplan using the World Café Method. The six stations were identified, in line with FAO's Action Plan pillars, and additional topic of network coordination. Table X in the Conclusion summarizes the consolidated workplan.

The outcomes of the congress reflect a collaborative commitment to addressing AMR challenges, aligning actions with the FAO Action Plan and fostering ongoing cooperation across the Reference Centre network using a sustainable, One Health approach. Future endeavours will focus on implementing agreed activities, facilitating effective communication and advancing global efforts to combat AMR.

Introduction

FAO established its network of Reference Centres to support its efforts to turn the tide on AMR by enhancing its scientific approach and the implementation of the FAO Action Plan on AMR 2021–2025 using a One Health approach.[2] To date, there are nine designated FAO Reference Centres for AMR, located in Denmark, France, Germany, Mexico, the Russian Federation, Senegal, Thailand, the United Kingdom of Great Britain an Northern Ireland and the United States of America.

Building on the network's annual virtual meetings, FAO and the UK Reference Centre for AMR hosted the inaugural in-person congress welcoming colleagues from all the Reference Centres of the FAO AMR Reference Centre network to strengthen relationships, share expertise and agree areas of collaboration for 2023.[3]

The congress was opened by Keith Sumption (FAO Chief Veterinary Officer/Chief, Joint Zoonotic Diseases and AMR Centre) and Ian Brown (APHA Science Director). Both welcomed the opportunity for international collaboration through the network of Reference Centres for AMR and highlighted the potential for impact.

The congress aimed to achieve the following objectives:

- discuss emerging issues with regard to AMR in the food and agriculture sectors and identify opportunities for partnership and joint action;
- map Reference Centre activities to the FAO Action Plan on AMR;
- identify ways of raising awareness of the Reference Centre network's offer of technical support to country partners and stakeholders; and
- discuss the contribution of the Reference Centre network to FAO's activities and opportunities for further collaboration, focusing on laboratory and surveillance aspects, including:
    - InFARM
    - the Multi-stakeholder Partnership Platform
    - the AMR laboratory community of practice
    - the RENOFARM initiative

FAO and antimicrobial resistance – an introduction

Junxia Song (FAO, AMR focal point) from FAO headquarters presented a comprehensive overview of the current situation on AMR in agrifood systems within the One Health framework, highlighting FAO's pivotal activities to support its members in tackling AMR.

FAO's commitment to addressing AMR is deeply embedded in its Strategic Framework (2022–2031),[4] outlining five key priorities in the One Health Priority Programme Area:

1. Improve early warning systems for animal and plant pests and diseases.
2. Enhance biosecurity measures for pest and disease management.
3. Strengthen emergency preparedness and response capabilities.
4. Intensify AMR risk management efforts.
5. Foster One Health systems that integrate environmental considerations.

Currently, FAO's AMR initiatives encompass a range of projects, including collaborations with the UK Fleming Fund, the United States Agency for International Development, the European Union Antimicrobial Resistance Tripartite, the Australian Agrifood Systems and One Health Programme Fund,

the Multi-Partner Trust Fund for AMR, the Russian Federation, the Republic of Korea and the European Commission.

The country-level support provided by FAO is exemplified by its Progressive Management Pathway for AMR (PMP-AMR) approach, which has supported more than 30 countries in developing and implementing National Action Plans on AMR in agrifood sector. A global team of 62 facilitators has been trained to assist countries in participating in PMP-AMR assessments.

One notable success of FAO's intervention at field level is the implementation of the Farmer Field Schools (FFS) approach, fostering behavioural change in agricultural systems through the establishment and growth of FFS sites.

FAO has initiated several high-impact projects, including the InFARM platform for collecting data on AMR, RENOFARM and the One Health Knowledge Nexus for designing communities of practice to facilitate knowledge exchange.

As part of the Quadripartite collaboration on AMR, FAO actively engages in a strategic framework for collaboration, supporting high-level advocacy through the global leaders group. The AMR Multi-Partner Trust Fund serves as a crucial resource mechanism for four global projects, addressing multidimensional aspects of combating AMR, including global surveillance systems, monitoring and evaluation, legal frameworks and environmental considerations.

Forty-seven countries have endorsed the Muscat Ministerial Manifesto on AMR, committing to significant reductions in AMU in agrifood systems by 2030, with a global target of a 30–50 percent reduction in use.

FAO is now preparing for the seventy-ninth session of the United Nations General Assembly in September 2024, developing a roadmap for the event. Major events in 2023 included the publication of FAO's first biennial report on tackling AMR in agrifood,[5] the InFARM global call for data, the launch of RENOFARM and the AMR MSPP plenary.[6] This comprehensive update underscores FAO's ongoing commitment to combating AMR through innovative projects, collaborative efforts and strategic planning.

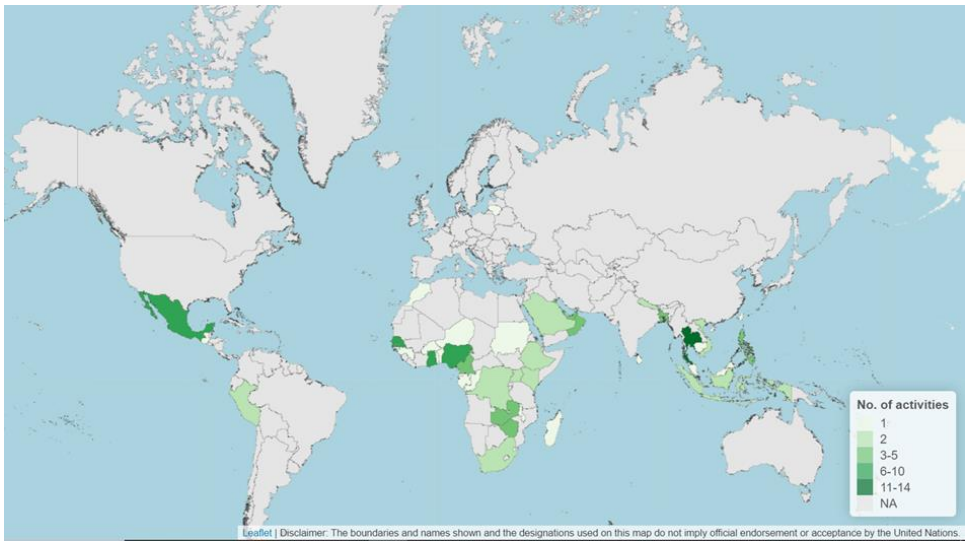
FAO Reference Centres for Antimicrobial Resistance – an update

Jieun Kim (FAO, focal point of the FAO Reference Centres for AMR) provided a concise overview of the current status of the network of FAO Reference Centres for AMR. Of the nine Reference Centres, five (Denmark Technical University [DTU], Freie Universität Berlin, Chulalongkorn University, the UK Department for Environment, Food and Rural Affairs [Defra] and Ohio State University [OSU]) are currently undergoing the designation renewal process, while the Federal Budget Institute of Science (FBIS) Central Research Institute of Epidemiology of Rospotrebnadzor in the Russian Federation has been newly designated.

In line with the areas of collaboration and workplans agreed during the designation and renewal process, various channels have been established to facilitate collaboration between FAO and the Reference Centre network. These include the assignment of visiting officers/professors to FAO's AMR team, regular participation in FAO seminars, conferences and meetings, as well as the provision of specific services through Letters of Agreement. The communication mechanism involves bimonthly teleconferences, ad hoc meetings, a FAO AMR newsletter and an annual congress to exchange updates and identify further collaboration opportunities. The activities are subject to regular review and adjustments based on annual reports submitted.

Throughout 2022, FAO's support for countries via its Reference Centres spanned multiple geographical regions, with a predominant focus on pillar 2 of the FAO Action Plan: strengthening surveillance and research (see Figure 1).

Figure 1 Activities related to FAO action pillars provided for countries



Source: Authors' elaboration based on 2022 annual reports.

While FAO's support from Reference Centres appears to be globally distributed, a large proportion of the Centres are located in Europe, with the remainder situated in Mexico, the Russian Federation, Senegal, Thailand and the United States.

The objectives and outcomes of the congress meeting were as follows: to define joint activities, roles, responsibilities and timeframes for activities in 2023 and 2024. The congress report captures the commitments by each Reference Centre to implement FAO's work on AMR and as a record of the transparent discussions that took place. This report reaffirms the Centres' commitment to working collaboratively and to ensuring the continued success of the FAO Reference Centre for AMR network.

FAO Reference Centre activity showcase – highlights

The Reference Centre activity showcase featured presentations from representatives of AMR Reference Centres, providing valuable insights into ongoing initiatives.

FAO AMR Reference Centre in the United Kingdom

Rachel Dalton (Veterinary Medicine Directorate [VMD]) commenced her presentation by introducing the three organizations – Cefas, APHA and VMD – that collectively make up the Reference Centre in the United Kingdom. Their multifaceted activities in 22 countries include partnerships with national governments and organizations, surveillance and research, international engagement, guidance, standards and capacity building. Highlighted capacity-building activities included laboratory and virtual training courses, most recently in Nigeria.

Stefan Schwarz (Freie Universität Berlin) presented Freie Universität Berlin's Veterinary Centre for Resistance Research, established in 2022. Its focus includes training individuals, collaborative research, guideline development, responsible AMU, bioscience and training on various AMR topics.

Rene Hendriksen (DTU) represented the Danish FAO Reference Centre, which was established in 2019. DTU engages in global surveillance, validating phenotypic and genotypic AMR data, and the development of reference materials and guidelines. Noteworthy projects include grants in Africa and Asia funded by the Fleming Fund and collaborations with SeqAfrica.

Rungtip Chuancheun (Chulalonkorn University, Thailand) presented the structure of the Thai Reference Centre, which focuses on AMR monitoring, food safety and AMR research. Their activities encompass raising awareness and capacity building, as well as coordination and collaboration with FAO AMR Reference network, WHO global foodborne infection network, and other agencies.

The Russian FAO Reference Centre for AMR, designated in December 2022, includes the Reference Centre on Monitoring of Salmonellosis and the Reference Centre for Monitoring Residual Amounts of Antibiotics and AMR in Food Raw Materials and Food Products. With more than 1 940 employees, it actively supports the development and implementation of AMR good practices globally.

Jean-Yves Madec (Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail [ANSES], France) introduced the French Reference Centre, which was designated in late 2020. ANSES has coordinated various research and reference activities, organized international training courses and initiated collaborative projects with the FAO Regional Office for sub-Saharan Africa. Its participation in global projects includes InFARM projects, aquaculture and fishery-related projects, inter-Reference Centre collaboration (for example, with the United Kingdom) and work in the social sciences.

Carloss Jasso (Servicio Nacional de Sanidad, Inocuidad y Calidad Agroalimentaria [SENASICA], Mexico) introduced the collaborative work of the Reference Centre in Mexico. Designated as an AMR Reference Centre in December 2020, it comprises several national centres that make a significant contribution to awareness, engagement and responsible AMU, including antimicrobial pesticides. Its international collaborations involve laboratory training (antimicrobial susceptibility testing, polymerase chain reaction testing, whole genome sequencing for antibiotic resistance genes (ARGs), proficiency testing, supporting FAO-ATLASS assessment and the donation of reference strain materials.

Thomas Wittum (Infectious Disease Institute of Ohio State University [OSU]) from the OSU Reference Centre for AMR focused on applied and translational research in AMR. The US Reference Centre's programmes cover antimicrobial stewardship in human healthcare, veterinary medicine, animal agriculture and extensive education initiatives to support developing countries. Recent examples include the Caribbean Integrated Surveillance System on Antimicrobial Resistance in Agriculture project, supporting Caribbean islands' veterinarian training programmes to build and develop surveillance capacity as part of the national system. At a global level, OSU appointed two experts to assist with the update of FAO's PMP approach for AMR to version 2.0. OSU also collaborated closely with the Clinical and Laboratory Standards Institute to develop training courses for low-recourse veterinary and food-safety diagnostic laboratories around the world.

Institut Pasteur de Dakar (IPD), Senegal – No presentation.

Discussion 1: AMR laboratory community of practice

FAO is establishing an AMR laboratory community of practice to facilitate knowledge sharing, skills improvement and the harmonization of practices among laboratory experts dedicated to AMR detection and characterization. The community is designed to provide a platform for continuous

interaction, information exchange, peer-to-peer learning and professional development. FAO is seeking the active involvement of its Reference Centres for AMR in shaping and operationalizing the collaborative body.

Session highlights

Introduction of the AMR laboratory community of practice:

- definition of a "community of practice", in which individuals with common interests work together to build knowledge and capabilities;
- alignment with pillar 2 of the FAO Action Plan, focusing on strengthening surveillance and research for evidence-based decisions.

AMR laboratory community of practice impact areas:

- a focus on generating harmonized AMR data in food and agriculture at a global, regional, and national level;
- primary impact areas include improving AMR data reporting, enhancing therapeutic treatments and promoting knowledge sharing within and among sectors (One Health).

Member benefits:

- increased knowledge, competencies and skills in laboratory methods for AMR detection;
- access to expert advice, staying updated with research findings and networking opportunities.

Functions of the community of practice:

- serves as a platform for community interactions, resource sharing, learning and as a social space;
- utilizes digital solutions, such as FAO Virtual Learning Centres, for courses, webinars, fora and resource sharing.

Roles and responsibilities:

- proposed roles include community of practice manager, event coordinator, knowledge product coordinator, youth focal point and community of practice specialist.

APHA experience:

- insights shared by Roderick Card and Ramon Maluping of APHA, highlighting the community-driven nature of the community of practice;
- members benefit from a variety of presentations, expert sessions and professional development topics.

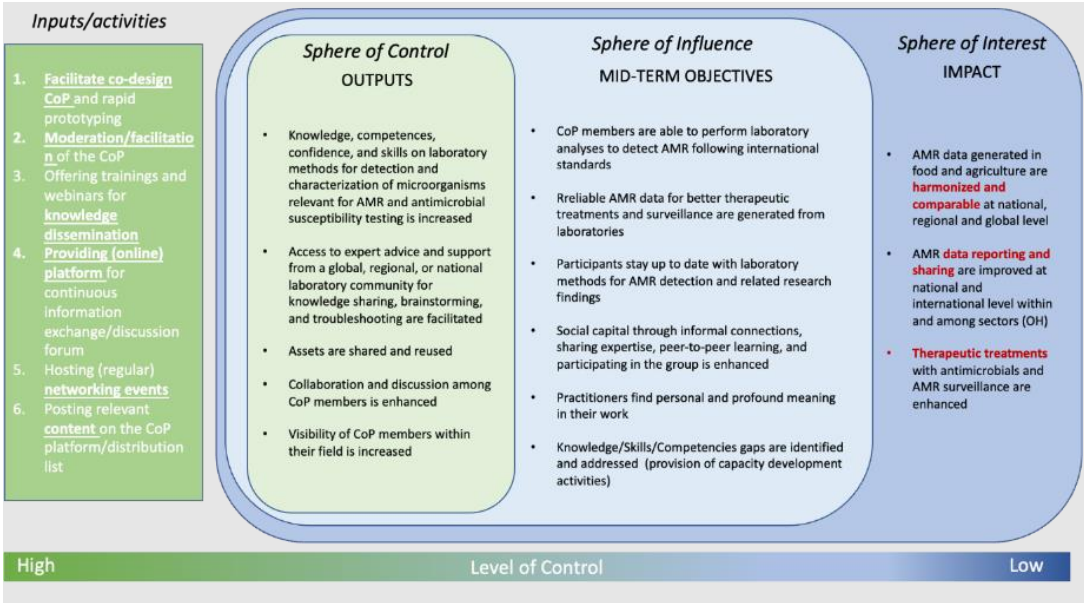
Session discussion:

- Stephan Schwarz emphasized that guidelines are different to standards, and that there is a need to emphasize to members of the community of practice that they should follow standards without modification.
- Daniela Bataglia questioned the benefit of separating the AMR laboratory from other AMR topics and emphasized collaboration and cross-fertilization.
- David Verner-Jeffreys underscored the need to coordinate, as there can be several topics, and suggested using Twitter (now X), while Suzanne Eckford recalled the importance of looking back at past FAO case-study series.
- Rene Hendriksen also asked what sort of gap could be filled, or advantages brought about, by the community of practice compared with newsletters, webinars or other existing media for exchange.
- Mary Joy Gordoncillo asked how coordination could take place at the regional level, as there are similar or related global and regional initiatives that may overlap. She suggested considering how coordination is foreseen in the long term, when membership becomes too big for current structures.

- Common concerns were raised about potential overlaps with similar platforms and media networks for exchange, the need for coordination and collaboration, the need for consultation at regional level, and managing future growth and sustainability.

On the whole, the session demonstrated enthusiasm for the AMR laboratory community of practice, with members seeking clarification on its scope, advantages and potential challenges. Ongoing discussions will shape the development and operationalization of this collaborative platform. The draft theory of change for the AMR laboratory community of practice was presented (see below), and participants were asked to provide comments or signal agreement.

Figure 2 AMR laboratory community of practice theory of change



Source: FAO

Discussion 2: Surveillance, laboratories and research

In this session, FAO highlighted its commitment to strengthening laboratory capacity, surveillance, monitoring and research as part of the FAO Action Plan. The discussion revolved around the tools available, particularly FAO assessment tools, with an emphasis on FAO-ATLASS for laboratory and AMR surveillance system assessments and areas of future collaboration with the Reference Centre network.

Capacity-building initiatives

FAO used the FAO-ATLASS tool to assess country-specific situations, providing tailored support based on individual country requests. Its efforts saw a total of 35 assessments in 14 countries using FAO-ATLASS for AMR capacity assessments since 2016.

Training examples

The discussion delved into specific training examples, such as sample collection and processing for AMR, hands-on training on sampling and bacterial isolation in the Lao People's Democratic Republic and training on standard antimicrobial susceptibility testing. Notably, the AMR/AMU surveillance systems in food animals in the Asia-Pacific region witnessed progressive growth, with the number of participating laboratories increasing from 13 in 2019 to 38 in 2022.

Role of the AMR Reference Centres

The role of Reference Centres was explored, prompting a reflection on the expertise and ongoing or planned projects related to AMR, AMU and antimicrobial residue surveillance, laboratory surveillance and research. The proposal to expand the scope of Reference Centre activities to include plants/crops, the environment and antimicrobial residues was also considered.

Of particular significance was a discussion on antimicrobial residues, acknowledging their heightened importance for countries in Europe and Central Asia, due to European Union export requirements. Expertise offered by ANSES (France) and VMD (United Kingdom) was highlighted in this area. The discussion spanned current challenges, the support required for sample collection and the need for

standard operating procedures and guidelines. A key talking point was the potential compilation of a list of stakeholders that might be interested in contributing to a review of ATLASS from a residues perspective and the prototyping of an ATLASS tool for residues.

Summarized outputs and actions:

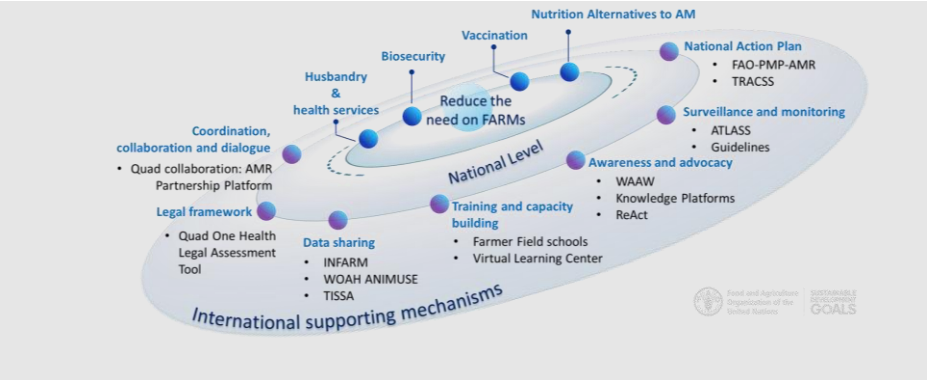
- a call for mapping ongoing/planned projects related to AMR in plants/crops, the environment and antimicrobial residues;
- identification of funds/resources and available products;
- compilation of names of stakeholders with expertise and availability to offer support on the topic of antimicrobial residues;
- mapping existing resources, including standard operating procedures and guidelines, for testing antimicrobial residues; and
- an emphasis on continued capacity-building efforts through targeted training programmes.

Discussion 3: Reduce the Need for Antimicrobials on Farms for Sustainable Agrifood System Transformation initiative

During this session, Antonio Valcarce presented RENOFARM, an FAO initiative aimed at facilitating the transformation of national agrifood systems by implementing practices that reduce the need for antimicrobials. The rationale behind the initiative lies in the significant use of antimicrobials in animals for food production, coupled with their potential impact on human medicine. The ambitious goals of RENOFARM include the full implementation of national action plans for AMR in 100 participating countries, a 30-50 percent reduction in total AMU in the food and agriculture sectors, training of 50 percent of veterinary para-professionals, and zero use of medically important antimicrobials in non-veterinary medical and crop production.

Strategies to achieve goals: Mr Valcarce presented a diagram illustrating the complex structure of international supporting mechanisms, highlighting the multifaceted actions required to achieve RENOFARM's objectives. Trials and pilots are set to run in Nigeria and Ghana, with full initiative documents and launch events scheduled for after the pilot in 2024. The invitation to participate will then be extended to additional countries, asking them to commit to the RENOFARM initiative and secure resources to fund participation and activities.

Figure 3 RENOFARM supporting mechanisms



Source: FAO

Relatedly, Daniela Battaglia shared details of the upcoming expert meeting at FAO, focusing on alternative feed, feed ingredients, feed additives and feeding practice to reduce specific initiative AMU in farm animals. She requested support from the Reference Centre network in collecting scientific evidence on alternative feeding practices, conducting an inventory of these practices, gathering successful experiences and creating animal nutrition strategies to reduce AMR.

Discussion points

- Attendees were invited to provide inputs to improve RENOFARM and returned with enquires about existing AMR projects in Indonesia, Nigeria and Uganda and the countries participating in the pilot. Rene Hendrikson (DTU Food) responded that there were projects in the livestock and aquaculture sectors of Nigeria on AMU and AMR that aligned with the work of the UK Reference Centre in Nigeria. Both Reference Centres are currently supporting a Fleming Fund fellows programme in several countries.
- Suggestions were made to enhance the feed production industries in Mexico, with the FAO AMR Reference Centre in Mexico expressing interest in collaborating with FAO and other Centres on RENOFARM.

Discussion 4: International FAO Antimicrobial Resistance Monitoring System

Background

FAO is in the final stages of developing its InFARM information technology (IT) platform, aimed at establishing a global framework for sharing, analysing and interpreting AMR data. The initiative responds to the critical need for a standardized approach to strengthening the generation of evidence on AMR/AMU. The primary objective of InFARM is to assist countries in collecting, analysing and utilising AMR data from animals and food, contributing to global efforts on integrated AMR/AMU surveillance. Input from Reference Centres on AMR will be integral to refining and operationalizing the InFARM IT platform and system.

This session introduced the InFARM IT platform and system, sharing insights from Reference Centre initiatives supporting surveillance activities, and discussing and developing possible contributions to the InFARM system.

Alejandro Dorado García (FAO) provided an update on the number of countries with national surveillance systems, noting an increase from 2017 to 2022. He gave an overview of the key specifications of the InFARM platform, FAO InFARM coordination, FAO InFARM representatives, national InFARM focal points and global users. The following bullet points are specific points raised in the discussion moderated by Jean-Yves Medec from ANSES, one of the Reference Centres participating in developing the InFARM initiative:

- Reporting levels: The reporting levels were explained and categorized as PRIV_I (only visible for my country – private interface), PUB_II (publicly available interface protecting country identity) and PUB_III (publicly available interface showing country identity).
- Definition of InFARM datasets: Datasets are defined based on the year of sample collection, level of representation (pilot surveillance, regular surveillance at national level) and purpose of surveillance (for example, healthy terrestrial animals for public health, diseased terrestrial animals for public health, or healthy aquatic animals for public health).
- Automatically generated reports: InFARM will generate interactive data visualizations encompassing tables and graphs on volumes of data and analysis of AMR prevalence and trends.
- Benefits of InFARM: The platform offers a safe place to store and manage data with restricted access, easy tools for interpretation, a one-stop-shop repository, improved coordination and harmonization of data generation, and contributes to global One Health AMR surveillance efforts.
- Timeline for InFARM: The long-term plan involves development and validation in 2022, global rollout in 2023, expansion in 2024 and consolidation in 2025 (a revised timeline for the global rollout is planned for 2024).

A discussion unfolded on obtaining permission to share data, with clarification that governments needed to nominate institutions for data sharing.

Further details will be provided, and FAO requests further support and involvement from the Reference Centre network to roll out this initiative.

Discussion 5: Multi-Stakeholder Partnership Platform on Antimicrobial Resistance

Background

In response to the 2019 report, *No time to wait: Securing the future from drug-resistant infections*,[7] by the Ad Hoc Interagency Coordination Group on AMR to the United Nations Secretary-General, the Quadripartite established the Multi-Stakeholder Partnership Platform (MSPP) on AMR. This global, inclusive and collaborative forum aims to engage stakeholders across the One Health spectrum in transparent cooperation on sustainable and innovative solutions, ensuring the responsible use of antimicrobials. Facilitated by the Quadripartite and hosted by FAO, the platform offers opportunities for stakeholders to network, enhance knowledge and collectively address AMR challenges under a One Health approach. The purpose of this session was to introduce the AMR MSPP. Acknowledging its 500 participants, as outlined in the Muscat Manifesto, the session shared insights into the platform's

governance and priority areas based on previous consultations (consultations were delivered by VMD, part of the UK Reference Centre).

Discussion

The proposed discussion points included:

- feedback on the platform's modus operandi, structure, potential action group areas of interest and their potential complementarity with existing initiatives;
- insights into challenges and opportunities associated with broad stakeholder engagement, considering balance of power, conflicts of interest, accountability and transparency.

Rod Card (APHA) sought clarification on the definition of an "entity" when it came to UK Government applications to join the platform. Jen Dow (VMD) clarified that the UK Government is considered a single entity and that applications to the platform from separate UK Government departments would not be accepted. The UK is in the process of identifying a single individual to represent its interests in this regard. The same holds for any country wishing to join the platform.

Kitty Healey (VMD) found the governance structure intriguing and raised concerns about the complexity of initiatives such as RENOFARM and InFARM. Junxia Song (FAO) responded, emphasizing that the platform engages all stakeholders and that action groups cover additional initiatives. The platform serves as an effective way of engaging stakeholders, ensuring collaboration among international organizations.

Rachel Dalton (VMD) asked whether a representative of one entity could be part of multiple action groups. Nelea Motriuc (FAO) explained that action groups are proposed by members through calls for proposals within the platform. The proposals were then approved, allowing for One Health multisectoral and multistakeholder representation. Individuals were encouraged to join groups aligned with their interests, fostering inclusivity in the dialogue.

Conclusion

FAO colleagues encouraged participants to complete Slido surveys disseminated by the FAO team to prioritize key AMR challenges as the MSPP's initial focus. The discussion enriched understanding of potential challenges and opportunities related to multistakeholder engagement and provided valuable feedback on the platform's structure and priority areas.

Discussion 6: Good practices and responsible use of antimicrobials

Background and introduction

As outlined in the FAO Action Plan 2021–2025, FAO is dedicated to promoting the adoption of good practices (Outcome 3) and ensuring responsible AMU (Outcome 4) worldwide. The aim is to minimize infection, as well as the emergence and spread of AMR. FAO initiatives along these lines are being implemented at various levels, spanning global, regional and country-specific efforts. This session provided an opportunity to showcase FAO's work on these themes and explore potential areas of collaboration with FAO Reference Centres for AMR.

Daniel Beltran introduced the FAO Regional Office for Europe and Central Asia's ongoing work, employing tools such as knowledge, attitudes and practices (KAP) surveys, KoboCollect and face-to-face interviews to understand the link between AMR and AMU at field level. Mary Joy Gordoncillo showcased the FAO Regional Office for Asia and the Pacific's initiatives with regard to good practices and responsible AMU, aligned with FAO's regional AMR strategy in the Asia-Pacific region. Irene Ouoba

(FAO Regional Office for Africa) presented various policy initiatives with regard to the use of medicated feed and the development of treatment and biosecurity guidelines.

Discussion highlights

- **Experience of the United States:** Mr Thomas Wittum (OSU) shared the US experience of promoting good practices and responsible AMU. He emphasized the importance of surveillance reports and guidelines to promote responsible AMU and called for a clear definition of AMU.
- **Harmonization of training activities:** Emmanuel Kabali (FAO headquarters) stressed the need to harmonize activities related to good practices and prudent AMU among projects and international actors, including FAO Reference Centres. David Verner-Jeffreys (Cefas, UK) suggested using FAO Emergency Centre for Transboundary Animal Diseases guidelines as an entry point for scientific advice from Reference Centres.
- **Treatment guidelines:** Jing Wang (Joint FAO/International Atomic Energy Agency Centre of Nuclear Techniques in Food and Agriculture) highlighted the importance of context-specific treatment guidelines based on a country's identified priority pathogen list. FAO Reference Centres could contribute to the development of such guidelines.
- **Training programmes:** Thomas Wittum (OSU) emphasized the importance of training programmes, such as e-learning and webinars, to fill the gap in implementing guidelines. Irene Ouoba (FAO Regional Office for Africa) mentioned the importance of repetition, monitoring and measuring impact in training efforts.
- **Data-driven approaches:** Jean-Yves Madec (ANSES, France) emphasized the significance of data-driven approaches, such as comparing AMU data at farmer level. He suggested awarding or incentivizing farmers with low AMU.

Agreed points of action:

- to map the training opportunities and needs between FAO Reference Centres, FAO headquarters and Decentralized Offices;
- to explore the dissemination of existing training developed by FAO Reference Centres through FAO platforms, such as the FAO e-learning academy and virtual learning centres.

Discussion 7: Governance and sustainability

Background and introduction

Pillar 5 of the FAO Action Plan for AMR focuses on governance and has three primary outputs: i) the development of policies and regulatory frameworks for AMR containment; ii) research on innovation and incentives in food and agriculture; and iii) fostering partnerships and multisectoral collaboration. The collaboration takes place at global, regional and national level, where members can engage with FAO Reference Centres on AMR for research, capacity development and technical assistance.

This session, presented by Carmen Bullon, introduced FAO's work under pillar 5, with particular emphasis on multisectoral governance, regulation and critical research.

Maria Elena González Ruíz (SENASICA) presented Mexico’s initiatives on AMR governance, specifically on governance frameworks to support integrated surveillance, sparking a discussion and exchange of perspectives among the Reference Centres.

Discussion

Carmen Bullon discussed FAO methodology for analysing AMR-relevant legislation in the food and agriculture sectors, as well as the Quadripartite One Health legislative assessment. She highlighted the Quadripartite One Health legislative assessment conducted at the Regional Workshop for Latin America and the Caribbean in November 2022, attended by 116 participants from the region and Equatorial Guinea, emphasizing the instrumental role of legislation in implementing AMR objectives in various legal domains, such as public health, food safety, animal health, plant health, pesticides and the environment (One Health).

Maria González Ruíz presented the case study of Mexico, which had announced a mandatory national strategy for action against AMR in June 2015, modifying it on 11 September 2022. She introduced the SENASICA surveillance programme for 2017, 2018 and 2019, covering sample types, sizes, antibiotics, methodologies and results.

Irene Ouoba (FAO Regional Office for Africa) asked for clarification on the progress of the Quadripartite tool and for feedback from countries on its success and actions taken in different sectors. Carmen Bullon said Quadripartite collaboration was progressing despite challenges, emphasizing lessons learned.

Conclusion

Framework for collaboration and joint action in 2023–2024

Based on session and group discussions, the following joint actions were agreed by FAO and the AMR Reference Centre network:

Table X. Joint action framework of the network for 2023 and 2024

Objective	Sub-division	Activity	SENSICA	ANSES	OSU	DTU	Defra	Freie Universität Berlin	CU-VET	FBIS	IPD
1. Awareness and engagement	a	Support the development of guidelines and other tools (such as phone apps) to support risk communication and behavioural change			ü						
	b	Support training to change behaviour through e-learning and virtual learning centres		ü		ü					
	c	Support WAAW through Reference Centre social media posts, blogs and other engagement initiatives	ü			ü	ü		ü		
	d	Support AMR advocacy	ü					ü	ü		
2. Surveillance and research	a	Provide external quality assurance/proficiency testing to improve AMR Detection (phenotypic and molecular-based methods)		ü		ü	ü		ü		
	b	Support the development and maintenance of the FAO AMR laboratory community of practice	ü	ü	ü	ü	ü	ü	ü	ü	ü

	c	Provide in-person laboratory training and protocols on antimicrobial susceptibility testing and biofilm susceptibility methods, and residue testing and/or virtual training through FAO Virtual Learning Centres	ü		ü	ü	ü	ü	ü		
	d	Lend expert support for the development and/or revision of guidance documents on laboratory capacity and workforce development, especially towards laboratory accreditation on AMR detection and characterization	ü	ü	ü	ü	ü	ü	ü	ü	ü
	e	Provide services for confirmatory testing and further characterization of selected bacterial isolates, including molecular-based methods				ü					
	f	Provide expert advice on the revision of documents related to AMR, AMU and antimicrobial residue surveillance and monitoring	ü	ü	ü	ü	ü	ü	ü	ü	ü
	g	Provide expert advice on the development of InFARM, including the revision of documents and support for translation into different languages	ü	ü	ü	ü	ü	ü	ü	ü	ü
	h	Advocate for and support the submission of data from countries to InFARM	ü	ü	ü	ü	ü	ü	ü	ü	ü
3. Good practices	a	Support development of guidelines on veterinary prescription	ü		ü		ü				
	b	Promote the certification of good farming practices	ü		ü		ü				
	c	Create a community of practice for insepctors for good distribution practices	ü		ü		ü				

	d	Establish a university veterinary curriculum	ü		ü		ü				
4. Responsible AMU	a	Harmonize training activities	ü	ü	ü	ü	ü	ü	ü	ü	ü
	b	Support development of treatment guidelines	ü	ü	ü	ü	ü	ü	ü	ü	ü
	c	Implementation of guidelines and identification of training needs				ü	ü				
	d	Conduct situational analysis on the role of vets and agri-vets in AMU				ü	ü				
	e	Support RENOFARM pilots				ü	ü				
5. Governance and resource	a	Support the development and implementation of regulation and legislation on veterinary medicinal products, AMU, antimicrobial residue testing in sub-Saharan Africa, Southeast Asia and Latin America	ü				ü		ü		
	b	Offer consultation to Southeast Asian countries on the new or revised NAPs on AMR and new legislation	ü				ü		ü		
	c	Support and engage in the MSPP through support for action groups	ü				ü		ü		
6. Coordination of the FAO Reference Centres for AMR	a	Utilize bimonthly calls to map activities and identify the support needs of Reference Centres by region, inviting FAO regional focal points				ü	ü	ü			
	b	Building standardizing templates for annual reports and use the reports to raise awareness of what other Reference Centres are doing				ü	ü	ü			

Selection of host for the next congress

The FAO Reference Centre for AMR in Denmark will host the second annual congress.

Establishment of the joint Technical Secretariat

To streamline and harmonize the efforts of the FAO Reference Centres for AMR, the establishment of a joint Technical Secretariat is proposed. Its composition includes:

- an FAO focal person for AMR (Senior Animal Health Officer);
- an FAO point of contact for the Reference Centres for AMR (Animal Health Officer);
- representative(s) of the Reference Centre that hosted the most recent annual congress;
- representative(s) of the Reference Centre that will host the next annual congress, invited to join or observe for a smooth transition.

The Secretariat will:

- advise on placing technical topics on the agenda for bimonthly calls;
- support follow-up on actions arising from regular bimonthly calls;
- facilitate the exchange of relevant information on AMR in the agrifood system within the network;
- identify entry points for the joint coordination of research and/or projects (for example, following up on recommendations from expert dialogue);
- contribute to organizing the annual congress of the FAO Reference Centres for AMR;
- coordinate the provision of technical guidance to FAO within the network, including Quadripartite collaboration on AMR and the implementation of the FAO Action Plan on AMR, as necessary and requested.

The UK Reference Centre, FAO and DTU have nominated relevant focal points to serve in the Secretariat until the next annual congress meeting.

Annex 1 – Meeting agenda

Day One: Wednesday 15 March 2023			
Time	**Activity**	**Speakers**	**Moderator**
12:00-13:00	*Arrival, security, and registration*		
13:00-13:10	Welcome	Ian Brown, Scientific Services Director APHA	
13:10-13:20	Opening remarks	Keith Sumption (FAO CVO, remote)	
13:20-13:40	Icebreaker session • Rose, thorn, bud	Francesca Latronico and Roderick Card	
13:40-13:55	FAO introduction • Update on the Action Plan on AMR and key initiatives	Junxia Song (FAO)	
13:55-14:10	Update on the FAO AMR Reference Centres	Jieun Kim (FAO)	
14:10-15:20	Reference Centre activity showcase • Five minutes from each Reference Centre • Presentations	Reference Centres	APHA
15:20-15:30	*Break in poster area*		
15:30-16:30	AMR laboratory community of practice • Introduction from FAO • Discussion on role of Reference Centres • Outputs and actions summarized	Francesca Latronico (FAO)	Roderick Card and Ramon Maluping (APHA)
16:30-17:30	Surveillance, laboratories and research • Key updates from FAO • Discussion on role of Reference Centres • Outputs and actions summarized	Francesca Latronico (FAO)	Rungtip Chuanchuen (CU Vet)
17:30-17:35	Day 1 Wrap up	Roderick Card (APHA)	APHA
17:35-19:00	*Transfer to hotel and free period*		
19:00	*Evening meal at The Talbot, Ripley*		

Day Two: Thursday 16 March 2023			
Time	**Activity**	**Speakers**	**Moderator**
08:40-08:55	*Arrival, security and registration*		
08:55-09:00	Welcome and introduction to aims of morning	FAO	APHA
09:00-09:30	Reduce the need initiative (RENOFARM) • Introduction from FAO • Discussion on role of Reference Centres • Outputs and actions summarized	Junxia Song (FAO) Antonio Valcarce (FAO, remote)	Rachel Dalton (VMD)
09:30-10:20	InFARM • Introduction from FAO • Discussion on role of Reference Centres • Outputs and actions summarized	Francesca Latronico (FAO) Alejandro Dorado García (FAO remote)	Jean-Yves Madec (ANSES)
10:20-10:35	*Break*		
10:35-11:15	Multi-stakeholder partnership platform • Introduction from FAO • Discussion on role of Reference Centres • Outputs and actions summarized	Junxia Song (FAO) Nelea Motriuc (FAO remote)	Jen Dow (VMD)
11:15-12:00	Good practice and AMU • Key updates from FAO • Discussion on role of Reference Centres • Outputs and actions summarized	Irene Ouoba (FAO) Emmanuel Kabali (FAO, remote)	Thomas Wittum (OSU)
12:00-13:00	*Lunch and networking* *Group photo*		
13:00-14:00	APHA tour • Laboratory tour • Visit to animal facilities	APHA	
14:00-14:45	Governance • Key updates from FAO • Discussion on role of Reference Centres • Outputs and actions summarized	Carmen Bullon (FAO, remote)	Maria Elena González Ruíz (SENSASICA)
14:45-15:30	Awareness and communicating impact • Raising awareness of the Reference Centres' capabilities – communications • Increasing engagement of the Centres • Outputs and actions summarized	Fallon Bwatu Mbuyi (FAO, remote) and All	
15:30-15:45	*Break*		

15:45-16:45	Framework for collaboration and joint approaches • Lab and surveillance template to drive discussion • Challenges and opportunities • Workplan in 2023 • Outputs and actions summarized General discussion in plenary	Junxia Song (FAO) Francesca Latronico (FAO) Mary Joy Gordoncillo (FAO)	Jieun Kim (FAO)
16:45-16:50	Selection of host for the next congress • Volunteer sought	Jieun Kim (FAO)	
16:50-17:00	Meeting close	Junxia Song (FAO)	UK AMR Reference Centre
17:00	*Transfer to hotel and free period*		

Notes

[1] FAO. n.d. AMR-LEX. In: *FAO*. Rome. [Cited 14 February 2024]. https://amr-lex.fao.org/main/profile/en

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[4] FAO. 2021. *Strategic Framework 2022–31.* Rome. https://www.fao.org/3/cb7099en/cb7099en.pdf

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[7] Ad hoc Interagency Coordination Group on Antimicrobial Resistance. 2019. *No time to Wait: Securing the future from drug-resistant infections*. Rome, World Health Organization. https://www.who.int/publications/i/item/no-time-to-wait-securing-the-future-from-drug-resistant-infections