

WOAH's Workplan on AMR in Aquaculture

Dr Dante Mateo – Scientific Coordinator, AMR&VPD, WOAH



Résistance aux antimicrobiens (RAM) en aquaculture

11 - 12 juillet 2024 Tunis, Tunisie

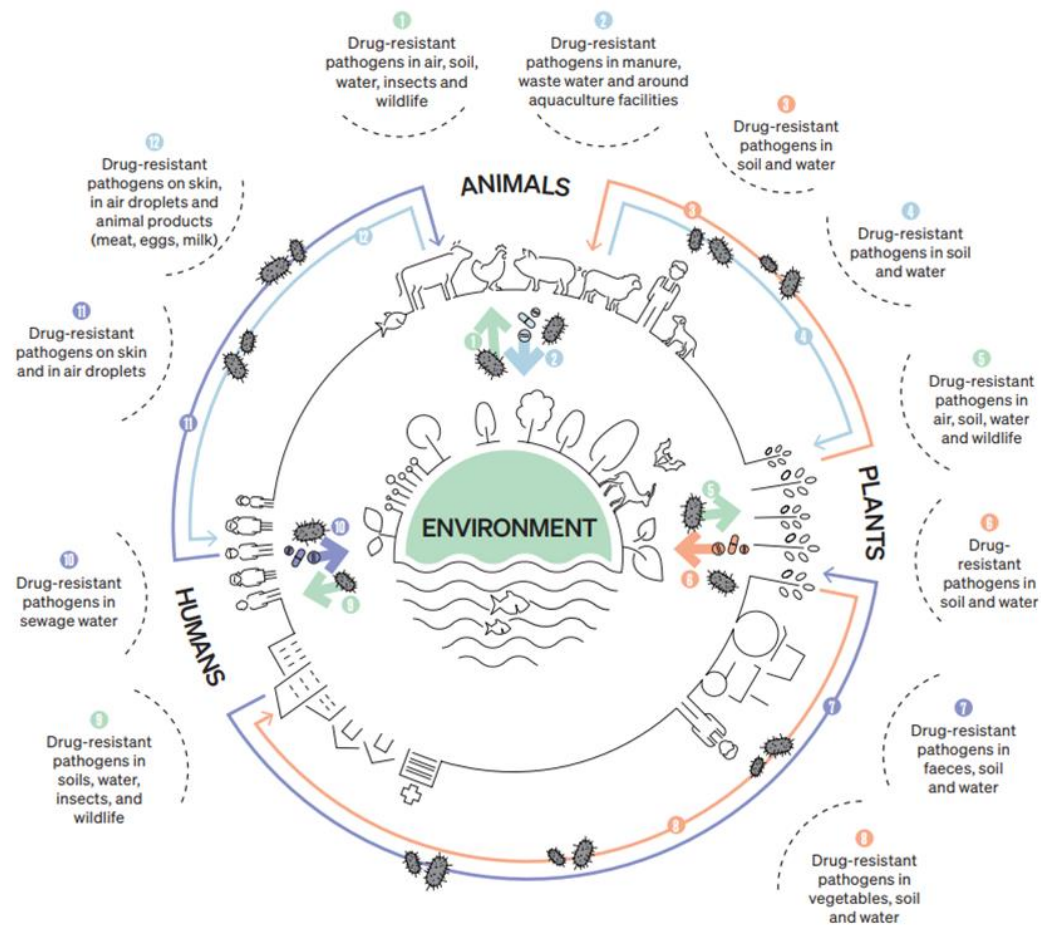




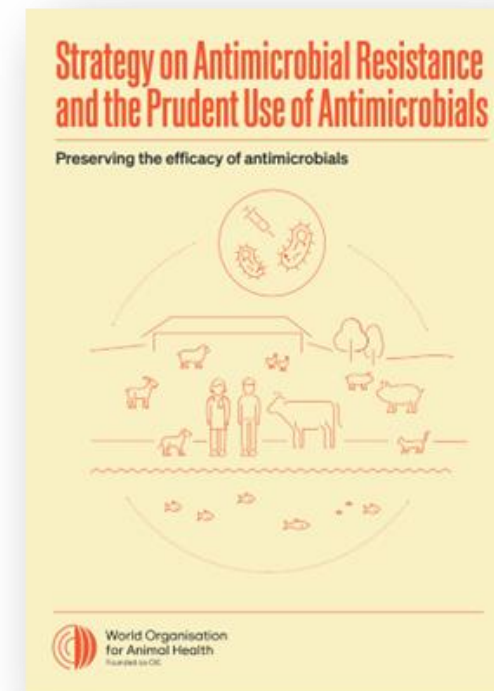
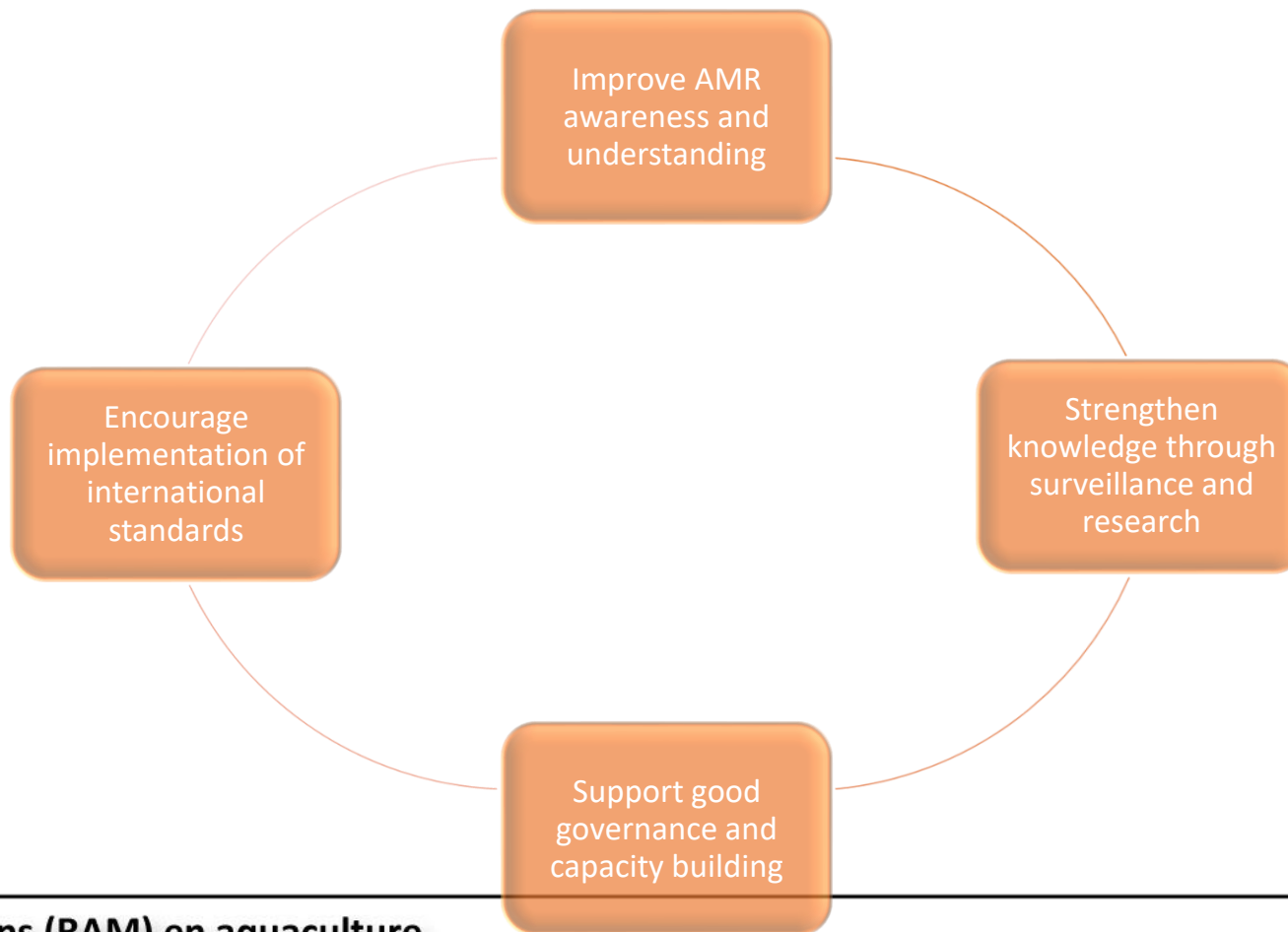
World Organisation
for Animal Health
Founded as OIE

ANTIMICROBIAL RESISTANCE: A ONE HEALTH CHALLENGE

Misuse and overuse of antimicrobials can generate antimicrobial resistance. Drug-resistant pathogens can then spread between and within animals, humans, plants and through the environment.



The WOAHA Strategy supports the objectives established in the Global Action Plan on AMR, developed by WHO with strong contribution from FAO and WOAHA. It reflects the mandate of the WOAHA, through four main objectives:





	Objective 1 STANDARDS Scientifically sound OIE international standards meet OIE Members' needs to manage risks, facilitate safe trade and improve aquatic animal health and welfare
Activity	1.1 Develop new OIE standards
	1.2 Revise existing <i>Aquatic Code</i> standards
	1.3 Review the scientific basis of existing animal welfare standards
	1.4 Revise existing <i>Aquatic Manual</i> standards
	1.5 Identify barriers to the implementation of standards
	1.6 Increase the accessibility of standards
	Objective 2 CAPACITY BUILDING OIE programmes support the strengthening of the Aquatic Animal Health Services of OIE Members
Activity	2.1 Support the implementation of standards
	2.2 Increase the use of the OIE PVS Pathway
	2.3 Develop public-private partnerships
	2.4 Identify barriers to transparency in disease reporting
	2.5 Develop a Disease Identification Guide for mobile devices
	2.6 Support OIE Delegates and OIE Focal Points
	2.7 Establish an OIE Global Aquatic Animal Health Scholarship scheme
	2.8 Support small-scale aquaculture
	Objective 3 RESILIENCE Responses to emerging aquatic animal health issues of regional or global concern are coordinated and timely
Activity	3.1 Formalise procedures for a coordinated OIE approach to disease emergencies
	3.2 Provide support for early response at the national level
	3.3 Develop guidelines for collaborative emergency response
	3.4 Provide practical AMR guidance
	Objective 4 LEADERSHIP OIE's capacity to provide global aquatic animal health and welfare leadership is strengthened
Activity	4.1 Further develop international partnerships
	4.2 Develop the OIE's aquatic animal health and welfare capabilities
	4.3 Engage OIE scientific networks
	4.4 Establish forums for the OIE Community
	4.5 Identify the highest-priority research areas

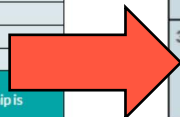
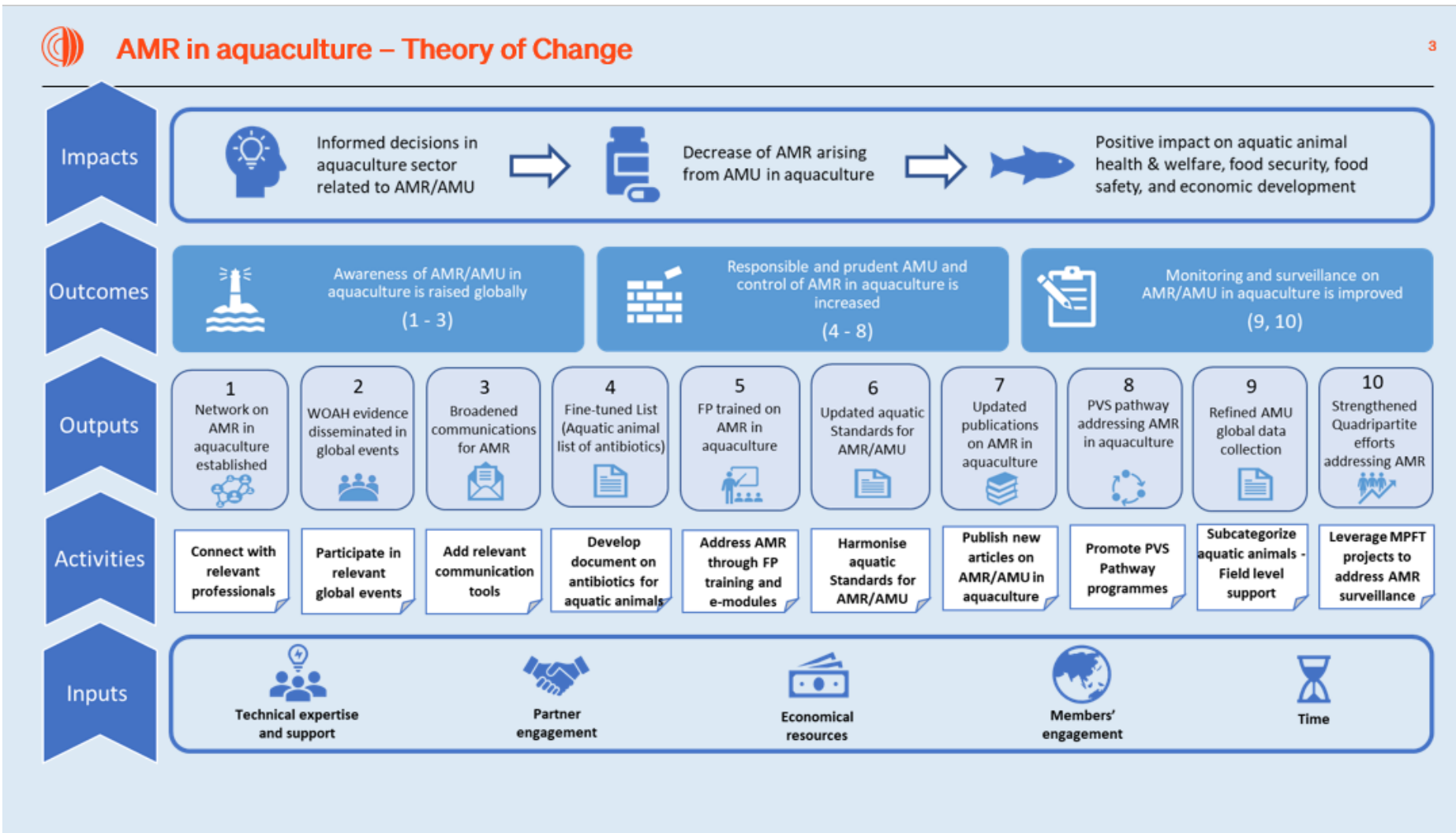
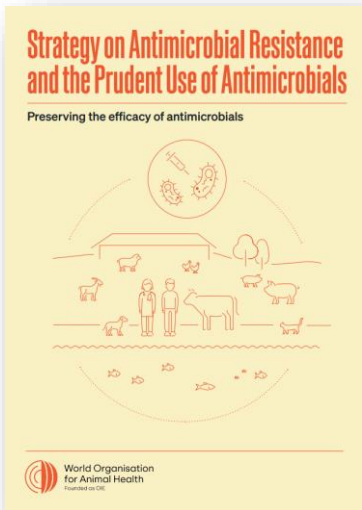
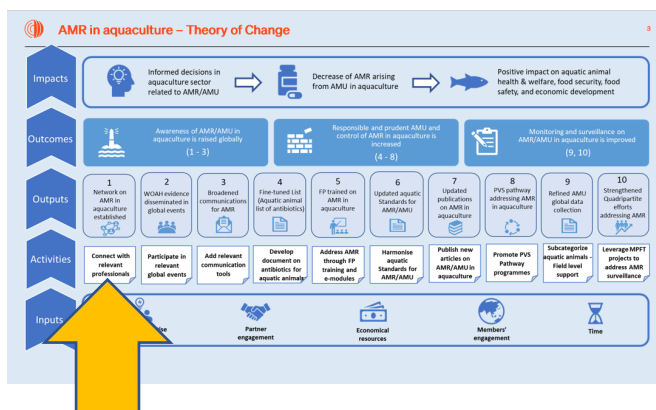


TABLE 3 - ACTIVITIES TO SUPPORT THE ACHIEVEMENT OF OBJECTIVE 3: RESILIENCE

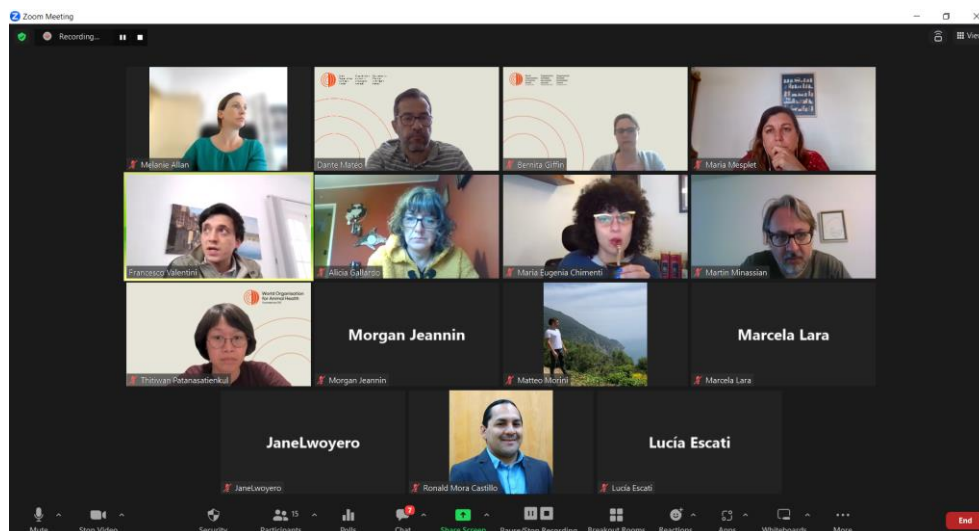
Activity	Description	Resources required
3.1 Formalise procedures for a coordinated OIE approach to disease emergencies	Develop a procedure to coordinate the approach for responding to aquatic animal health emergencies of regional or global concern	Existing OIE resources / further investment may be required
3.2 Provide support for early response at the national level	Develop a proposal for an OIE mechanism to initiate early action to respond to emerging issues and support Members in their response efforts	Investment required
3.3 Develop guidelines for collaborative emergency response	Develop best practice guidelines for Members to enable them to respond collaboratively to disease emergencies, including emerging diseases	Investment required
3.4 Provide practical AMR guidance	Develop tools and practical guidance for evaluating and addressing the risks of AMR arising through the use of antimicrobials in aquatic animals	Build on existing OIE initiatives / further investment may be required

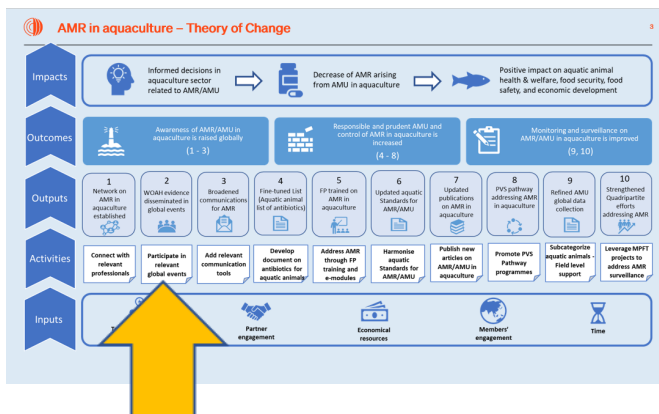




Creation of an AMR in Aquaculture Network

- Exchange information on activities and feedback
- 18 meetings so far
- WOAHA Members:
 - Headquarters (various Departments)
 - Regional/Subregional Representations
 - Aquatic Animal Health Standards Commission
 - WOAHA Collaborating Centre on Antimicrobial Stewardship in Aquaculture

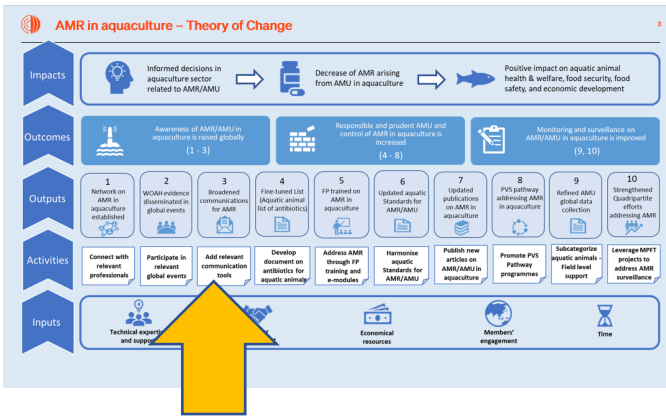




Participation in global events

- FAO global/regional seminars – 2021
- WB-MBASWP workshops – 2021
- 9th International Symposium Aquatic Animal Health ISA AH / WOA H Collaborating Centre for Antimicrobial Stewardship for Aquaculture CASA, Santiago, Chile – Sep 2022



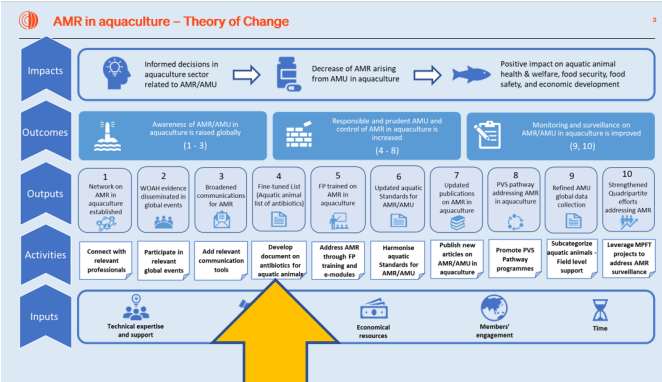


Development of communication tools

- *Fighting AMR: A guide for Aquatic Animal Health Professionals*
- *Fighting AMR: A guide for Aquatic Animal Producers*



<https://www.woah.org/en/document/fighting-antimicrobial-resistance-a-guide-for-aquatic-animal-health-professionals/>



Fine tune list of antimicrobials for aquatic animals

➤ **Technical Reference Document Listing Antimicrobial Agents of Veterinary Importance for Aquatic Species** (developed by an ad hoc Group of experts)

Annex IV. Technical Reference Document Listing Antimicrobial Agents of Veterinary Importance for Aquatic Species

An appendix to the List of antimicrobial agents of veterinary importance

MEETING OF THE WOA WORKING GROUP ON ANTIMICROBIAL RESISTANCE

Paris, 4 to 6 October 2022

1. Scope

The objective of this *Technical Reference Document Listing Antimicrobial Agents of Veterinary Importance for Aquatic Species* (hereafter referred as *Aquatic Technical Reference Document*) is to provide additional specific and updated information to the *List of Antimicrobial Agents of Veterinary Importance*. By identifying antimicrobial agents used in aquatic species, it aims to contribute to the development and update of national treatment guidelines, advice on prevention and best practice management, risk management, and risk prioritization to minimise and contain antimicrobial resistance (AMR). This document is not intended to serve as a treatment guide.

This document is focused on antibiotics used in food producing aquatic animals represented by species groups: fish and crustaceans. Although the use of antibiotics in the mollusc, amphibian and ornamental industries is also recognized, these applications are not within the scope of this document.

Only those antibiotics in authorized products labelled for the treatment of infections in fish and crustaceans considered. It is acknowledged that extra-label/off-label use often occurs in aquaculture, especially in countries where there are few antibiotic alternatives. In some countries, where regulations are minimal, or if to implement, there are antibiotic products being marketed, individually, or in combination with other molecules are commonly used in aquaculture establishments. Antibiotics exclusively used extra-label/off-label (i.e. evidence of on-label use in any country), or if unauthorised/well-established combinations, are not covered in the Aquatic Technical Reference Document.

Use of antibiotics in fish species are represented by the abbreviation 'FIS' in the Table of antimicrobial agents in fish and crustacean aquaculture of this document, following the designation in the main List of Antimicrobial Agents of Veterinary Importance. Use of antibiotics in crustacean species have been allocated the new design 'CRU'. It should be kept in mind that the antibiotics listed in the Aquatic Technical Reference Document may be available or appropriate to treat all susceptible fish and crustacean species affected by each pathogen, the multiplicity of species utilized in aquaculture, that varies according to geographical areas, environmental temperatures and salinities, the use of veterinary medicinal products varies accordingly.

It is acknowledged that the situation is very diverse in different regions for licensing, availability, extra label use, and susceptibility to antimicrobial agents, and that the general information provided in this document is to be interpreted in light of the local context. For instance, the authorization of antibiotics for use in some species might not be the same in all countries to treat the same bacterial pathogen.

Aquatic animal-related recommendations stated in the World Organisation for Animal Health (WOAH, found here) Standards and Guidelines (mainly in the Aquatic Animal Health Code) and the List of Antimicrobial Agents of Veterinary Importance should be considered in conjunction with this document.

2. Methodology to prepare this document

An ad hoc Group on Technical Reference for Aquatic Animals was nominated by WOA to develop the A Technical Reference Document. The ad hoc Group's members (Appendix 1a) consisted of representatives WOA Working Group on Antimicrobial Resistance (AMR) and experts from various geographical areas complementary expertise.

As a first step, data of antibiotics used in aquaculture worldwide was compiled. The information obtained product labels and official lists of authorized antimicrobials from various countries was used to prepare a preliminary list of important bacterial pathogens of fish and crustaceans, and the classes of antibiotics used to the diseases caused by these pathogens. This information was complemented by an evidence-guided literature undertaken by the ad hoc Group. Various globally focused reviews of aquatic animal diseases published in the last ten years (2012-2022) were consulted for fish and crustacean pathogens and recommended treatments.

Table of antimicrobial agents used in fish and crustacean aquaculture

ANTIMICROBIAL AGENTS (CLASS, SUB-CLASS)	VCA	VRA	VA	Molecule	Species ¹	Used/not used in fish/crustaceans	Specific comments for aquatic species by class
AMINOGLYCOSIDES	x		x	Neomycin	AVL, BOV, CAP, CRU	Not used	
AMINOGLYCOSIDES				Spectinomycin	AVL, BOV, CAP, EQU, LEP, OVA, SIL	Not used	
AMINOGLYCOSIDES	x			Dihydrostreptomycin	AVL, BOV, CAP, EQU, LEP, OVA, SIL	Not used	
AMINOGLYCOSIDES				Streptomycin	AVL, AV, SIL, BOV, CAP, EQU, LEP, OVA, SIL	Not used	For the aminoglycoside ² + 2 desoxytetracycline regimen is used to treat infections caused by Aeromonas, Edwardsiella and Vibrio in fish and crustaceans.
AMINOGLYCOSIDES + DEOXYTETRACYCLINES	x			Amikacin (thymon-aminicillin antibiotic)	EGU	Not used	
				Apramycin	AVL, BOV, LEP, OVA, SIL	Not used	
				Amikacin (thymon-aminicillin antibiotic)	BOV, LEP, OVA, SIL	Not used	
				Fransisella spp.	BOV, CAP, OVI	Not used	
				Gentamicin	AVL, BOV, CAM, CAP, EQU, LEP, OVA, SIL	Not used	
				Kanamycin	AVL, BOV, EQU, SIL	Not used	
				Neomycin	AVL, SIL, BOV, CAP, CRU, EQU, LEP, OVA, PBL, SIL	Used	
				Flamoxonyl	AVL, BOV, CAP, OVA, LEP, SIL	Not used	
				Tobramycin (thymon-aminicillin antibiotic)	EGU	Not used	

¹ Criteria for categorization described in the List of Antimicrobial Agents of Veterinary Importance
² Species abbreviations described in List of Antimicrobial Agents of Veterinary Importance
³ Abbreviations for aquatic species in relation to the List of Antimicrobial Agents of Veterinary Importance: FIS: molecules considered as used in fish; CRU: new species denomination for molecules considered as used in crustaceans

Appendix 2

LIST OF MAJOR BACTERIAL PATHOGENS AND DISEASES AFFECTING AQUATIC SPECIES SPECIES

Pathogens ¹	Examples of diseases	Examples of susceptible host species
Fish		
<i>Aeromonas</i> spp. (<i>A. caviae</i> , <i>A. hydrophila</i> , <i>A. veronii</i>)	Mollic <i>Aeromonas</i> septicemia	Cyprinids (carp), Salmonids (salmon, trout), Siluriformes (catfish)
<i>Aeromonas salmonicida</i>	Furunculosis	Cichlids (tilapia), marine fish (various species), Salmonids (salmon, trout)
<i>Chlamydia</i> sp.	Epitheliocystis	Cichlids (tilapia), Siluriformes (catfish)
<i>Edwardsiella ictaluri</i>	Etiatic septicemia of catfish	Siluriformes (catfish)
<i>Edwardsiella piscicida</i> (formerly <i>E. ictaluri</i>)	Edwardsiosis	Anguilliformes (eel), Cichlids (tilapia), marine fish (various species), Pelecypods (ayu), Salmonids (trout), Siluriformes (catfish)
<i>Flavobacterium branchiolum</i>	Bacterial gill disease	Salmonids (salmon, trout)
<i>Flavobacterium columnare</i> (formerly <i>Flexibacter columnaris</i>)	Columnaris disease	Cichlids (tilapia), Cyprinids (carp), Salmonids (salmon, trout), Siluriformes (catfish)
<i>Flavobacterium psychrophilum</i>	Bacterial cold water disease, rainbow trout fry syndrome	Pelecypods (ayu), Salmonids (salmon, trout)
<i>Francisella</i> spp.	Francisellosis	Cichlids (tilapia), marine fish (various species), Siluriformes (catfish)
<i>Lactococcus garvieae</i> , <i>L. peturi</i>	Piscine Lactococcosis	Cichlids (tilapia), marine fish (various species), Salmonids (trout)
<i>Nocardia</i> spp.	Nocardiosis	Cichlids (tilapia), marine fish (various species)
<i>Photobacterium damselae</i> subsp. <i>piscicida</i> (formerly <i>Pasteurella piscicida</i>), <i>P. damselae</i> subsp. <i>damselae</i>	Pseudotuberculosis, pasteurellosis, photobacteriosis	Cichlids (tilapia), marine fish (various species), Salmonids (salmon, trout)
<i>Piscirickettsia salmonis</i>	Piscirickettsiosis	Salmonids (salmon, trout)
<i>Pseudomonas</i> spp.	Pseudomoniasis, <i>Pseudomonas</i> septicemia	Siluriformes (catfish)

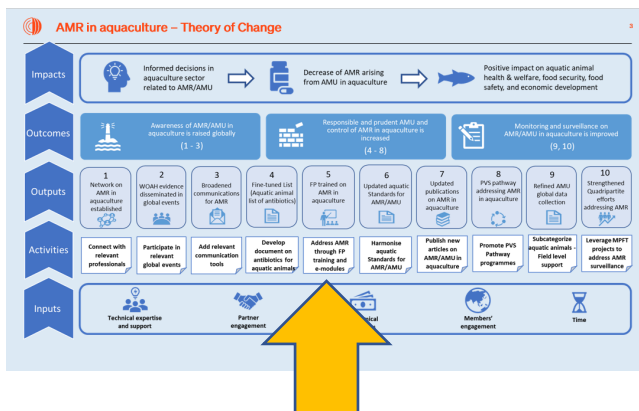
¹ In parenthesis are examples of common pathogenic species

Appendix 3

ANTIMICROBIAL CLASSES USED IN VETERINARY MEDICINE FOR AQUATIC SPECIES INFECTIONS

FINFISH	Aeromonas spp. (A. caviae, A. hydrophila, A. veronii), Mollic Aeromonas salmonicida	Aeromonas salmonicida	Chlamydia sp. - Epitheliocystis	Edwardsiella ictaluri - Etiatic septicemia of catfish	Edwardsiella piscicida - Edwardsiosis	Flavobacterium branchiolum - Bacterial gill disease	Flavobacterium columnare - Columnaris disease	Flavobacterium psychrophilum - Bacterial cold water disease, rainbow trout fry syndrome	Francisella spp. - Francisellosis	Lactococcus garvieae, L. peturi - Piscine Lactococcosis	Nocardia sp. - Nocardiosis	Photobacterium damselae piscicida, P. damselae subsp. damsela - Pseudotuberculosis, pasteurellosis, photobacteriosis	Piscirickettsia salmonis - Piscirickettsiosis	Pseudomonas spp. - Pseudomoniasis, Pseudomonas septicemia
AMINOGLYCOSIDES + 2 DEOXYTETRACYCLINES	x	x	x	x	x	x	x	x	x	x	x	x	x	x
AMPHIPHILIC LINCOSAMIDES	x	x	x	x	x	x	x	x	x	x	x	x	x	x
MAGNESIUM PENICILLINS	x	x												
FRANSISCELLA DERIVATIVES					x									
FLUOROQUINOLONES 1 st Gen	x	x							x					
QUINOLONES 2 nd Gen (FLUROQUINOLONES)	x	x												
SULFONAMIDES	x	x												
SULFONAMIDES + DIAMINOPYRIMIDINES	x	x	x	x	x	x	x	x	x	x	x	x	x	x
TETRACYCLINES	x	x	x											

<https://www.woah.org/app/uploads/2022/11/a-woah-wg-amr-report-oct-2022.pdf>



Focal Points trained on AMR in Aquaculture Supporting our Regional/Subregional Representation workshops/training sessions

- Sub-Regional workshop on Antimicrobial Resistance in aquaculture (Durban 2019)
- Training Seminar for Focal Points on Veterinary Products for the Africa region - 7th cycle (on-line 2022)
- Regional Seminar for OIE National Focal Points for Veterinary Products - 7th Cycle (on-line 2022)
- Eastern and Southern Africa Workshop on Aquatic Animal Health and AMR (Maputo 2022)
- Development of Guidelines for use of veterinary products in Aquatic Animals (Entebbe 2023)
- Training Seminar for Focal Points: AMR in Aquaculture Workshop for English Speaking Africa (Kigali 2023)



eLearning modules on the responsible use of antimicrobials in terrestrial and aquatic animals

Activity lead : WOAHA Capacity Building Department

Development : Consortium Lattanzio (Phylum & IZSve)

Technical review : WOAHA AMR&VPD

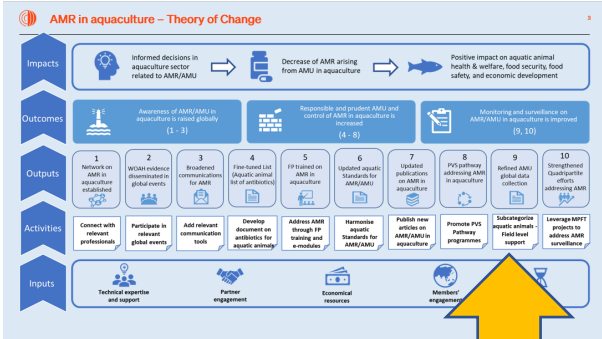
Module	Level	Consortium members
1. General introduction to AMR, with WOAHA lens	Day 1 and VPP	Phylum
2. Stewardship on AMR under One Health approach	Day and VPP	Instituto Zooprofilattico Sperimentale delle Venezie IZSve
3. Stewardship on AMR in terrestrial animals	Day 2	Phylum
4. Stewardship on AMR in aquatic animals	Day 2	Instituto Zooprofilattico Sperimentale delle Venezie IZSve
5. Building a One Health national AMR Action Plan	Expert level	Phylum

Module 4: Stewardship on AMR in aquatic animals

- Unit 1 – Responsible and prudent use in aquaculture production
- Unit 2 – Responsibilities of different actors involved in antimicrobial consumption
- Unit 3 – AMR risk assessment in fish farming
- Unit 4 – Collection of data about antimicrobial use in aquaculture
- Unit 5 – AMR Action Plan under One Health Approach

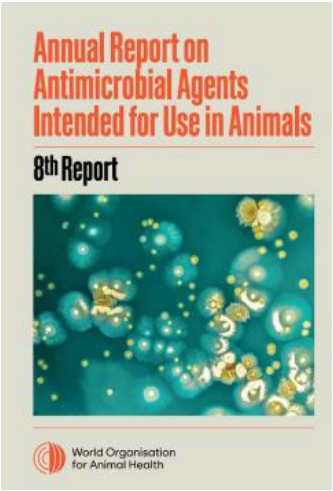


A9. Sub-categorisation of aquatic animals for AMU database



Refine AMU Global data collection for aquatic animals

- Sub-categorization of food-producing aquatic animals
- Inclusion of 'ornamental fish' within non-food-producing animals



Excel Template

25 Food-producing animal species covered by the information on antimicrobial quantities

Please indicate which food-producing animals are covered by the data. Multiple selections are possible.

For the purpose of this database, the following terms are defined:

1. Terrestrial food-producing animals
Pigs – commercial: pigs including piglets, fattening pigs and breeding pigs.
Sheep/goats (mixed flocks): use this option only if there are mixed flocks and you cannot differentiate between sheep and goats in your country.
Other commercial poultry: it includes turkey, duck, geese, quail, guinea fowl, pheasant, ostrich, etc. in commercial production.
Poultry – backyard: poultry including hens in backyard or village flocks.
Equidae: horses, donkeys and the like.
All – terrestrial food-producing animals: use this option only if all terrestrial food-producing animals listed in question 25 (e.g. commercial, pigs - backyard, etc.) are covered by the information on antimicrobial quantities.

2. Aquatic food-producing animals
Fish – Cyprinidae: carp, etc.
Fish – Salmonidae: salmon, trout, etc.
Fish – Cichlidae: tilapia, etc.
Fish – Siluriformes: catfish, etc.
Crustaceans – Penaeidae: marine shrimp/prawn.
All – aquatic food-producing animals (aquaculture): use this option only if all aquatic food-producing animals listed in question 25 (e.g. commercial, fish - backyard, etc.) were included in the information on antimicrobial quantities.

Terrestrial food-producing animals

- Cattle
- Pigs - commercial
- Pigs - backyard
- Sheep
- Goats
- Sheep and goats (mixed flocks)
- Layers - commercial production for eggs
- Broilers - commercial production for meat
- Other commercial poultry
- Poultry - backyard
- Buffaloes (excluding Syncerus caffer)
- Cervidae (farmed)
- Camelidae
- Equidae
- Rabbits
- Bees - honey
- Reptiles (e.g. crocodiles)

Other terrestrial food-producing animals

- Other

All terrestrial food-producing animals

- All - terrestrial food-producing animals

Aquatic food-producing animals (aquaculture)

- Fish - Cyprinidae
- Fish - Salmonidae
- Fish - Cichlidae
- Fish - Siluriformes
- Fish - Marine
- Fish - Undefined
- Crustaceans - Penaeidae
- Molluscs
- Amphibians

Other aquatic food-producing animals (aquaculture)

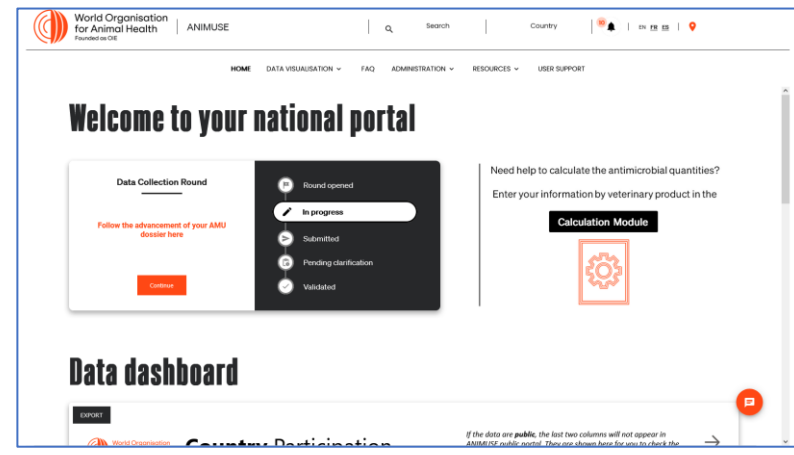
- Other

All aquatic food-producing animals (aquaculture)

- All - aquatic food-producing animals (aquaculture)



ANIMUSE



27 Non food-producing animal species covered by antimicrobial quantities, if any

Please indicate which non food-producing animals are covered by the data. Multiple selections are possible.

- Canines
- Felines
- Equidae
- Ornamental Fish
- Other

28 Clarification of other species considered to be non food-producing animals, if your response to Question 27 is 'Other'



11 Animal species covered by the information on antimicrobial quantities.

Terrestrial food-producing animals

- Cattle
- Pigs - commercial
- Pigs - backyard
- Sheep
- Goats
- Sheep and goats (mixed flocks)
- Layers - commercial production for eggs
- Broilers - commercial production for meat
- Poultry - backyard
- Other commercial poultry
- Buffaloes (excluding Syncerus caffer)
- Cervidae (farmed)
- Camelidae
- Equidae
- Rabbit/Hares
- Bees
- Reptiles (e.g. crocodiles)
- Other
- All

Aquatic food-producing animals

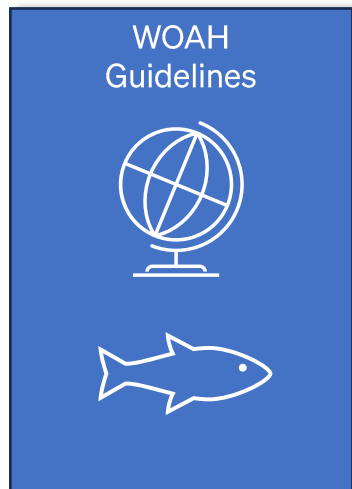
- Fish - Cyprinidae
- Fish - Salmonidae
- Fish - Cichlidae
- Fish - Siluriformes
- Fish - Marine
- Fish - Undefined
- Crustaceans - Penaeidae
- Molluscs
- Amphibians
- Other
- All

Non-food-producing animals

- Canines
- Felines
- Equidae
- Ornamental Fish
- Other



Q4 2023

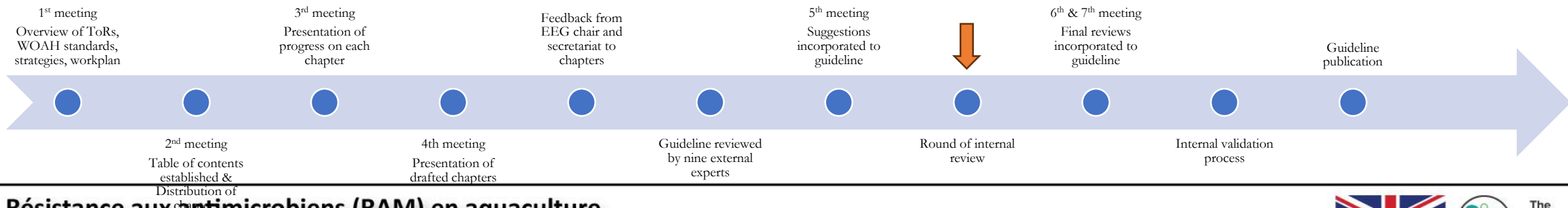


Q1 2025



Electronic expert group

	Name	Professional affiliation
1	Dr Sameh ABDELAZEEM	Researcher – Central Laboratory for Aquaculture, Agriculture Research Center, EGYPT
2	Dr Nelly ISYAGI	Fisheries and Aquaculture Trade and Investment Expert AU-IBAR, KENYA
3	Prof Dr Indrani KARUNASAGAR	Director (Projects & DST-TEC), Nitte (DU) Coordinator, MSc Marine Biotechnology (DBT), NUCSER / FAO Reference Center AMR, INDIA
4	Dr Marcela LARA	Advisor - Centre for Antimicrobial Stewardship on Aquaculture CASA (WOAH CC), CHILE
5	Dr Eduardo M. LEAÑO	Senior Programme Officer Network of Aquaculture Centres in Asia-Pacific NACA, THAILAND
6	Prof Dr Dušan PALIĆ	Professor and Chair - Fish Diseases and Fisheries Biology Ludwig-Maximilians-Universität München, GERMANY
7	Dr F. Carl UHLAND	Vet Epidemiologist / Microbiologist, Foodborne Disease & AMR Surveillance Division, Centre for Food-borne, Environ & Zoonotic, Public Health Agency of Canada, CANADA





Thank you

d.mateo@woah.org

12, rue de Prony, 75017 Paris, France

T. +33 (0)1 44 15 19 49

F. +33 (0)1 42 67 09 87

woah@woah.org

www.woah.org

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