World Organisation for Animal Health

WOAH Workplan on AMR in Aquaculture

Regional Workshop on Antimicrobial Resistance in Aquaculture for English-Speaking African Countries

13 - 15 August 2025
Harare, Zimbabwe

Dr Dante Mateo

Scientific Coordinator

AMR&VPD – WOAH

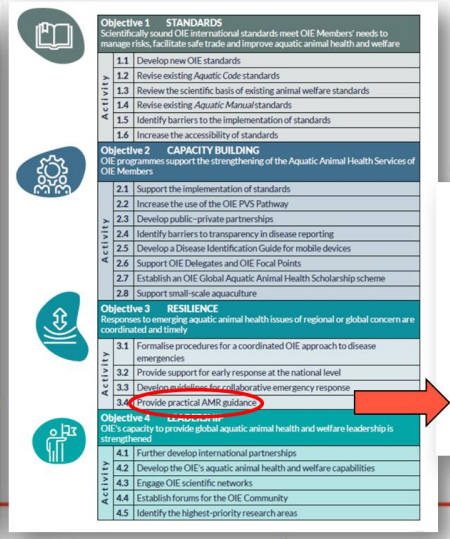
The Fleming Fund

Funded by UK Government

World Organisation for Animal Health

WOAH AMR & Aquatic Strategies

- Improve AMR awareness and understanding
- Strengthen knowledge through surveillance and research
- Support good governance and capacity building
- Encourage implementation of international standards



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
Activity	1.2	Revise existing *Aquatic Code* standards
Activity	1.3	Review the scientific basis of existing animal welfare standards
Activity	1.4	Revise existing *Aquatic Manual* standards
Activity	1.5	Identify barriers to the implementation of standards
Activity	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
Activity	2.2	Increase the use of the OIE PVS Pathway
Activity	2.3	Develop public–private partnerships
Activity	2.4	Identify barriers to transparency in disease reporting
Activity	2.5	Develop a Disease Identification Guide for mobile devices
Activity	2.6	Support OIE Delegates and OIE Focal Points
Activity	2.7	Establish an OIE Global Aquatic Animal Health Scholarship scheme
Activity	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
Activity	3.2	Provide support for early response at the national level
Activity	3.3	Develop guidelines for collaborative emergency response
Activity	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
Activity	4.2	Develop the OIE's aquatic animal health and welfare capabilities
Activity	4.3	Engage OIE scientific networks
Activity	4.4	Establish forums for the OIE Community
Activity	4.5	Identify the highest-priority research areas

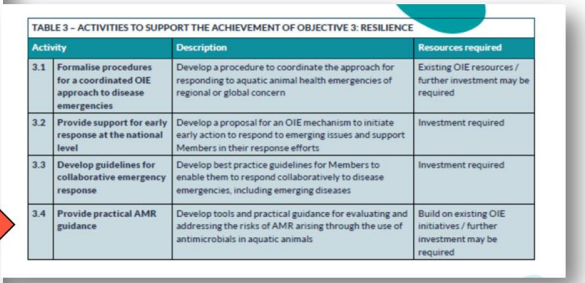


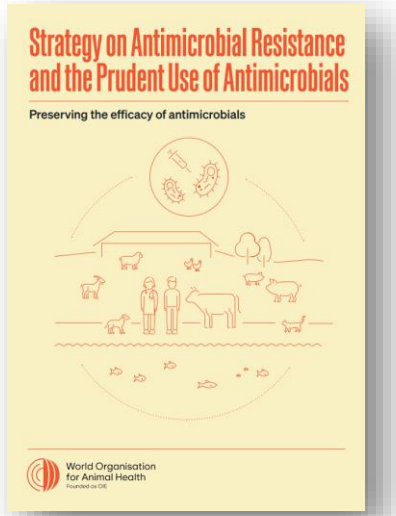
TABLE 3 – ACTIVITIES TO SUPPORT THE ACHIEVEMENT OF OBJECTIVE 3: RESILIENCE

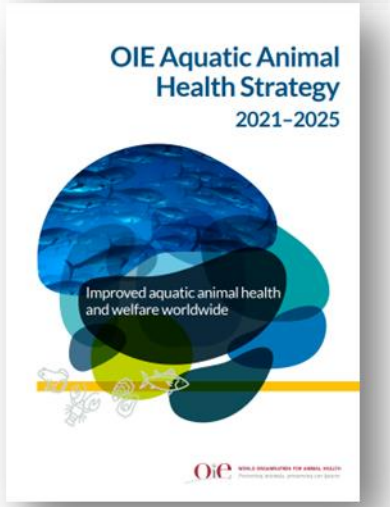
Activity		Description	Resources required
3.1	**Formalise procedures for a coordinated OIE approach to disease emergencies**	Develop a procedure to coordinate the approach for responding to aquatic animal health emergencies of regional or global concern	Existing OIE resources / further investment may 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

The Fleming Fund
Funded by UK Government

World Organisation for Animal Health

WOAH Workplan on AMR in Aquaculture





AMR in aquaculture – Theory of Change

3

Impacts

Informed decisions in aquaculture sector related to AMR/AMU → Decrease of AMR arising from AMU in aquaculture → Positive impact on aquatic animal health & welfare, food security, food safety, and economic development

Outcomes

- Awareness of AMR/AMU in aquaculture is raised globally (1 - 3)
- Responsible and prudent AMU and control of AMR in aquaculture is increased (4 - 8)
- Monitoring and surveillance on AMR/AMU in aquaculture is improved (9, 10)

Outputs

1. Network on AMR in aquaculture established
2. WOAH evidence disseminated in global events
3. Broadened communications for AMR
4. Fine-tuned List (Aquatic animal list of antibiotics)
5. FP trained on AMR in aquaculture
6. Updated aquatic Standards for AMR/AMU
7. Updated publications on AMR in aquaculture
8. PVS pathway addressing AMR in aquaculture
9. Refined AMU global data collection
10. Strengthened Quadripartite efforts addressing AMR

Activities

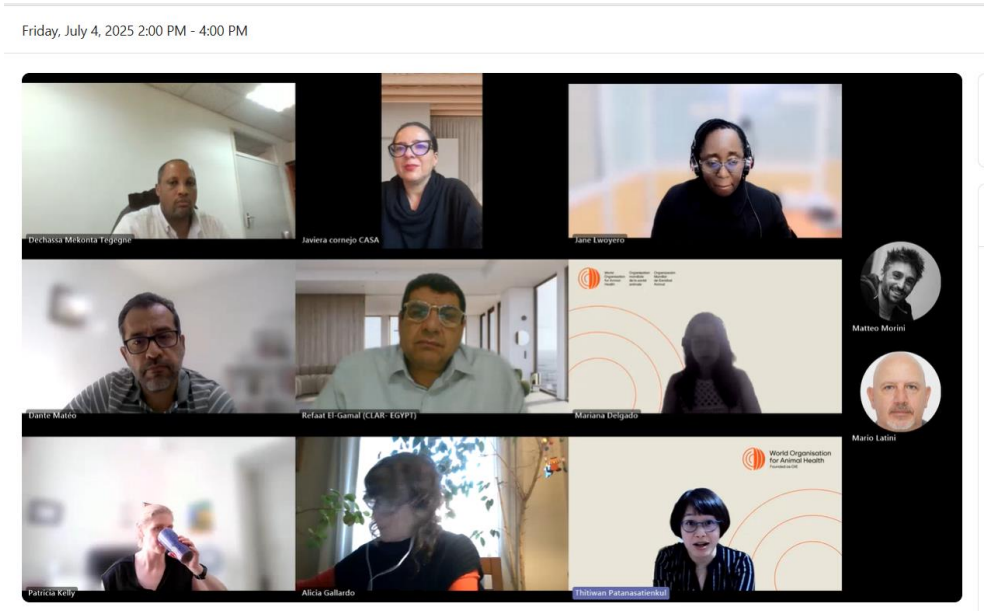
- Connect with relevant professionals
- Participate in relevant global events
- Add relevant communication tools
- Develop document on antibiotics for aquatic animals
- Address AMR through FP training and e-modules
- Harmonise aquatic Standards for AMR/AMU
- Publish new articles on AMR/AMU in aquaculture
- Promote PVS Pathway programmes
- Subcategorize aquatic animals - Field level support
- Leverage MPFT projects to address AMR surveillance

Inputs

Technical expertise and support; Partner engagement; Economical resources; Members' engagement; Time

The Fleming Fund
Funded by UK Government

A1. Connecting relevant professionals



O1. AMR in Aquaculture Network

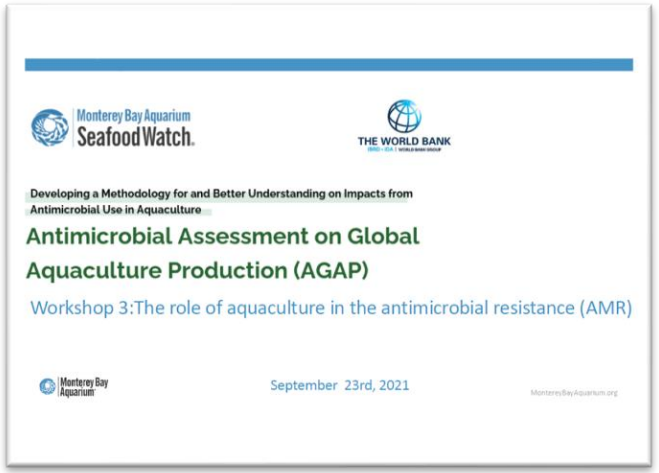
- Exchange information on activities and seek feedback
- Bimonthly meetings (23rd in July 2025)
- Meeting notes for follow up actions
- WOAH Members:
  - Headquarters (various Departments)
  - Regional/Subregional Representations
  - Aquatic Animal Health Standards Commission
  - Collaborating Centres
    - Centre for Antimicrobial Stewardship in Aquaculture (CASA), Chile
    - Central Laboratory for Aquaculture Research (CLAR), Egypt

The Fleming Fund
Funded by UK Government

A2. Disseminating WOAH evidence

O2. Participation in AAH global events

- FAO global/regional seminars – 2021
- WB-MBASWP workshops – 2021
- 9th International Symposium Aquatic Animal Health ISAAH / WOAH Collaborating Centre for Antimicrobial Stewardship for Aquaculture CASA, Santiago, Chile – Sep 2022
- 22nd International Conference of Diseases of Fish and Shellfish, Heraklion, Greece – Sep 2025

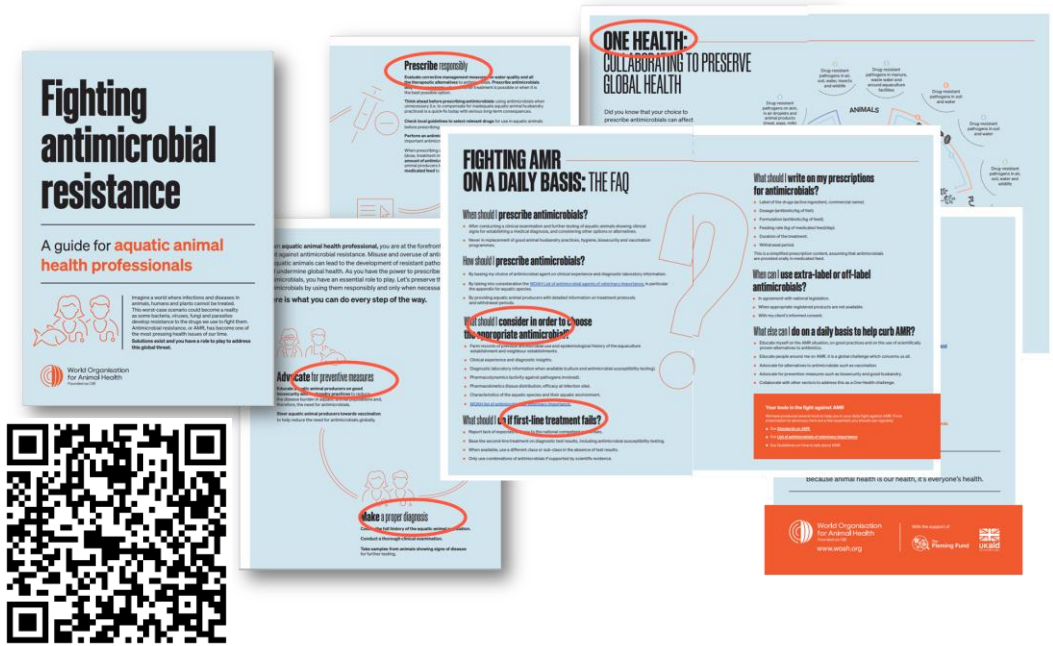


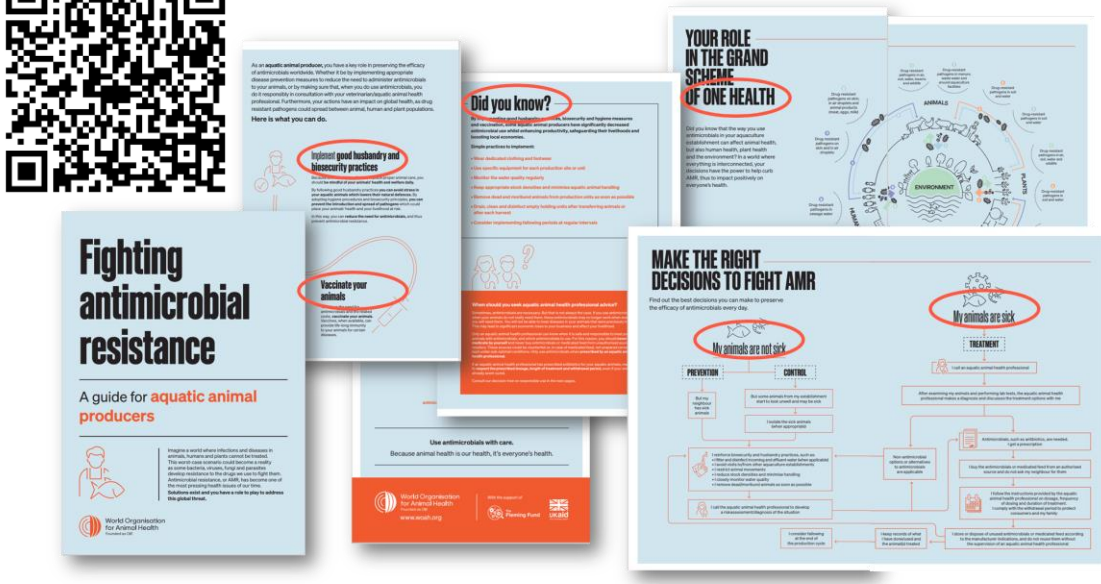
The Fleming Fund
Funded by UK Government

A3. Broadening tools – AMR aquatics

O3. Technical communication tools for aquaculture

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





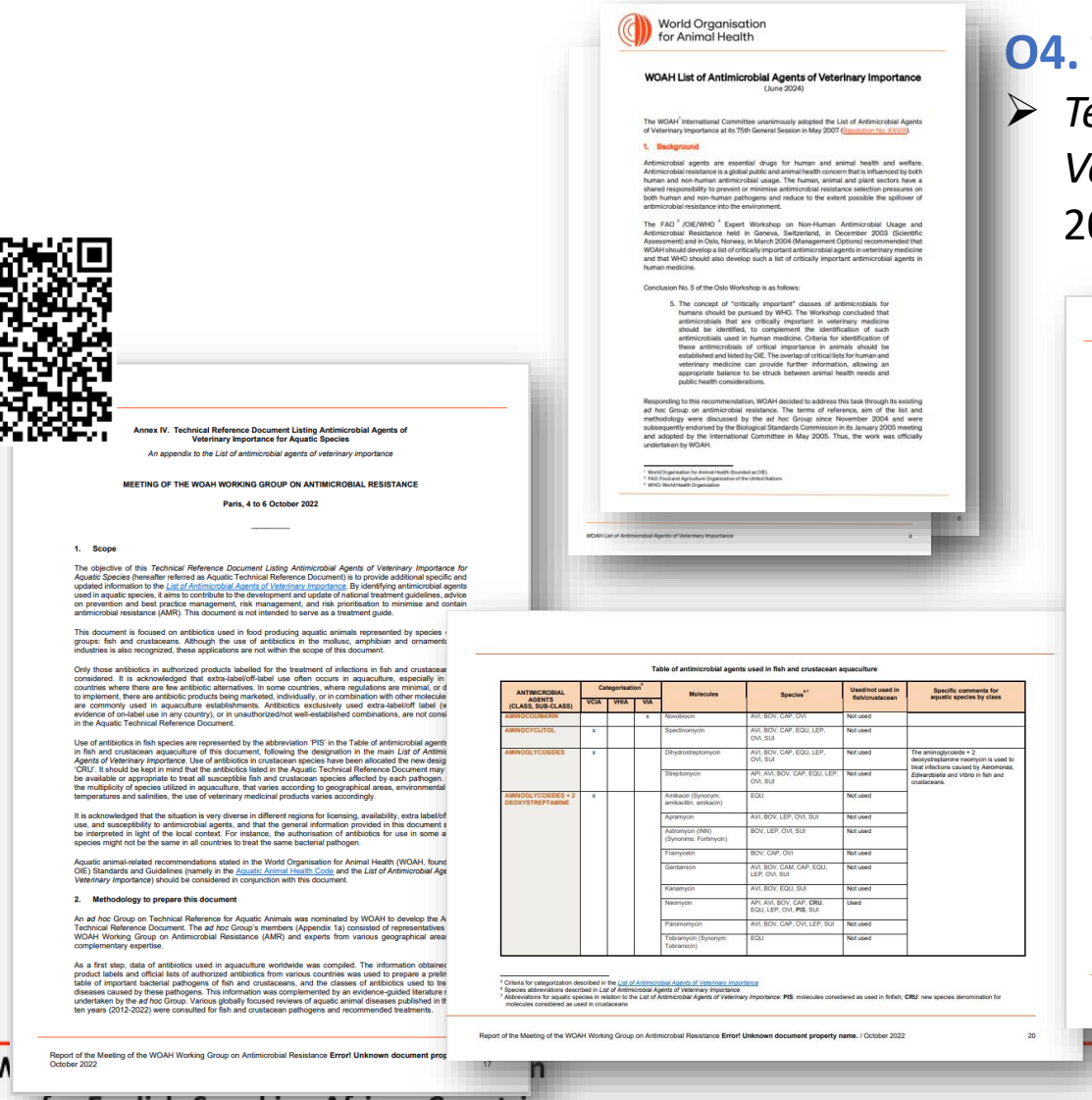
The Fleming Fund
Funded by UK Government

World Organisation for Animal Health

A4. Fine tuning WOAH List – aquatics

O4. Technical Reference Document for aquatics

- *Technical Reference Document Listing Antimicrobial Agents of Veterinary Importance for Aquatic Species* (*ad hoc* Group – 2022)



World Organisation for Animal Health

WOAH List of Antimicrobial Agents of Veterinary Importance
(June 2024)

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 WOAH WORKING GROUP ON ANTIMICROBIAL RESISTANCE

Paris, 4 to 6 October 2022

Table of antimicrobial agents used in fish and crustacean aquaculture

Appendix 2

LIST OF MAJOR BACTERIAL PATHOGENS AND DISEASES AFFECTING AQUATIC SPECIES SPECIES

Pathogens[3]	Examples of diseases	Examples of susceptible host species
Fish		
Aeromonas spp. (*A. caviae*, *A. hydrophila*, *A. veronii*)	Motile *Aeromonas septicaemia*	Cyprinids (carps), Salmonids (salmon, trout), Siluriformes (catfish)
Aeromonas salmonicida	Furunculosis	Cichlids (tilapia), marine fish (various species), Salmonids (salmon, trout)
Chlamydia sp.	Epitheliocystis	Cichlids (tilapia), Siluriformes (catfish)
Edwardsiella ictaluri	Enteric septicaemia of catfish	Siluriformes (catfish)
Edwardsiella piscicida (formerly *E. tarda*)	Edwardsiellosis	Anguilliformes (eel), Cichlids (tilapia), marine fish (various species), Plecoglossids (ayu), Salmonids (trout), Siluriformes (catfish)
Flavobacterium branchiophilum	Bacterial gill disease	Salmonids (salmon, trout)
Flavobacterium columnare (formerly *Flexibacter columnaris*)	Columnaris disease	Cichlids (tilapia), Cyprinids (carp), Salmonids (salmon, trout), Siluriformes (catfish)
Flavobacterium psychrophilum	Bacterial cold water disease, rainbow trout fry syndrome	Plecoglossids (ayu), Salmonids (salmon, trout)
Francisella spp.	Francisellosis	Cichlids (tilapia), marine fish (various species), Siluriformes (catfish)
Lactococcus garvieae, *L. petauri*	Piscine Lactococcosis	Cichlids (tilapia), marine fish (various species), Salmonids (trout)
Nocardia spp.	Nocardiosis	Cichlids (tilapia), marine fish (various species)
Photobacterium damselae subsp. *piscicida* (formerly *Pasteurella piscida*), *P. damselae* subsp. *damselae*	Pseudotuberculosis, pasteurellosis, photobacteriosis	Cichlids (tilapia), marine fish (various species), Salmonids (salmon, trout),
Piscirickettsia salmonis	Piscirickettsiosis	Salmonids (salmon, trout)
Pseudomonas spp.	Pseudomoniasis, *Pseudomonas septicaemia*	Siluriformes (catfish)

[3] In parenthesis are examples of common pathogenic species

Report of the Meeting of the WOAH Working Group on Antimicrobial Resistance **Error! Unknown document property name.** / October 2022 32

Appendix 3

ANTIMICROBIAL CLASSES USED IN VETERINARY MEDICINE FOR AQUATIC SPECIES INFECTIONS

FINFISH	*Aeromonas* spp. (*A. caviae*, *A. hydrophila*, *A. veronii*) motile *aeromonas septicaemia*	*Aeromonas salmonicida* – Furunculosis	*Chlamydia* sp. - Epitheliocystis	*Edwardsiella ictaluri* - Enteric septicaemia of catfish	*Edwardsiella piscicida* – Edwardsiellosis	*Flavobacterium branchiophilum* – Bacterial gill disease	*Flavobacterium columnare* – Columnaris	*Flavobacterium psychrophilum* – Cold water disease; rainbow trout fry syndrome	*Francisella* spp. – Francisellosis	*Lactococcus garvieae*, *L. petauri* – Lactococcosis	*Nocardia* sp. – Nocardiosis	*Photobacterium damselae piscicida*, *P. damselae damselae*, *Photobacterium*, *pseudotuberculosis*, *pasteurellosis*	*Piscirickettsia salmonis* – Piscirickettsiosis
AMINOGLYCOSIDES + 2 DEOXYSTREPTAMINE	X	X		X	X								
AMPHENICOLS	X	X		X	X	X	X	X	X	X		X	X
LINCOSAMIDES										X			
MACROLIDES			X			X	X		X	X			
PENICILLINS	X	X										X	
PHOSPHONIC ACID DERIVATIVES					X							X	
PLEUROMUTILINS													
QUINOLONES 1ST Gen	X	X			X			X				X	X
QUINOLONES 2ND G (FLUOROQUINOLONES)	X	X			X		X	X		X		X	
SULFONAMIDES	X	X					X				X	X	
SULFONAMIDES + DIAMINOPYRIMIDINES	X	X		X	X		X					X	
TETRACYCLINES	X	X	X		X	X	X	X	X	X		X	X

Report of the Meeting of the WOAH Working Group on Antimicrobial Resistance **Error! Unknown document property name.** / October 2022 34

Regional W… Aquaculture for English-Speaking African Countries

13 - 15 August 2025 Harare, Zimbabwe

The Fleming Fund

Funded by UK Government

World Organisation for Animal Health

A5a. Training WOAH Focal Points

O5a. Workshops on AMR/AMU/antimicrobials in aquaculture

Focal Point	Subject	Region	Place, year
AA	AMR (risk assessment)	Southern Africa	Durban, 2019
AA	AAH & AMR	Southern Africa	Maputo, 2022
AA & VP	VP registration & use	Eastern Africa	Entebbe, 2023
AA	AMR/AMU	ENG-Africa	Kigali, 2023
AA	AMR/AMU	FRE-Africa	Tunis, 2024
AA & VP	VP registration & use	Eastern Africa	Arusha, 2024
AA	AMU/AMR	Asia & the Pacific	Singapore, 2024

AA: Aquatic Animals; AAH Aquatic Animal Health; VMP: Veterinary Products





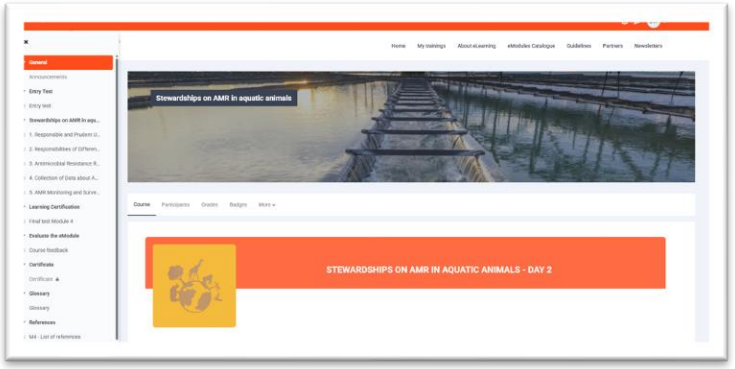
A5b. Training

O5b. eLearning module on Stewardship on AMR in aquatic animals

Activity lead : WOAH Capacity Building Department

Development : Consortium Lattanzio (Phylum & IZSVe)

Technical review : WOAH AMR&VPD



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

Module	Level	Developers (Consortium members)
1. **General introduction to AMR, with WOAH 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

The Fleming Fund
Funded by UK Government

A6. Harmonizing AMU/AMR aquatic standards

O6. Update process of Section 6 of the Aquatic Code

- Relevant sections on AMR/AMU of Terrestrial Code started updating process following new approaches and updates international guidance documents

Aquatic Animal Health Code — Contents | Index

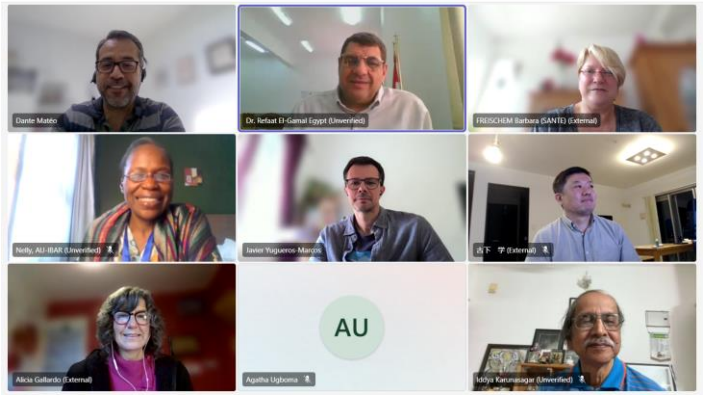
SECTION 6.

ANTIMICROBIAL USE IN AQUATIC ANIMALS

Chapter 6.1.	Introduction to the recommendations for controlling antimicrobial resistance	Adopted 2010, latest update 2011
Chapter 6.2.	Principles for responsible and prudent use of antimicrobial agents in aquatic animals	Adopted 2011, no updates
Chapter 6.3.	Monitoring of the quantities and usage patterns of antimicrobial agents used in aquatic animals	Adopted 2012, no updates
Chapter 6.4.	Development and harmonisation of national antimicrobial resistance surveillance and monitoring programmes for aquatic animals	Adopted 2012, no updates
Chapter 6.5.	Risk analysis for antimicrobial resistance arising from the use of antimicrobial agents in aquatic animals	Adopted 2015, no updates

The Fleming Fund — Funded by UK Government

A6. AMR/AMU standards: Ch 6.2 AC



Ad hoc Group for updating chapter 6.2 of the Aquatic Code

Name	Professional affiliation
Ms Barbara FREISCHEM (Chair)	WOAH Working Group on AMR European Medicine Agency, **THE NETHERLANDS**
Dr Nelly ISYAGI	Fisheries and Aquaculture Trade and Investment Expert AU-IBAR, **KENYA**
Dr Iddya KARUNASAGAR	Nitte (DU) Coordinator, MSc Marine Biotechnology (DBT), NUCSER / FAO RC AMR, **INDIA**
Dr Alicia GALLARDO	WOAH Aquatic Animal Health Standards Commission WOAH CC Centre for Antimicrobial Stewardship on Aquaculture CASA, **CHILE**
Dr Refaat EL GAMAL	WOAH CC Central Laboratory for Aquaculture Research (CLAR), **EGYPT**
Dr Manabu FURUSHITA	National Fisheries University, **JAPAN**

AMR&VPD transmitted AAHSC recommendation for updating AC Ch 6.2
Aug 2024

AAHSC requested a Gap analysis of Section 6 AC
Sep 2024

Gap analysis submission to AAHSC
Jan 2025

AMR&VPD proposed an AHG. AAHSC decided starting updates with Ch6.2
Feb 2025

AHG to update Ch 6.2 is formed
May 2025

Two AHG meetings are conducted
Jun-Aug 2025

Progress on Ch 6.2 is presented to AAHSC
Sep 2025

Round of comments by Members
Oct-Dec 2025 (?)

Comments are addressed in last AHG meeting
Jan 2026 (?)

Ch 6.2 is presented in GS for adoption
May 2026 (?)

The Fleming Fund
Funded by UK Government

A9a. Refining AMU database: Aquatics

O9a. Sub-categorization of food-producing aquatic animals

& Inclusion of 'ornamental fish'

Excel Template

25	Food-producing 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 ☐ 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)
27	Non food-producing animal species covered by antimicrobial quantities, if any	☐ 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'*	*<free text field>*

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:

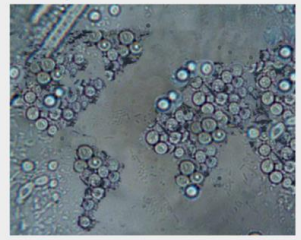
1. Terrestrial food-producing animals
Pigs – commercial: pigs including piglets, fattening pigs and breeding pigs.
Sheep/goats (mixed flocks): use this option only if there are mixed flocks and you cannot differentiate between sheep and goats in your country.
Other commercial poultry: it includes
duck, geese, quail, guinea fowl,
ostrich, etc. in commercial pro
Poultry – backyard: poultry
hens in backyard or village
Equidae: horses, donkey
All – terrestrial food-pr
option only if all terres
animals listed in quest
commercial, pigs - bac
the information on an

2. Aquatic food-produ
Fish – Cyprinidae: carp
Fish – Salmonidae: salm
Fish – Cichlidae: tilapia, et
Fish – Siluriformes: catfish, e
Crustaceans – Penaeidae: mari
All – aquatic food-producing animal
(aquaculture): use this option o
food-producing animals liste
Fish - Cyprinidae, Fish - Sa
Penaeidae, Molluscs, et
information on antimi

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

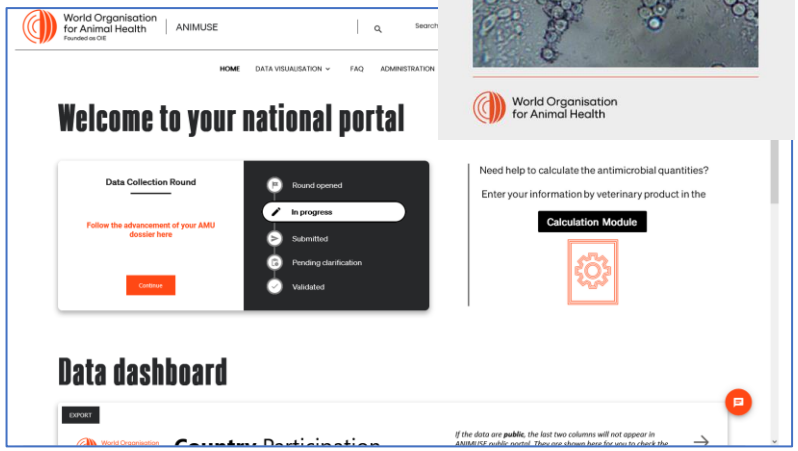
Annual Report on Antimicrobial Agents Intended for Use in Animals

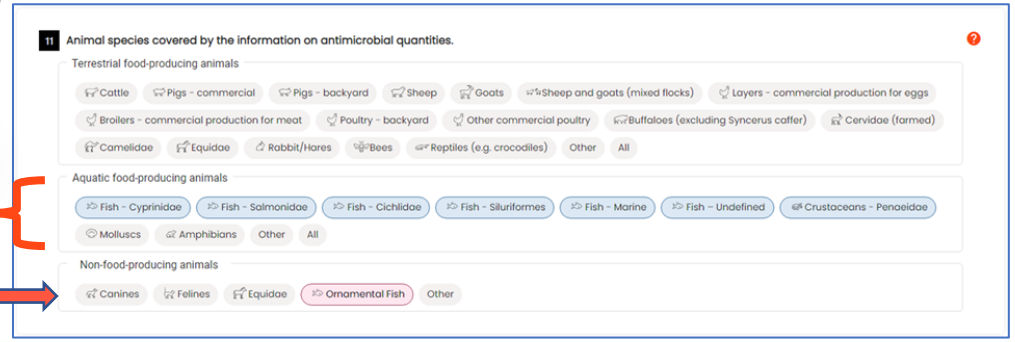
9th Report



World Organisation for Animal Health

ANIMUSE





The Fleming Fund

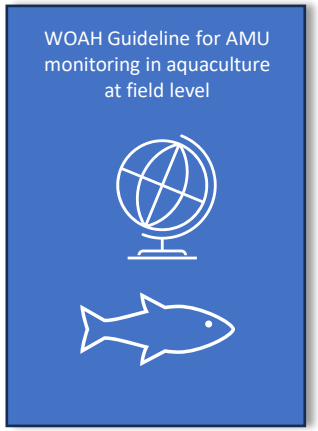
Funded by UK Government

World Organisation for Animal Health

A9b. Refining AMU database: Aquatics

O9b. Field level AMU data monitoring – Guideline

Q4 2023



Q4 2025

Technical expert group

Name	Professional affiliation
Dr Sameh ABDELAZEEM	Central Laboratory for Aquaculture, Agriculture Research Center, **EGYPT**
Dr Nelly ISYAGI	Fisheries and Aquaculture Trade and Investment Expert AU-IBAR, **KENYA**
Dr Indrani KARUNASAGAR	Nitte (DU) Coordinator, MSc Marine Biotechnology (DBT), NUCSER / FAO Reference Center AMR, **INDIA**
Dr Marcela LARA	Centre for Antimicrobial Stewardship on Aquaculture CASA (WOAH CC), **CHILE**
Dr Eduardo M. LEAÑO	Network of Aquaculture Centres in Asia-Pacific NACA, **THAILAND**
Dr Dušan PALIĆ	Fish Diseases and Fisheries Biology Ludwig-Maximilians-Universität München, **GERMANY**
Dr Sophie ST-HILAIRE	Jockey Club College of Veterinary Medicine and Life Sciences, City University of Hong Kong, **CHINA**
Dr F. Carl UHLAND	Foodborne Disease & AMR Surveillance Division, Centre for Food-borne, Environ & Zoonotic, Public Health Agency of Canada, **CANADA**

1st meeting
Overview of ToRs, WOAH standards, strategies, workplan

2nd meeting
Table of contents established & Distribution of chapters

3rd meeting
Presentation of progress on each chapter

4th meeting
Presentation of drafted chapters

Feedback from EEG chair and secretariat to chapters

Guideline reviewed by nine external experts

5th meeting
Suggestions incorporated to guideline

Round of internal review

6th & 7th meeting
Final reviews incorporated to guideline

Internal validation process

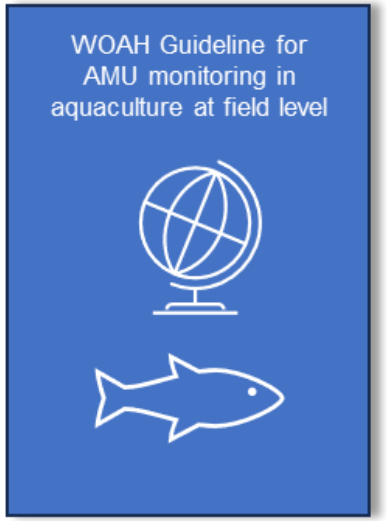
Guideline publication

The Fleming Fund
Funded by UK Government

A9c. Guideline Implementation

O9c. Workshop & Implementation of guideline in selected countries

(Asia and the Pacific – October 2025)



Workshop on practical use of guidelines

- Thailand
- Vietnam
- Philippines
- Indonesia

National scope monitoring plan

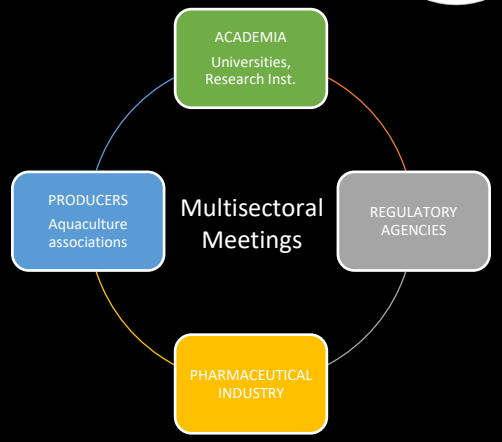
The Fleming Fund
Funded by UK Government

World Organisation for Animal Health

NEW: Promoting ATAs in aquaculture

REASONS (WP1)

IDRC · CRDI Canada



Alternatives to Antibiotics:
- Autogenous vaccines
- Bacteriophages
- Prebiotics
- Probiotics
- Immunostimulants
- Antimicrobial peptides
- Medicinal plants

Against main bacterial pathogens of:
- **Tilapia**
- **Shrimp**

Country multisectoral meetings

Centre for Antimicrobial Stewardship on Aquaculture CHILE
- Colombia
- Brazil

Centre for Genetic Engineering and Biotechnology CUBA
- Mexico
- Cuba ?

1° International multisectoral meeting → 2° International multisectoral meeting → **3-year Action plan**

2025 - 2026

The Fleming Fund — Funded by UK Government

Thank you !

Dante Mateo

AMR&VPD - WOAH

d.mateo@woah.org

The Fleming Fund

Funded by UK Government