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Training Report:

Aquatic sample collection, transportation and processing for AMR surveillance

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About WorldFish

WorldFish is a nonprofit research and innovation institution that creates, advances and translates scientific research on aquatic food systems into scalable solutions with transformational impact on human well-being and the environment. Our research data, evidence and insights shape better practices, policies and investment decisions for sustainable development in low- and middle-income countries.

We have a global presence across 20 countries in Asia, Africa and the Pacific with 460 staff of 30 nationalities deployed where the greatest sustainable development challenges can be addressed through holistic aquatic food systems solutions.

Our research and innovation work spans climate change, food security and nutrition, sustainable fisheries and aquaculture, the blue economy and ocean governance, One Health, genetics and AgriTech, and it integrates evidence and perspectives on gender, youth and social inclusion. Our approach empowers people for change over the long term: research excellence and engagement with national and international partners are at the heart of our efforts to set new agendas, build capacities and support better decision-making on the critical issues of our times.

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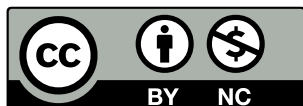
Acknowledgments

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Background:

Effective aquatic sample collection, transportation, and laboratory processing are critical for generating high-quality, reliable, and comparable data for antimicrobial resistance (AMR) surveillance in aquaculture, as inappropriate handling can compromise sample integrity and undermine surveillance outcomes. To strengthen national capacity for evidence-based AMR surveillance, technical staff from the Department of Fisheries (DOF) were trained on standardized field and laboratory protocols to support systematic sample collection, transportation, processing and enrichment for microbiological assessment. This hands-on training was arranged under the Fleming Fund Country Grant to Bangladesh (FFCGB), with technical and programmatic support from the SAAF AoW3 One Health program of WorldFish. The training represents a continuous and strategic effort by WorldFish's Aquatic Animal Health and One Health (AAH and OH) programs to strengthen the capacity of competent authorities in Bangladesh, enabling them to lead, sustain, and scale up AMR surveillance in aquaculture under a One Health approach, and to generate robust evidence to inform policy, regulatory actions, and responsible antimicrobial use in the sector. This session (Part 1) formed part of a five-day, hands-on training program designed to comprehensively cover the key components of antimicrobial resistance (AMR) surveillance in aquaculture. The training addressed multiple aspects of the surveillance process, including standardized aquatic sample collection, safe transportation, laboratory processing, quality assurance, and data integrity, with a strong emphasis on practical application to strengthen participants' technical skills and operational readiness for field and laboratory implementation.

The objective of the training was to provide refresher, hands-on training to Department of Fisheries technical staff on standardized aquatic sample collection, transportation, and processing to ensure the quality and consistency of AMR surveillance in aquaculture.

Training details

Venue: Quality Control (QC) Laboratory, Department of Fisheries, Savar, Dhaka

Date: November 19, 2025

Participants: Six (6) DOF staff from Dhaka, Khulna and Chattogram FIQC labs

Trainer: Shafiq Rehman, Scientist, Aquatic Animal Health and One Health, WorldFish

The training session commenced with an inauguration and introduction session chaired by Shilpi Dey, Quality Assurance Manager at the Department of Fisheries, followed by a pre-training assessment conducted by Shafiq Rehman to understand participants' baseline knowledge on AMR surveillance in aquaculture. Representatives from the Quality Control Laboratory, FFCGB, WorldFish, and CVASU participated in this opening session. After a tea break, the technical session began with a presentation and interactive discussion on aquatic sample collection and fish necropsy, facilitated by Shafiq Rehman. This was followed by a hands-on practical session, during which participants practiced specimen collection from fish and shrimp samples under his guidance, strengthening their practical skills in standardized sample handling for AMR surveillance.



Coverage of Key Technical Topics and Practical Demonstrations

The training comprehensively covered the critical steps required for effective antimicrobial resistance (AMR) surveillance in aquaculture, combining theoretical presentations with intensive hands-on laboratory practice. Emphasis was placed on ensuring standardization, biosafety, and data quality throughout the entire sample-to-result pathway.

The session began with a detailed presentation covering pre-collection preparation, highlighting the importance of advance planning before field activities. Participants were guided on preparing sampling kits, ensuring the availability of sterile instruments, transport media, personal protective equipment (PPE), labeling materials, cold chain arrangements, and biosecurity measures. Proper documentation, including sample identification, farm or market information, and chain-of-custody records, was emphasized as a prerequisite for traceable and reliable AMR surveillance data.

This was followed by a detailed discussion on developing a sample collection plan, aligned with AMR surveillance objectives. The trainer explained how to determine sample size, select representative fish and shrimp populations, identify sampling locations (fish farms and wet markets), and prioritize target species and tissues. The importance of minimizing bias and ensuring consistency across sampling sites was highlighted to support comparability of AMR data over time and across regions.

The training then addressed live sample collection from fish farms, focusing on appropriate handling techniques to reduce stress and avoid contamination. Participants learned how to safely capture live fish, maintain water quality during temporary holding, and apply biosecurity measures to prevent disease spread between ponds or farms. Practical considerations for working in field conditions were discussed, including communication with farmers and maintaining animal welfare standards.

A dedicated session covered fish euthanasia, emphasizing humane and ethical methods consistent with national and international guidelines. The trainer explained approved euthanasia techniques, appropriate dosages, and safety precautions, ensuring that participants understood the importance of minimizing animal suffering while preserving sample quality for laboratory analysis.

The presentation also covered fresh sample collection procedures from fish farms and wet markets, highlighting differences in handling live versus freshly dead specimens.

Participants were trained on selecting suitable specimens, assessing freshness, and avoiding compromised samples. Procedures for dead specimen transportation were explained, including the use of insulated containers, ice packs, and proper sealing to prevent leakage and cross-contamination, while maintaining the cold chain.

In parallel, live specimen transportation protocols were discussed, focusing on maintaining optimal conditions such as oxygenation, temperature control, and minimal transport time to preserve sample integrity. The risks associated with stress-induced bacterial changes were explained, reinforcing the need for careful transport planning.

Following the presentation, the trainer conducted a laboratory demonstration on fish necropsy for AMR surveillance. Step-by-step necropsy techniques were shown, emphasizing aseptic procedures and biosafety. Participants were trained to systematically collect samples from fish and shrimp organs for AMR surveillance, including skin, gills, muscle, and intestinal tissues. Proper sterilization of instruments between samples and prevention of cross-contamination were repeatedly reinforced.

The final component focused on sample enrichment, where participants learned how collected specimens are processed and placed in appropriate culture media and incubators to enrich targeted bacterial isolates. The trainer explained the rationale behind enrichment, incubation conditions, and timelines, linking this step directly to downstream antimicrobial susceptibility testing (AST) and AMR analysis.



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After the presentation, participants actively engaged in hands-on laboratory practice, applying each step under close supervision. Trainees independently performed necropsy, specimen collection, labeling, processing, and preparation for enrichment, allowing them to gain confidence and practical competence. The combination of structured presentations and practical demonstrations ensured that participants not only understood the procedures conceptually but were also capable of implementing them independently in real surveillance settings.



Overall, the training strengthened participants' technical capacity to conduct standardized aquatic sample collection, transportation, necropsy, and laboratory processing for AMR surveillance, reinforcing good laboratory practices and supporting high-quality, evidence-based AMR monitoring in the aquaculture sector.

Program Schedule

Date	Time	Activities	Training Methods	Trainer/Facilitator
Day 1 09/11/2025	9:30 am - 10:00 am	Inauguration/Introduction; Pre-training assessment		Quality Control Laboratory FFCGB WorldFish CVASU
	10.00 am - 10.30 am	Tea break		
	10:30 am - 11:30 am	Sample collection and necropsy	Presentation and discussion	Dr. Shafiq Rheman
	11:30 pm - 1:00 pm	Specimen collection from fish samples	Hands-on practice	Dr. Shafiq Rheman
	1:00 pm – 2:00 pm	Prayer and lunch break		
	2:00 pm – 2:30 pm	An overview of isolation and identification of bacteria for AMR surveillance in aquaculture sector	Presentation and discussion	Dr. Himel Barua
	2:30 pm - 5:00 pm	Necessary media preparation; Pre-enrichment for <i>E. coli</i> , <i>Salmonella</i> , <i>Vibrio</i> and <i>Listeria</i> from the samples collected for AMR surveillance in aquaculture sector	Hands-on practice	Dr. Himel Barua Dr. Tanvir Ahmad Nizami
Day 2 10/11/2025	9:30 am - 11:00 am	AST by disk diffusion method	Presentation and discussion	Dr. Himel Barua
	11:00 am - 11:30 am	Tea break		
	11:30 am - 1:00 pm	Isolation of <i>E. coli</i> and <i>Vibrio</i> on selective media; Selective enrichment for <i>Salmonella</i> , <i>Listeria</i> and <i>Staphylococcus</i>	Hands-on practice	Dr. Himel Barua Dr. Tanvir Ahmad Nizami
	1:00 pm - 2:00 pm	Prayer and lunch break		
	2:00 pm – 5:00 pm	AST by disk diffusion method	Hands-on practice	Dr. Himel Barua

				Dr. Tanvir Ahmad Nizami
Day 3 11/11/2025	9:30 am – 11:00 am	AST by broth microdilution method	Presentation and discussion	Dr. Himel Barua
	11:00 am – 11:30 am	Tea break		
	11:30 am - 1:00 pm	Interpretation of AST by disk diffusion and report producing; Sub-culturing of <i>E. coli</i> on selective media; Isolation of <i>Salmonella</i> , <i>Listeria</i> , and <i>Staphylococcus</i> on selective media; Isolation of <i>Vibrio</i> on non-selective media	Hands-on practice	Dr. Himel Barua Dr. Tanvir Ahmad Nizami
	1:00 pm - 2:00 pm	Prayer and lunch break		
	2:00 pm - 5:00 pm	AST by broth microdilution	Hands-on practice	Dr. Himel Barua Dr. Tanvir Ahmad Nizami
Day 4 12/11/2025	9:30 am - 10:30 am	Interpretation of AST by broth microdilution and report producing	Hands-on practice	Dr. Himel Barua
	10:30 am – 11:00 am	Tea break		
	11:00 am – 12:00 pm	Common mistakes and troubleshooting in AST	Presentation and discussion	Dr. Himel Barua
	12:00 pm - 1:00 pm	Transportation of bacterial isolates to National Reference Laboratory in Aqua Health; Preservation of bacterial isolates	Presentation and discussion/Hands-on practice	Dr. Himel Barua
	1:00 pm - 2:00 pm	Prayer and lunch break		
	2:00 pm - 5:00 pm	Sub-culturing of <i>E. coli</i> , <i>Salmonella</i> , <i>Listeria</i> and <i>Staphylococcus</i> on non-selective media; Identification of <i>Vibrio</i>	Hands-on practice	Dr. Himel Barua Dr. Tanvir Ahmad Nizami
Day 5 13/11/2025	9:30 am - 10:30 am	Identification of <i>E. coli</i> , <i>Salmonella</i> , <i>Listeria</i> and <i>Staphylococcus</i>	Hands-on practice	Dr. Himel Barua
	10:30 am -	Tea break		

	11:00 am			
	11:00 am - 1:00 pm	AMR data management	Presentation and discussion	Representative from IEDCR
	1:00 pm - 2:00 pm	Prayer and lunch break		
	2:00 pm - 3:30 pm	Feedback from the trainees; post-training assessment	Open discussion	Quality Control Laboratory FFCGB CVASU

Participants List

SI No.	Name	Affiliation
01	Shilpi Dey	Quality Assurance Manager, Quality Control Laboratory, DoF, Savar
02	Shafiq Rheman	Scientist, Aquatic Animal Health and One Health, WorldFish
03	Himel Barua	Professor, Faculty of Veterinary Medicine, Chattogram Veterinary and Animal Sciences University
04*	Md. Shahi Imran Rasel	Fish Inspection Quality Control Officer, QC lab, DOF, Khulna
05*	Marzia Sultana	Assistant Director, QC lab, Dhaka
06*	Mohammad Imran	Fish Inspection Quality Control Officer, QC lab, Chattogram
07*	Md. Rakibul Hasan Rakib	QC Lab, Khulna
08*	A. K. Md. Ahmadul Kabir	QC Lab, DOF, Chattogram
09*	Tanzina Nasrin	Microbiologist, Quality Control Laboratory, DOF, Dhaka
10	Nure Alam Siddiky	Deputy Team Lead, Fleming Fund Country Grant to Bangladesh, DAI Global

*Trainee

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