



Bangladesh Safe and Sustainable Aquatic Food Project Workshop - Embedding One Health to Support Aquatic Food Production during Covid-19

WorldFish & Centre for Environment, Fisheries and Aquaculture Science

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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.

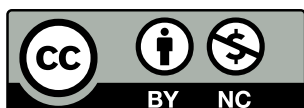
Our research and innovation work spans climate change, food security and nutrition, sustainable fisheries and aquaculture, the blue economy and ocean governance, One Health, genetics and AgriTech, and it integrates evidence and perspectives on gender, youth and social inclusion. Our approach empowers 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.

WorldFish is part of One CGIAR, the world's largest agricultural innovation network.

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Table of contents

List of acronyms.....	3
1. Executive summary	4
2. Background.....	5
3. Purpose	5
4. Participation	5
5. Description of the workshop	6
5.1 Day 1: Session 1& 2.....	6
5.2 Day 2: Session 3	6
6. Findings	7
7. Recommendations and Future directions.....	7
Annex 1. Workshop Agenda	10
Annex 2. Participant list	13
Annex 3. Audience Poll Results	19
Annex 4. One Health Poster	21
Annex 5. Links to All Presentations	22

List of acronyms

AMR	Antimicrobial Resistance
Cefas	Centre for Environment, Fisheries and Aquaculture Science
Defra	Department of Environment, Fisheries and Rural Affairs
FAO	Food and Agriculture Organization
FF	Fleming Fund
ODA	Official Development Assistance
OH	One Health
OHA	One Health Approach
WF	WorldFish

1. Executive summary

Centre for Environment, Fisheries and Aquaculture Science (Cefas) is an executive agency of the UK's Department of Environment, Fisheries and Rural Affairs (Defra). Cefas partnering with WorldFish (WF) launched a new project namely '**Embedding One Health to support aquatic food production during Covid-19**' funded by the Official Development Assistance (ODA) aid program, which aims to support building capability and educational tools promoting a One Health approach to the aquatic food system in Bangladesh.

This online-based workshop was a critical step towards implementation of a unique transdisciplinary approach in Bangladesh. The main objective of this workshop was to formally introduce a new concept of One Health Aquaculture (OHA) approach to the authorities and stakeholders responsible for policies in Bangladesh. Participants who attended the workshop were from WorldFish, Cefas (UK), the University of Exeter (UK), Government officials, private sectors, NGOs, academicians, researchers from Bangladesh (See Annex 2).

The first day of workshop was inaugurated and welcomed by both Neil Hornby, CEO, Cefas, UK, and Christopher Price, Regional Director-South Asia and Country Director, WorldFish Bangladesh. Following the inauguration, two distinguished speakers Dr. Nitish Debnath, Team Leader, Fleming Fund Country Grant, Bangladesh, and Professor Grant D. Stentiford, Seafood Hazards Theme Lead, Head of OIE Collaborating Centre for Emerging Aquatic Animal Diseases, Cefas, Weymouth Laboratory, UK. Dr Nitish highlighted the one health movement that is taking place in Bangladesh and the involvement of key ministries and national stakeholders. Dr Stentiford presented a conceptual one health framework with success metrics for aquatic food systems and described how such a framework can be applied to the aquaculture sector in Bangladesh. Two group activities were performed on day 1 to engage with Bangladeshi participants which were lead by Cefas and WorldFish to collect their valuable suggestions and recommendations (Table 1). Open discussions took place with participants who exchanged their views with Cefas and WF leads at the end of day 1.

The second day was mainly focused on plenary talks and presentations which were organised under three main themes. These themes covered talks on diverse topics such as disease monitoring, GIS modeling, water resource management, recent and future Bangladesh safe and sustainable aquatic projects, digital mapping, fish-specific viruses, nematodes, probiotics, and coastal resource management for fish production, and antimicrobial resistance (AMR). Question/answer sessions were run at the end of each theme to respond to participant's queries.

This two days' online workshop was closed by WorldFish Principal scientist Vishnumurthy Mohan Chadag and Cefas project lead Professor Grant D. Stentiford. Dr. Mohan mainly focused on future collaboration opportunities, especially involving the broad community to build a strong One Health Network and OHA approach in Bangladesh. Professor Grant presented summary of two days and future directions. He underlined the constraint of the vertical, hierarchical structure of administrations at all levels in most countries, which has to be overcome to allow a broader understanding of One Health approach at the policy level.

2. Background

One Health is a simple philosophy reminding us that the health of all life on earth is inter-connected. It considers how maintenance or alteration in 'health status' of one part of the environment-human-organism triad affects other parts of that system - a concept amply highlighted during the current Covid-19 pandemic where intricate relations between human health, wildlife and the environment have been exposed. WorldFish (WF), Bangladesh, and Centre for Environment, Fisheries and Aquaculture Science (Cefas), UK jointly organized a two-day virtual workshop on 22nd and 23rd March 2021 at online platform to introduce a new One Health (OH) concept to Bangladeshi government competent authority departments, industry stakeholders and academicians. This workshop was inaugurated and welcomed by both Neil Hornby, CEO, Cefas, UK and Christopher Price, Regional Director-South Asia and Country Director, WorldFish Bangladesh.

3. Purpose

The One Health Aquaculture workshop was a critical step towards a unique Bangladesh approach to One Health, ensuring that all stakeholders have a shared vision and clear roadmap for implementing One Health strategies for disease surveillance, response, preparedness, workforce, environmental protection and, prevention and control activities in their current and future areas of focus.

The ultimate aim of this workshop was to formally introduce the concept of the One Health Aquaculture (OHA) approach to the authorities and stakeholders responsible for policies associated with environmental, human and animal health in national aquatic food production in Bangladesh. It is intended to support aquatic food production and the trade aspirations of the Government of Bangladesh and, where suitable, to build a lasting framework for future engagement.

4. Participation

A diverse group of experts participated and contributed from different professional backgrounds (science, policy & practice), different fields of expertise and countries, both within Bangladesh and beyond, as well as a combination of senior and junior experts. This included natural science scientists, health scientists and social scientists, policy representatives from national governments and Cefas, the University of Exeter and WorldFish researchers working in Bangladesh. A total of 97 participants registered for the workshop. To get an overview of the various fields of expertise represented during the workshop, please see participants list (**Annex 2**). Representatives from all reference and sentinel laboratories, members of the Fleming fund country grant group on point prevalence surveillance of AMR actively participated in the workshop.

5. Description of the workshop

The workshop was facilitated and conducted as per the agenda (**Annex 1**)

5.1 Day 1: Session 1& 2

First day of the workshop was divided in two sessions. First full day was chaired and moderated by Dr. Zenat Zebin Hossain, Scientist, WorldFish, Bangladesh.

Session 1 comprised of two plenary talks from our honorable speakers on the prospect of One Health (OH) and the concept of One Health Aquaculture were introduced formally to the responsible authorities and other stakeholders in Bangladesh responsible for policies associated with environmental-, human health- and animal health-elements of national aquatic food production. First presentation was given by **Dr. Nitish Debnath, Team Leader, Fleming Fund Project, Bangladesh**. Dr. Nitish pointed out the major challenges and opportunities of implementing One Health approach in Bangladesh as well as the history of Institutionalization of One Health Approach in Bangladesh. He aptly described one health as a public good and a civil society movement.

Second presentation was given by **Professor Grant D. Stentiford, Seafood Hazards Theme Lead, Head of OIE Collaborating Centre for Emerging Aquatic Animal Diseases, Cefas, Weymouth Laboratory, UK**. He described OHA and specifically, a proposed set of success metrics which can be 'designed in' to strategies for sustainable aquaculture production - by addressing specific sustainability requirements and collaboration aspirations with the institutions in Bangladesh. Both presenters focused on the OH concept from their own country prospective Bangladesh and the UK respectively. During the question answer session both speakers addressed comments from national and international participants. An audience poll was also run before the end of the first session followed a by 15 minutes break.

During **session 2**, there were two group activities aimed at gathering opinions and recommendations from participants. In group activity 1, all the participants were divided into three breakout rooms. Cefas and WF leads chaired each room with approximately 18 people assigned to each room. A common question on the 'opportunities and barriers of sustainable aquaculture in Bangladesh' was asked accrossed all breakout rooms and recommendations were taken from the participants. After 30 minutes, first group activity ended and all participants from the three breakout rooms returned to the general platform for a break. During this period, moderators and rapporteurs of each breakout room compiled all the recommendations and suggestions to present among the whole audience. A large number of suggestions and other feedback were reported, providing promise that the OHA concept can be established in Bangladesh (**Table 1**).

In the second group activity, three breakout rooms on People, environment and organism themes took place with participants and chair resumed. This session also brought many valuable recommendations. When all findings from each room were compiled, chairs were responsible to answer any further queries. Finally, an open took place and many participants exchanged their views with Cefas and WF leads.

5.2 Day 2: Session 3

The second day of the workshop was divided into three themes including seventeen plenary talks (**Annex 5**) by leading experts and professionals from Bangladesh and the UK. The day was chaired and moderated by Dr. Jérôme Delamare-Deboutteville. Two audience polls were run at the beginning and the end of day 2.

Theme 1: One Health Aquaculture 1: Under this theme there were six flash talks mostly focusing on disease monitoring, GIS modeling, water resource management, recent and future Bangladesh safe and sustainable aquatic projects. Final presentation was on detection of SARS-CoV-2 methods from seafood. A 30 minutes Q/A session was run to respond to each question directed at presenters followed by a 30 minutes' break.

Theme 2: One Health Aquaculture 2: This session was also composed of six presentations focusing on disease management, digital mapping, fish-specific viruses, nematodes, probiotics, and coastal resource management for fish production. During 30 minutes Q/A session, queries raised by participants were answered by presenters.

Theme 3: One Health Aquaculture 3: In the third and last theme, the main focus was on Antimicrobial Resistance (AMR) associated with aquaculture. FAO representatives, Cefas leads, WorldFish colleagues, Fleming Fund Fellows and an academician presented their specific works and activities on the AMR in Bangladesh. Similarly this session ended and a Q/A session where many participants spoke about the issues raised by AMR. When an academician presented his molecular work on colistin resistant bacteria, FAO representative and the assistant director of drug administration came forward and expressed the urgent need to take necessary steps to stop the use of this antibiotic.

The Final closing speeches were given by WorldFish Principal scientist Vishnumurthy Mohan Chadag and Cefas project lead Professor Grant D. Stentiford. Both focused on future opportunities for collaboration, especially involving a broad community of national and international experts to build a strong One Health Network and OHA approach in Bangladesh – the key recommendation being that cross Department evidence sharing and policy-making will be required to develop and embed the OHA approach to fit the specific needs of the Bangladeshi authorities and citizens.

6. Findings

Professor Grant D. Stentiford presented an overall synthesis of two days' workshop. He underlined the constraint of the vertical, hierarchical structure of administrations at all levels in most countries, which has to be overcome to allow a broader understanding of the One Health approach at the policy level. More specific summary points from him are given below:

Brief Summary of Day 1:

- i) The OH concept is common sense and, already being operationalised in Bangladesh
- ii) Application as 'One Health Aquaculture' is possible – a movement is needed
- iii) Cross-Dept./industry/public governance recommended – 'OHA Council' or similar
- iv) Translation of the OHA approach using media/comms/tech channels needed
- v) OHA can lead to a step-change in sustainable aquaculture design – but, it will take time and sustained effort oriented to a clear goal.

Brief Summary of Day 2 was:

- i) Risk profiling using 'all hazards' schema is usable/scalable tool for different sub-sectors
- ii) Data portals/GIS will become key tools for sustainable aquaculture planning
- iii) Water availability/quality policy must be intricately linked to aquaculture strategy
- iv) Understanding water pollution (chemicals, antibiotics, pharma etc) is critical priority
- v) New technologies are re-shaping our thinking on microbial/physiological drivers of disease*
- vi) But, an ability to describe specific pathogens (e.g. *Macrobrachium rosenbergii* golda virus) are still critical*

N.B: *Health vs Disease

7. Recommendations and Future directions

The workshop participants discussed recommendations and further actions that could be taken to further develop the OHA concept in Bangladesh. Recommendations based on specific topics are given in **table 1** and summary of the most prominent recommendations organized by theme as follows:

1. **Coordination and Communication:** All sectors and responsible authorities have to come together to establish the One Health/OHA Approach. All responsible sectors /or/ every responsible sector should develop joint programs between departments that will have formalized plans for implementation.
2. **Education and Training:** Concept of One Health/OHA should be fully integrated and adapted into the curriculum of primary, secondary and tertiary education institutions for better understanding and implementation by all from early ages. A One Health/OHA curriculum that will train students and young professionals about One Health/OHA and cooperation across sectors needs to be created. In addition

to the curriculum on One Health/OHA, all sectors must prepare and engage with the next generations in One Health/OHA activities (such as conducting joint outbreak investigations and response, disease surveillance, etc.).

3. **Digital platform:** A common digital platform should be built gathering various data layers available related to disease outbreak, risk profiling, farmed organisms, infectious diseases, people, environment etc. This will help to build a valuable common resource for the One Health/OHA Network. Also online based trainings,, awareness campaigns should be used to reach more people.

Beside these common recommendations, **Professor Grant D. Stentiford** highlighted few points for future work:

- i) After that workshop it will be expected that this new OHA approach will be taken forward in the UK Blue Planet Fund in 2021/2022 and potentially beyond.
- ii) Primary flow of work to establish OH in Bangladesh will be : **In-country goal > OHA design > Priority Setting > e.g. Risk Tool > Data Collection > Online Portal**
- iii) Specific relationship building to Responsible Authority labs (via OIE, FAO centres) needs to occur
- iv) In-country discussions around formation of inter-disciplinary governance structure for OHA needs to occur

Topics	Recommendations
Opportunities and barriers for sustainable aquaculture expansion in Bangladesh	<ol style="list-style-type: none"> 1. The genetic aspect of aquatic organism being produced is very important to consider in aquaculture production 2. Water quality should receive more importance as key criteria for sustainable producing of aquatic food 3. More education and training programs tailored for farmers 4. Microbiological focus 5. Materials: audio and video should be available online and telecasted via radio and television as the main platforms 6. Access to proper reporting systems/platforms and diagnostics centres 7. Different perceptions from non-specialist like farmers. Academicians think theoretically but farmer's perception is more practical 8. Different stocking approaches of aquatic animals: expert standards practices versus what farmers do in reality (e.g. multiple restocking events to compensate for losses) Training of farmers to better understand the one health approach
Bringing One Health Aquaculture to Bangladesh: Environment	<ol style="list-style-type: none"> 1. Environmental implementation Policy – the hardest to do effectively 2. No policy around water usage so there is a need for a water use policy 3. Species selection, adaptability needed, changes with markets, profitability and changes the needs from the environment. 4. Environment is often seen as a luxury and people never think of it
Bringing One Health Aquaculture to Bangladesh: People	<ol style="list-style-type: none"> 1. Periodic checking of the product before Supply-Legislative quality control 2. Encourage farmers for taking certification labels - generating positive support (We can encourage the farmers by telling them that “good certification will help in good trading in the market”) 3. Development of simple field kits made available to poor farmers. 4. Government and NGOs should give loan to women with low interest
Bringing One Health Aquaculture to Bangladesh: Organisms	<ol style="list-style-type: none"> 1. Less quality seeds available that can lead to disease events 2. Inbreeding as an issue, genetic pollution 3. Big challenge is both good quality of brood and good quality seeds 4. The aim of 'One Health Aquaculture' should be to produce 'Healthy Aquatic Organisms' without compromising the health of other organisms

Table 1. General recommendations from workshop participants.

Annex 1. Workshop Agenda

Bangladesh safe and sustainable aquatic food project workshop - Embedding One Health to support aquatic food production during Covid-19

Online Event – 22nd & 23rd March 2021

Day 1&2

14:00 BD Time	08:00 UK Time	Registration:	
22 nd March	Session 1: One health		
14:10	08:10	Welcome	Neil Hornby
		WorldFish-Welcome	Christopher Price
		Trajectory of Institutionalization of One Health Approach in Bangladesh	Nitish Debnath
		One Health Aquaculture	Grant Stentiford
		Q/A	
		Audience poll	
15:15 BD time	09:15 UK Time	Session end - Followed by 15-minute break	
22 nd March	Session 2: Workshops – One Health in aquaculture success matrices		
15:30	09:30	Introduction to Group activity 1	
		Group activity 1	
		Break	
		Regroup and discuss key points raised in Group activity 1	
		Introduction to group activity 2	
		Group activity 2	
17:30	11:30	Break	
17:45	11:45	Regroup and discuss key points raised in breakout 2	
		Open floor for Discussion and round up	Chadag Vishnumurthy Mohan

19:00 BD Time	13:00 UK Time	End session
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23 rd March	Session 3: Delivering One Health in Bangladesh	
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14:00	08:00	Registration & Introduction
		Audience poll
		One Health Aquaculture 1
		Using a risk profiling approach to developing Bangladeshi bivalve mollusc production – first steps Rachel Hartnell
		One Health GIS model development Richard Heal
		Bangladesh safe and sustainable aquatic food Mohammad Mahfujul Haque
		SAF Aquaculture Projects in Bangladesh. Focus: Environment Charles Tyler
		Water resource requirements to support sustainable aquaculture development in Bangladesh Lisa Bickley
		SARS-CoV-2 methods for seafood David Walker
		Panel – questions and answers

15:30 BD time	09:30 UK Time	Break
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16:00	10:00	One Health Aquaculture 2
		Integrated approaches to disease management David Bass
		Digital mapping for disease monitoring T.S. Amjath Babu
		Discovery of a novel RNA virus in the Giant Freshwater Prawn (<i>Macrobrachium rosenbergii</i>) Chantelle Hooper
		Prevalence and Intensity of <i>Contracaecum sp.</i> in Jew Fish (<i>Otolithoides Pama</i>) Ms. Joyshri Sarker
		Probiotics in aquaculture: Competitive exclusion of pathogens and immunostimulants against it Golam Sarower
		Coastal Water Resources: Home for Fish Ms. Farhana Akhter Kamal

Panel – questions and answers

17:05
BD time

11:05
UK Time

Break

17:30

11:30

One Health Aquaculture 3

Organism & Aquaculture

FAO BD
Representative

Drivers to promote OH and Tackle AMR

Muhammad
Meezanur Rahman

The UK FAO AMR Reference Centre: our
work in Bangladesh

David Verner-
Jeffreys

Point Prevalence Survey of Antimicrobial
Use in Human, Commercial Chicken and
Aquaculture Using One Health Approach
in Bangladesh

Sukanta
Chowdhury

One-Health Assessment of Emerging
Antimicrobial Resistance Genes (ARGs)
in Bangladeshi Poultry droppings,
Aquacultures, and Manure

Salequl Islam

Panel – questions and answers

Audience poll

Closing speech

19:00
BD time

13:00
UK Time

Conclusion of workshop

Annex 2. Participant list

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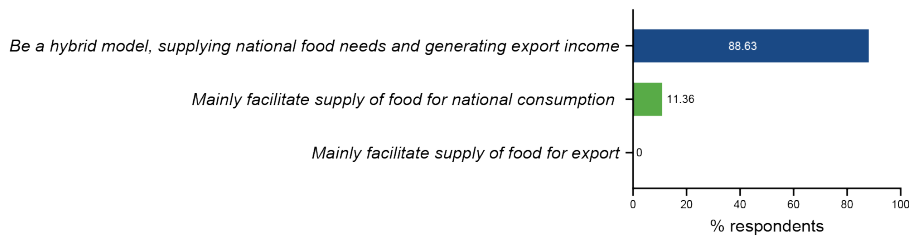
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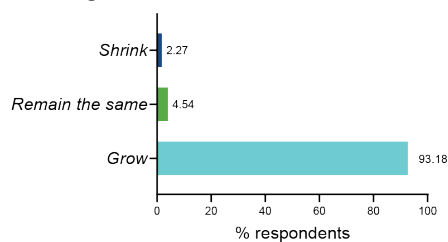
Annex 3. Audience Poll Results

Poll 1

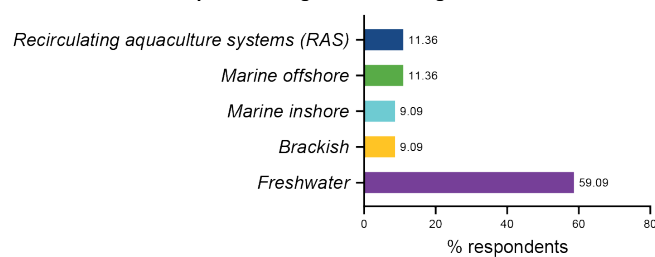
Do you think that the Bangladeshi aquaculture sector should:



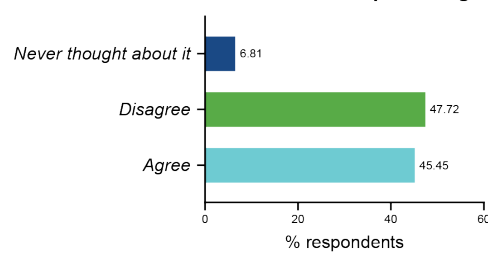
Over the next three decades, do you think that size of the aquaculture sector in Bangladesh will:



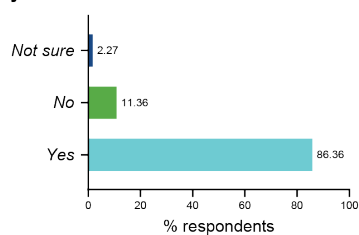
Which productions systems/environments have the most potential for sustainable aquaculture growth in Bangladesh:



One Health is a well understood concept in Bangladesh:

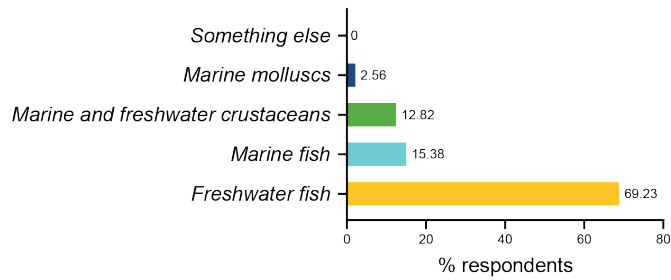


Do you work in One Health?

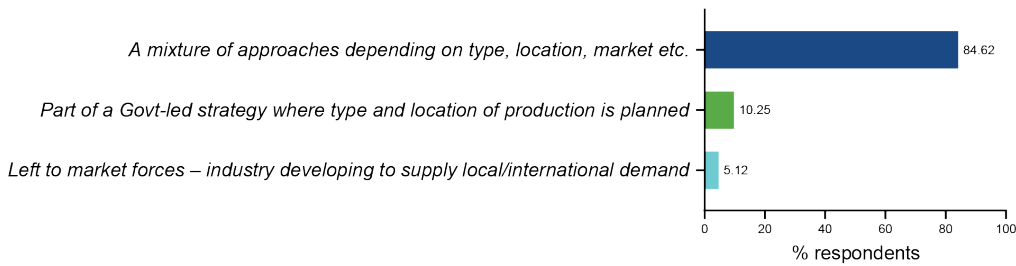


Poll 2

Which aquaculture sub-sector has the most potential for sustainable growth in Bangladesh:

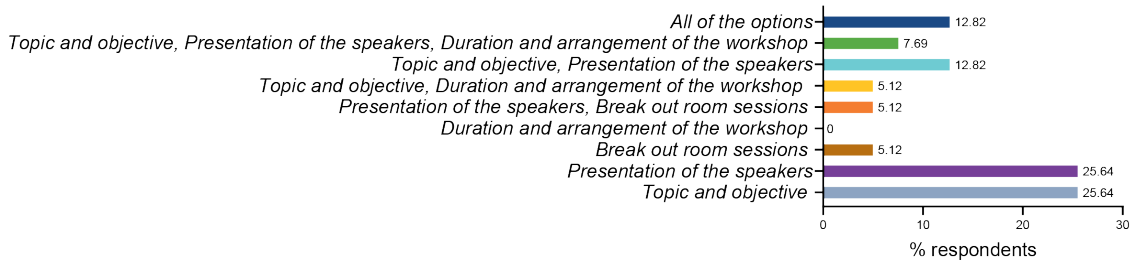


Should the development of aquaculture strategy be:

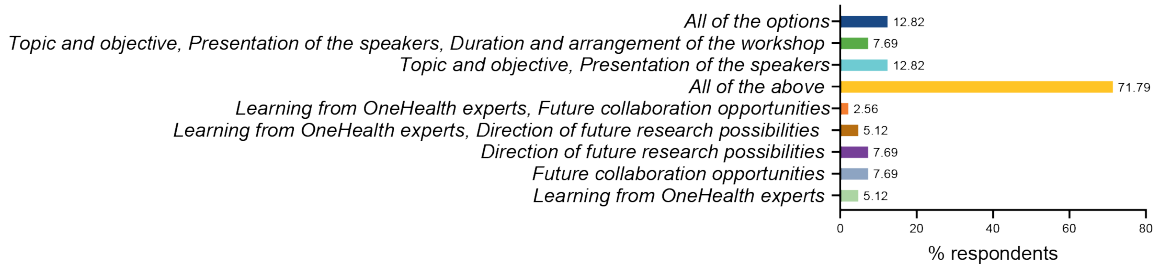


Poll 3

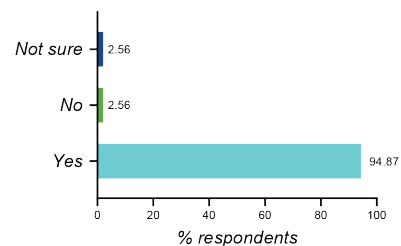
Which aspect of this workshop did you like the most?



What did you find most useful from this workshop?



Do you work in One Health?



Annex 4. One Health Poster

Bangladesh safe and sustainable aquatic food project - Embedding One Health to support aquatic food production during Covid-19

One Health Aquaculture

One Health is a simple philosophy reminding us that the health of all life on Earth is interconnected. It considers how maintaining or altering the "health status" of one part of the environment-human-organism triad affects other parts of the system. The COVID-19 pandemic has amplified this approach, showing how important are the intricate relations of health among humans, wildlife and the environment.

By applying the One Health approach to food systems, such as aquaculture, it is possible to consider a broad range of research, evidence, policies and legislative requirements. These span human, animal and environmental health and should be designed with the goal of sustainable systems in mind.

Aims

The ultimate aim of this project is to formally introduce the concept of One Health approach for aquaculture to the authorities and stakeholders responsible for policies associated with environmental, human and animal health in national aquatic food production in Bangladesh. It is intended to support aquatic food production and the trade aspirations of the Government of Bangladesh and, where suitable, to build a lasting framework for future engagement.

In general, the project supports public safety and establishing educational training tools promoting a One Health approach to the aquatic food system.

More specifically, however, supports three main objectives:

1. Assess the Bangladeshi aquatic foods system through the One Health lens
2. Engage with policymakers
3. Develop tools, methods and capabilities to test for COVID-19 in seafood and wastewater



Project name

Bangladesh safe and sustainable aquatic food project - Embedding One Health to support aquatic food production during Covid-19

Donor

Official Development Assistance (ODA) aid program of the UK government

The project has six main pillars:



1. Bangladesh-UK Engagement activities

A central part of the project is to engage the authorities responsible for the broad policies associated with aquatic food production, such as environmental, animal and human health, as well as trade.



2. Food from water in Bangladesh – a One Health analysis

A comprehensive analysis is needed of the Bangladeshi aquatic food sector. This analysis must be measured against the defined success metrics spanning the health of the environment, people and organisms—collectively called One Health. It must also consider the ongoing impacts of COVID-19 on aquaculture and supply chains.



3. Animal and human health hazard assessment and risk profiling

It is necessary to understand the risk both to stocks within the production cycle (animal health) and to consumers of the end-product (human health).



4. Global Aquatic Microbial Hazard Portal

This portal is intended to provide access to information, data, and analyses, via Cefas, FAO Reference Centers and OIE Collaborating Centre on key hazards associated with current and future aquatic food production.



5. Establishing SARS-CoV-2 virus testing methods in seafood and wastewater

It is critical to develop and transfer robust and supported methods to test for in seafood and wastewater. This must be done in the laboratory networks of the appropriate authorities across Bangladesh to support public safety and protect national and international trade.



6. AMR: Facilitating future collaboration on CV-19 responses through capacity building on AMR livelihoods

Strengthen AMR surveillance by providing technical assistance and diagnostic services and establishing AMR surveillance of key pathogens from farmed fish.



Stentford et al. (2020) Sustainable aquaculture through the One Health lens. *Nat Food* 1, 468–474. <https://doi.org/10.1038/s43016-020-0127-5>

National One Health workshop

WorldFish and Cefas, UK jointly will lead a workshop with its partners, including Bangladeshi national competent authorities, universities and research institutions, FAO, and the University of Exeter, UK. During the workshop, Cefas will introduce the six pillars of the project and then discuss them with partners in focused breakout sessions. In addition, the team and participants will summarize previous and current collaborative projects in Bangladesh associated with aquatic animal health, food safety and AMR all with a One Health research and development focus. Delegates at the workshop will have the opportunity to discuss the current partnership, including an opportunity to interact directly with the UK-based leads of the OIE Collaborating Centre for Emerging Aquatic Animal Diseases, as well as the FAO Reference Centre for AMR and the FAO Reference Centre for Bivalve Mollusc Sanitation.



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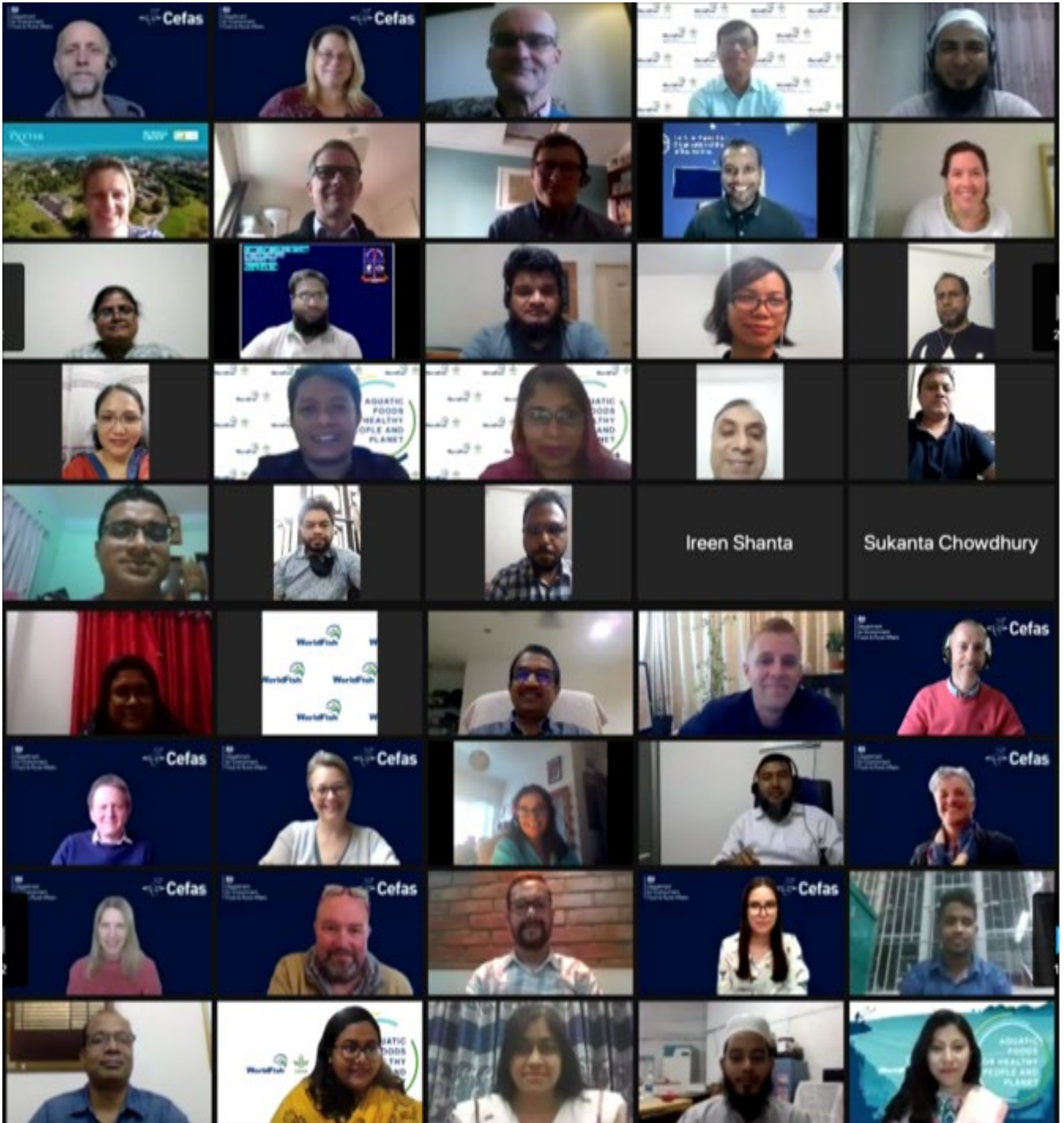
Annex 5. Links to All Presentations

Presenter	Presentation Links
Dr. Nitish C. Debnath	https://www.slideshare.net/worldfishcenter/103nitish-debnathtrajectory-of-institutionalization-of-one-health-approach-in-bangladeshpdf
Professor Grant D. Stentiford	https://www.slideshare.net/worldfishcenter/104grant-stentifordone-health-aquaculture
Dr. Rachel Hartnell	https://www.slideshare.net/worldfishcenter/201-rachel-hartnell-using-a-risk-profiling-approach-to-developing-bangladeshi-bivalve-mollusc-production-first-steps
Dr. Richard Heal	https://www.slideshare.net/worldfishcenter/202richard-healonehealth-gis-model-development
Mohammad Mahfujul Haque	https://www.slideshare.net/worldfishcenter/203mohammad-mahfujul-haquebangladesh-safe-and-sustainable-aquatic-food-246108564
Professor Charles Tyler	https://www.slideshare.net/worldfishcenter/204charles-tylersustainable-aquaculture-future-saf-aquaculture-projects-in-bangladesh-focus-on-the-environment
Dr. Lisa Bickley	https://www.slideshare.net/worldfishcenter/205lisa-bickleywater-resource-requirements-to-support-sustainable-aquaculture-development-in-bangladesh-246108880
Dr. David Walker	https://www.slideshare.net/worldfishcenter/206david-walkersarscov2-methods-for-seafood-246109074
Dr. David Bass	https://www.slideshare.net/worldfishcenter/207david-bassintegrated-approaches-to-disease-management
Dr. T. S. Amjath Babu	https://www.slideshare.net/worldfishcenter/208amjath-babudigital-platform-for-fish-disease-monitoring
Chantelle Hooper	https://www.slideshare.net/worldfishcenter/209chantelle-hooperdiscovery-of-a-novel-rna-virus-in-the-giant-freshwater-prawn-macrobrachium-rosenbergii
Joyshri Sarker	https://www.slideshare.net/worldfishcenter/210joyshri-sarkerprevalence-and-intensity-of-contracaecum-sp-in-jew-fish-otolithoides-pama
Dr. Golam Sarower	https://www.slideshare.net/worldfishcenter/211golam-sarowerprobiotics-in-aquaculture-competitive-exclusion-of-pathogens-and-immunostimulants-against-it
Farhana Akhter Kamal	https://www.slideshare.net/worldfishcenter/212farhana-akhter-kamalcoastal-water-resources-home-for-fish-246109479
Md. Habibur Rahman	https://www.slideshare.net/worldfishcenter/213fao-ectad-bdu2c-bara-and-oh-approach-for-aquaculture
Dr Muhammad Meezanur Rahman	https://www.slideshare.net/worldfishcenter/214meezanur-rahmandrivers-to-promote-oh-and-tackle-amr
Dr. David Verner-Jeffreys	https://www.slideshare.net/worldfishcenter/215david-vernerjeffreysthe-uk-fao-amr-reference-centre-our-work-in-bangladesh
Dr. Sukanta Chowdhury	https://www.slideshare.net/worldfishcenter/216sukanta-chowdhurypoint-prevalence-survey-of-antimicrobial-use-in-human-commercial-chicken-and-aquaculture-using-one-health-approach-in-bangladesh
Professor Md. Salequ Islam	https://www.slideshare.net/worldfishcenter/217salequ-islamonehealth-assessment-of-emerging-antimicrobial-resistance-genes-args-in-bangladeshi-poultry-droppings-aquacultures-and-manure

Bangladesh safe and sustainable aquatic food project workshop - Embedding One Health to support aquatic food production during Covid-19

WorldFish & Centre for Environment, Fisheries and Aquaculture Science

22&23rd March, 2021



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.

WorldFish is part of One CGIAR, the world's largest agricultural innovation network.

For more information, please visit www.worldfishcenter.org