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Centre for Environment Fisheries & Aquaculture Science

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FAO Reference Centre for Bivalve Mollusc Sanitation

Joint Cefas-FAO Training Workshop on the Development of Bivalve Production in Africa

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Cefas Document Control

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Draft V1	James Lowther	05/08/25	Initial draft
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Contents

Foreword

This document summarises relevant information from a technical training workshop on development of safe bivalve production. It was jointly hosted by Cefas as the FAO Reference Centre for Bivalve Mollusc Sanitation and the FAO Fisheries and Aquaculture division at the Argyle Grand Hotel, Nairobi, Kenya between 8th – 10th July 2025. Meeting attendees included responsible authority professionals from thirteen FAO member countries in Africa. The training content was derived from the Technical guidance for the development of the growing area aspects of bivalve mollusc sanitation programmes, 2nd edition (WHO and FAO, 2021). Resource support for this workshop was provided through the Fisheries and Aquaculture Division, FAO, Rome. Additional funding was provided by The UK ministerial Department of Environment, Food and Rural Affairs (Defra).

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Daniel Kasangi	Kenya Fisheries Service, KENYA
James Wanjama	Kenya Fisheries Service, KENYA
Daisy Muriuki	Kenya Fisheries Service, KENYA (opening address)
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Ricardo Torres Coll	FAO Fisheries and Aquaculture Division
Susan Ungadi	FAO Kenya
James Lowther	FAO Reference Centre for Bivalve Mollusc Sanitation
Andy Turner	FAO Reference Centre
Andy Younger	FAO Reference Centre
Michelle Price-Hayward	FAO Reference Centre (attending remotely)

FAO Reference Centre for Bivalve Sanitation workshop on

the development of bivalve production in Africa

Agenda

Dates: 8th, 9th & 10th July 2025

Venue: Argyle Grand Hotel, Mombasa Road, Nairobi, 00603, KENYA

Timings: Start time 8th July 13:00 – End time 10th July 17:00

Language: English

Cefas Team: Andrew Younger, Andrew Turner, James Lowther, Michelle Price-Hayward and Louise Stockley

FAO Team: Esther Garrido Gamarro, Ricardo Torres Coll and Susan Ungadi

Hands on training programme

Day 1 – 8th July 2025 (13:00 – 17:30)

1. Official opening; welcome to the meeting and introduction to the venue, round table introductions
2. Purpose of the workshop and agenda
3. Bivalve mollusc production, safety and trade requirements
4. National Experience: Individual countries

Coffee Break (15:00 – 15:30)

5. National Experience: Individual countries (continued)

Evening meal – 19:30 start

Day 2 – 9th July 2025 (9:30 – 18:00)

6. Public health hazards associated with bivalve molluscs
7. Practical Exercise – Hazard and risk identification, and potential control methods

Coffee Break (11:00 – 11:30)

8. Practical Exercise continued – Hazard and risk identification, and potential control methods

Lunch (12:30 - 13:30)

9. Growing Area Assessment – Data Gathering - desk based
10. Practical Exercise – Plan a shoreline survey
11. Combining and assessing desk based and field survey data
12. Practical Exercise - Interpretation of data and ranking impacts

Coffee Break (15:30 – 16:00)

13. Outcomes – Setting boundaries and designing sampling plan
14. Practical Exercise – Design a sampling plan and explain approach
15. Preliminary monitoring including data assessment
16. Practical Exercise – Classification monitoring data interpretation

Day 3 – 10th July 2025 (9:30 – 17:30)

17. Responsible Authority requirements
18. Practical Exercise – Responsible Authority decision making: Outbreak scenarios and actions required (biotoxins and microbiology)

Coffee Break (11:00 - 11:30)

19. Practical Exercise continued – Responsible Authority decision making

Lunch (12:30 – 13:30)

20. Introduction to possibilities for development of regional project proposals
21. Discussion on country needs and priorities

Coffee Break (15:30 – 16:00)

22. Feedback from discussion on country needs and priorities
23. Conclusions from the discussion
24. Closing words

Introduction

Following the official opening given by Daisy Muriuki of the Kenya Fisheries Service, the opening session of the workshop comprised an introductory presentation from FAO Fisheries and Aquaculture division on the development opportunities presented by bivalve shellfish production along with some of the challenges that this commodity poses due to the filter-feeding nature of the animals. This was then followed by a series of presentations from the invited national delegates, each providing an overview of bivalve production and trade, the role of the responsible authority in oversight of this, and the laboratory testing capacity within their own country.

Figure 1; opening address given by Daisy Muriuki of the Kenya Fisheries Service

The main body of the training workshop was led by staff of the FAO Reference Centre based at Cefas and consisted of a series of presentations on topics of relevance to development of safe bivalve production, interspersed with interactive exercises that gave the national representatives an opportunity to apply their new knowledge to realistic scenarios.

In the final part of the workshop, discussions were held between the national delegates, FAO and Reference Centre staff in order to identify needs and priorities for further support in this field.

Presentations are available on the website of the FAO Reference Centre (Training Workshop on the Development of Bivalve Production in Africa, July 2025 - Cefas (Centre for Environment, Fisheries and Aquaculture Science) while summaries of the practical exercises and the final discussion are included in the following sections of the report.

Figure 2; presentations on national experience with bivalve production and control were given by all national delegates

Practical Exercise - Hazard and risk identification, and potential control methods

Delegates were divided into 3 groups, each of which was supported by Reference Centre and FAO facilitators. Each group was provided with an information pack providing details of 10 potential hazards to human health associated with bivalve consumption, namely *Vibrio parahaemolyticus*, *V. vulnificus*, *V. cholerae*, *Salmonella enterica*, norovirus, hepatitis A virus, heavy metals, persistent organic pollutants, diarrhetic algal biotoxins and algal neurotoxins. In

the first half of the exercise the groups were asked to score each hazard for severity and likelihood (in the absence of any interventions) based on a simple scoring system with 1 representing negligible and 6 representing very high severity or likelihood. By multiplying these scores together each group determined an overall impact score for each hazard. In the second half of the exercise, the groups were asked to consider which of a range of different possible interventions (including cooking, relaying, application of the cold chain, high pressure processing, depuration and monitoring and harvesting restrictions) was most appropriate to reduce the risk posed by each hazard. Furthermore, the groups were asked to reassess likelihood and impact scores for each hazard after these interventions were applied.

Figure 3; national delegates carrying out the exercise on hazard and risk identification

The learning outcomes for this exercise included: an appreciation that different bivalve shellfish hazards have very different health impacts, ranging from mild to very serious illness and death; an understanding that some hazards can be rare while others occur very widely and frequently,

but that in all cases the occurrence of the hazard is impacted by the characteristics of each growing area; knowledge of a variety of different interventions and an understanding that their effectiveness against different hazards is very different, although well managed monitoring and harvesting restrictions are effective against most hazards.

Practical Exercises – Plan a shoreline survey; Interpretation of data and ranking impacts; Design a sampling plan and explain approach

In this linked series of exercises, delegates, again working in their groups, were asked to consider the different stages of a Growing Area Assessment (GAA) for a newly proposed bivalve production area.

In the first exercise, each group was provided with a pack of maps showing land use, population, weather, hydrography and river catchments etc., and other information including typical faecal indicator concentrations associated with different types of wastewater treatment effluents and animal faeces. This information combined was designed to represent the pre-existing data that might be available to a responsible authority before any additional survey work begins.

Delegates were asked to consider this information and design a shoreline survey for the area, in particular noting the locations and types of any samples they wished to collect.

In the second exercise, the groups were provided with additional information regarding the area typical of the type of additional data that might be generated by the shoreline survey and associated sampling. This data included flow rates and *Escherichia coli* (*E.coli*) concentrations for watercourses potentially impacting the production area and *E. coli* results for seawater and bivalve flesh samples. Using this data delegates were asked to identify the principal sources of contamination and rank them based on relative loading, occurrence and proximity.

Figure 4; national delegates carrying out the exercise on shoreline surveys

In the final exercise of this series, delegates were asked to consider all they had read and discussed in the previous exercises and to draw up a sampling plan for the area including delineation of production area boundaries, selection of monitoring points and recommendation of sampling type and frequency.

The learning outcomes for these exercises included: an understanding of how to use existing information to assess the potential risks in a newly proposed production area, and how to identify data gaps that can be filled by the shoreline survey and sample testing; experience in using assessment of new data from the shoreline survey to refine understanding of the production area; an appreciation of the different steps involved in the growing area assessment, culminating in the production of a sampling plan for primary monitoring.

Practical Exercise – Classification monitoring data interpretation

In this exercise, delegates were provided with hypothetical *E. coli* datasets for two different sites and in each case asked to recommend preliminary, initial full and established classifications

(under the EU classification system) based on data gathered during the first 6 months, 1 year and 3 years respectively. Each data set provided certain challenges, illustrating the types of judgments that need to be made with real data sets as they develop.

The learning outcomes for this exercise included: an understanding of the EU classification system (also widely applied outside of Europe and for countries that trade into the EU); an appreciation that the relatively small datasets used to set a preliminary classification may not be completely representative of the site and that regular reviews as more data is produced are therefore very important; an introduction to the possible usefulness of seasonal classifications; an appreciation of the need to select appropriate dilutions for the *E. coli* MPN test to ensure that acceptable and unacceptable *E. coli* levels can be distinguished.

Practical Exercise – Responsible Authority decision making: Outbreak scenarios and actions required (biotoxins and microbiology)

In this exercise, the groups of delegates were provided with outline details of two fictional scenarios, where an outbreak of serious illness appeared to be associated with consumption of bivalve molluscs. In the first scenario, illness was linked to a biotoxin hazard (diarrhetic shellfish poisoning) while in the second scenario a microbiological hazard (hepatitis A virus) was implicated.

In each case the groups were provided with an initial pack of documents, of the sort that a responsible authority would have access to in a real outbreak situation (newspaper articles, maps, laboratory accreditation schedules, public health statistics, weather reports etc.), and were asked to consider their responses to the outbreaks (acting as the responsible authority), to identify missing information and to consider appropriate actions. A series of specific questions to consider was also provided by the Reference Centre trainers.

After a period to allow consideration of the initial pack of documents, in both scenarios the delegates were provided with a second pack containing additional information to reflect the passage of time since the start of the outbreak, plus an additional set of questions to consider.

The learning outcomes for this exercise included: an understanding that awareness of the risks associated with bivalve consumption is important for responsible authorities; knowledge of the importance of good quality laboratories for supporting shellfish safety programmes; an appreciation that data from monitoring programmes should be actively monitored and reviewed; an understanding of the fact that unusual weather events and shifts in weather patterns can impact both biotoxin and microbiological risk.

Figure 5; national delegates carrying out the exercise on outbreak scenarios

Discussion on country needs and priorities

In the final session of the training workshop, the national delegates were asked to consider and present their country's needs and priorities for support in the development of safe bivalve production. Prior to the workshop, delegates had been asked to consult with relevant government

departments within their country to gauge national support for potential future projects in this area. The delegates were initially given the opportunity to discuss with their colleagues from other African countries to identify areas of common ground and were then invited each in turn to discuss their position with FAO and Reference Centre staff.

Finally, each delegate was asked to give a short presentation on their country's needs and priorities for the benefit of all workshop attendees.

Summary and next steps

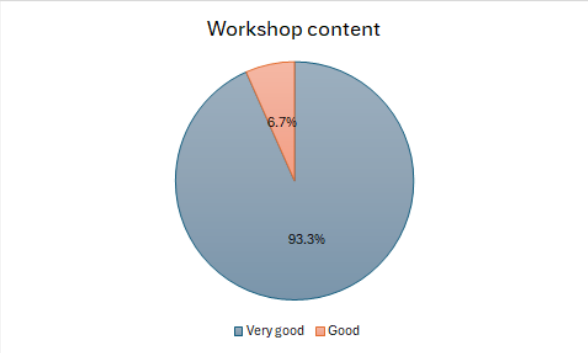
This training workshop successfully brought together responsible authority officers from thirteen African countries that have active bivalve mollusc production or the potential to develop it, with experts from the FAO Reference Centre for Bivalve Mollusc Sanitation and the FAO Fisheries and Aquaculture division, in order to exchange information and provide training on development of bivalve sanitation programmes to support safe production for local, regional or international trade.

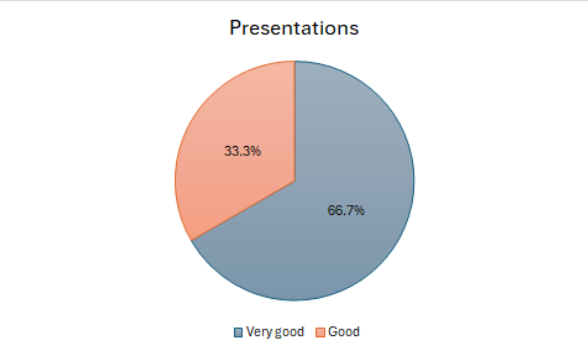
In addition to the tangible benefits to the participant countries in terms of increased knowledge and access to support networks, the meeting was intended to stimulate the involved national governments to take the opportunity to make proposals to FAO for project funding in this area, under the FAO Technical Cooperation Programme or other suitable funding avenues. Through such regional, sub-regional or national projects, FAO, with the support of the Reference Centre at Cefas, will aim to expand the bivalve sector in Africa in furtherance of its Sustainable Development Goals.

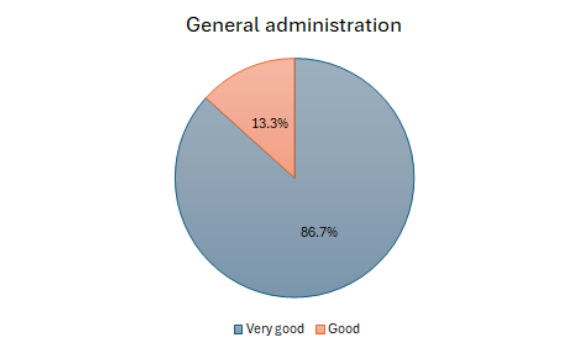
References

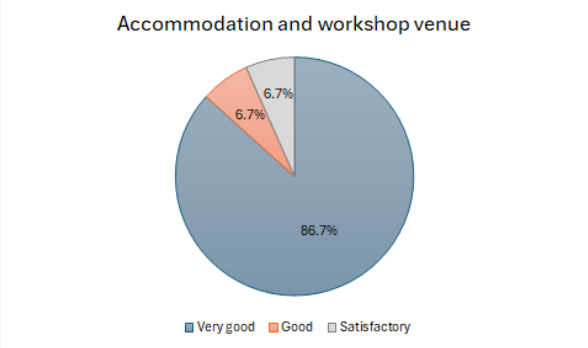
FAO and WHO. 2021. Technical guidance for the development of the growing area aspects of Bivalve Mollusc Sanitation Programmes. Second edition. Food Safety and Quality Series No.5A. Rome. https://doi.org/10.4060/cb5072en

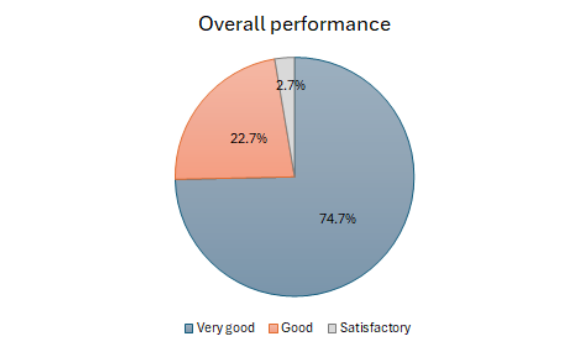
Appendix - Confidential Participant Feedback Results











Comments received alongside feedback scores;

- The workshop was educative.
- Most of the presentations and exercises were in English Language which was challenging to the French/ Portuguese speakers.
- Looking forward for another engagement. Thank you.
- The workshop is paramount, the 3 days training has equipped me with knowledge and understanding in bivalve sanitation issues. I thank the facilitators and presenters in sharing this useful information.
- Site visits and field trips are proposed to be organised at relevant laboratories and farms respectively to offer participants a real picture of testing and farming operations.
- The workshops should be extended to at least 7 days to ensure systematic grasp and easy understanding. For familarisation there should be a day specific for field outings and also visit interesting places in the host country.

Workshop photo

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Centre for Environment Fisheries & Aquaculture Science

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