

Evaluating options for the rational and healthy utilisation of small pelagic fish in Sub-Saharan Africa.



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Context

Small pelagic fish produced from marine waters off the coast of Central and West Africa and across the African Great Lakes Region (AGLR) and their associated value chains, sustain several million livelihoods (de Graaf and Garibaldi, 2014). These species are utilised for direct human consumption, to produce fish meal and fish oil for use in animal feeds and in the formulation of value-added products. Small fish from marine and inland waters constitute a valuable source of protein and micronutrients that could make a significant contribution to alleviating malnutrition and food insecurity in the AGLR, Central and West Africa (Isaacs, 2016; Hicks et al., 2019). Owing to population growth and economic development in these regions, demand for small pelagic fish is expected to rise over the coming years, putting increased pressure on this finite resource.

Aim

Considering the context, the purpose of this Delphi study was to capitalise on the knowledge and insights of people (termed stakeholders here) with different vested interests in value chains for small pelagic fish, and to assess the relative importance they assigned to key options for policy recommendations and future research for development investments. The effectiveness of the stakeholder Delphi process, in facilitating an equitable and fully representative process and building consensus amongst diverse and geographically dispersed stakeholders is being evaluated.

Study setting

The pressing need for planning and management strategies concerning fish in food systems in Africa that ensure the 'effective participation of small-scale fishers and fishworkers in decision-making and development processes that concern their lives and livelihoods' was highlighted in the recent 'Pan-African Workshop on Strengthening Organisational Structures of Non-State Actors for Sustainable Small-Scale Fisheries in Africa' held in Kasane, Botswana (FAO, 2020, p iv). Recognizing this imperative, an innovative stakeholder Delphi process was conceived here (see Figure 1) to engage with representative stakeholders in 8 priority countries selected for an FAO consultation across the AGLR (Malawi & Uganda), Central-West Africa (Congo, Ghana & Sierra Leone) and North-West Africa (Gambia, Mauritania & Senegal).*

Key findings

- Important opportunities to promote the rational and healthy utilization of small pelagic fish in the AGLR, Central and West Africa were identified across regional food systems and these insights could help guide decision making and future research investment for development to ensure this valuable resource is utilized efficiently, equitably and sustainably.
- An innovative stakeholder Delphi process was devised that could be utilized to engage fully representative food system stakeholders in contextualizing and prioritizing key options for decision making and future research that are identified initially through regional problem census and opportunity scanning initiatives (e.g. conferences, consultations, surveys, workshops).

Methods

For each country, 25-35 representative stakeholders were invited to participate in the Delphi study. Prior to this, a list of recommendations was identified based on a desk review, regional consultation and qualitative and quantitative data analysis. Questionnaires were completed by participants over two iterative assessment rounds (Figure 1). In Round 1 we requested them to rate from 1 (low) to 10 (high) the importance of each recommendation. In Round 2 we requested them to agree with the median rating or propose an alternative. Patterns in ratings and strength of agreement were assessed with Friedman's test and Kendall's coefficient of concordance W (Friedman, 1937; Schmidt, 1997).

Table 1. Recommendations from a regional consultation, ranked according to the mean average rating received from participants in Round 2.

Recommendation	Mean Rating	Rank
Recommendation 13. Implement an environmental audit for existing fish meal plants to check and monitor their capacity and level of enforcement of national norms/standards.	9.760	1
Recommendation 17. Assist and train local fish and livestock farmers so that they can formulate and produce alternative and efficient feeds.	9.756	2
Recommendation 12. Promote environmentally friendly and healthy / safe (for workers) fish meal production technologies.	9.708	3
Recommendation 7. Ensure regular assessment of key-stocks of fish and effective monitoring of harvest and post-harvest activities/operations of the fisheries sector at a national level.	9.621	4
Recommendation 15. Conduct research to assess the chemical properties of all types of wastes from fish meal plants and their environmental and health effects.	9.590	5
Recommendation 11. Prohibit fish meal factories from dumping toxic wastes into the sea and inland waterbodies (e.g. lakes, rivers and wetlands).	9.564	6
Recommendation 10. Make sure that fish meal factories are constructed far away from towns and villages to avoid adverse impacts on residents.	9.097	7
Recommendation 14. Promote the use of plant-based and/or insect-based protein as feed alternatives in national aquaculture and livestock sectors.	9.052	8
Recommendation 18. Promote national research programs to identify alternatives to fish-based feed and assess their feasibility, viability, efficiency and profitability.	9.026	9
Recommendation 5. Assess and monitor fish (categorised by e.g. size, species, source of production and means of processing/preservation) consumption, affordability and importance for food security and nutrition.	8.906	10
Recommendation 22. Implement and effectively enforce the policies and norms/standards specific to the fish-based feed industry.	8.842	11
Recommendation 8. Ensure regular assessment of key-stocks of fish and effective monitoring of harvest and post-harvest activities/operations of the fisheries sector at a regional level (African Great Lakes Region or West Africa coastal zone).	8.777	12
Recommendation 1. Promote better fish harvesting and post-harvesting methods to reduce by-catches being directed away from human consumption and used instead for fish meal and fish-based animal feeds production.	8.728	13
Recommendation 2. Regulate and limit the number, capacity and production of fish meal factories based on the status of fish stocks and need for fish for human consumption.	8.634	14
Recommendation 23. Assess the national/regional demand/need and affordability of fish-based feed for aquaculture and livestock sectors.	8.275	15
Recommendation 16. Define and introduce minimum price controls for fish that can be purchased by fish meal and fish-based animal feed producers, to ensure more income for fishers and encourage fish availability for local consumers and processors.	8.273	16
Recommendation 19. Promote regional (African Great Lakes Region or West Africa coastal zone) research programs to identify alternatives to fish-based feed and assess their feasibility, viability, efficiency and profitability.	7.734	17
Recommendation 3. Authorize fish meal and fish-based animal feeds production only from fish species that are not consumed by the local/national population.	7.677	18
Recommendation 21. Promote the establishment of fish-based feed industry in Malawi to support the development of the national aquaculture sector.	7.495	19
Recommendation 4. Conduct research to assess the stock of silver cyprinid (<i>Rastrineobola argentea</i>) locally named "kapenta" and find appropriate and efficient solutions to develop its value chain in Malawi, thus making more of this fish available for direct human consumption.	7.467	20
Recommendation 6. Establish regulations and guidelines for fishers catching shrimp in Sierra Leone so that their by-catches can be used for fish meal and fish-based animal feeds instead of being discarded.	7.328	21
Recommendation 9. Allow the production of fish meal and fish-based animal feeds only from the wastes generated by the fish processing industries.	7.243	22
Recommendation 20. Allow only the national professionals of the fisheries sector to invest in the fish-based feed industry.	4.041	23

Results

Participant numbers in Round 1 ranged from 11 to 36 per country; a total of 150 responses were received. A total of 115 responses were received during Round 2. Mean average ratings assigned by participants in Round 2 were used to prioritise and rank the 23 recommendations (Table 1). Mean ratings ranged from 4 to 9.76 and the nine highest ranked recommendations received a mean average rating above 9 from the panel. The top four ranked recommendations related to: conducting environmental audits of existing fish meal plants; capacity-building for fish and livestock farmers to enable greater use of alternative feeds; promoting environmentally-sound and safe technologies for fish meal production; assessing key fish stocks and monitoring associated harvest and post-harvest activities at a national level. Kendall's coefficient of concordance W was 0.646 following Round 2 and this indicated that the strength of agreement amongst participants had increased to moderate to strong and that the degree of confidence in this could be regarded as fair to high.

Conclusions

Building on outcomes of a regional consultation across 8 countries in the AGLR, Central and West Africa, broad-based consensus was achieved in prioritizing key options to enhance decision making and to guide future research on the utilization of small pelagic fish species. Actions across value chains were ranked highly indicating that there are multiple opportunities within food systems to safeguard and promote the rational and healthy utilization of small pelagic fish in these regions. Prior to implementing any of the options considered here it would be prudent to conduct further assessments to evaluate prospects and pre-conditions for success in particular settings. Safeguards may be required to ensure poor and marginal groups, especially women and children, are not negatively impacted by any of the options presented here. It is anticipated that outcomes from this research could contribute to more efficient, equitable, healthy and sustainable utilisation of the extremely valuable, and often under appreciated, small pelagic fish stocks in marine and inland waters in Africa.

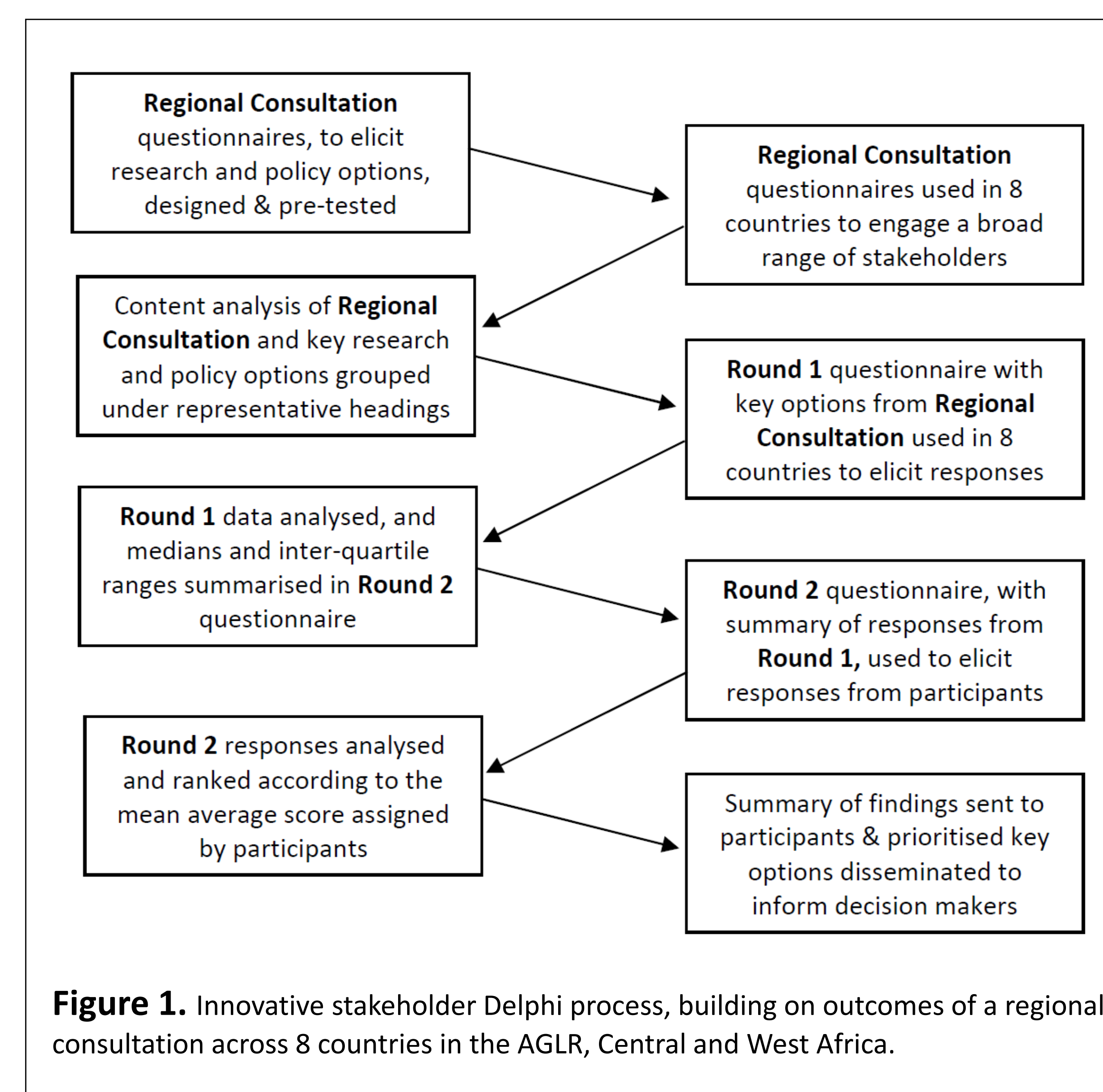


Figure 1. Innovative stakeholder Delphi process, building on outcomes of a regional consultation across 8 countries in the AGLR, Central and West Africa.



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* To ensure the study was conducted in an ethical manner, approval (UREC application 19.5.5.9) was sought from the University Research Ethics Committee of the University of Greenwich on the 30th June 2020 and approval was granted on the 2nd August 2020.

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*** We are allowing the opportunity to display posters for the purposes of sharing knowledge, however this poster has not been either internally or externally peer reviewed.