Food and Agriculture
Organization of the
United Nations

A TOOLKIT FOR INCORPORATING FISH INTO THE HOME-GROWN SCHOOL FEEDING PROGRAMME

A TOOLKIT FOR INCORPORATING FISH INTO THE HOME-GROWN SCHOOL FEEDING PROGRAMME

Mihasina Andrianarimanana, Molly Ahern, Andrea Polo Galante and Jogeir Toppe
Food and Agriculture Organization of the United Nations

Food and Agriculture Organization of the United Nations
Rome, 2024

Required citation:
Andrianarimanana, M., Ahern, M., Polo Galante, A. & Toppe, J. 2024. *A toolkit for incorporating fish into the home-grown school feeding programme*. Rome, FAO. https://doi.org/10.4060/cd0278en

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned.

The views expressed in this information product are those of the author(s) and do not necessarily reflect the views or policies of FAO.

ISBN 978-92-5-138686-6
© FAO, 2024

Some rights reserved. This work is made available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; https://creativecommons.org/licenses/by-nc-sa/3.0/igo/legalcode).

Under the terms of this licence, this work may be copied, redistributed and adapted for non-commercial purposes, provided that the work is appropriately cited. In any use of this work, there should be no suggestion that FAO endorses any specific organization, products or services. The use of the FAO logo is not permitted. If the work is adapted, then it must be licensed under the same or equivalent Creative Commons licence. If a translation of this work is created, it must include the following disclaimer along with the required citation: “This translation was not created by the Food and Agriculture Organization of the United Nations (FAO). FAO is not responsible for the content or accuracy of this translation. The original [Language] edition shall be the authoritative edition.”

Disputes arising under the licence that cannot be settled amicably will be resolved by mediation and arbitration as described in Article 8 of the licence except as otherwise provided herein. The applicable mediation rules will be the mediation rules of the World Intellectual Property Organization http://www.wipo.int/amc/en/mediation/rules and any arbitration will be conducted in accordance with the Arbitration Rules of the United Nations Commission on International Trade Law (UNCITRAL).

Third-party materials. Users wishing to reuse material from this work that is attributed to a third party, such as tables, figures or images, are responsible for determining whether permission is needed for that reuse and for obtaining permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

Sales, rights and licensing. FAO information products are available on the FAO website (www.fao.org/publications) and can be purchased through publications-sales@fao.org. Requests for commercial use should be submitted via: www.fao.org/contact-us/licence-request. Queries regarding rights and licensing should be submitted to: copyright@fao.org.

Contents

Tables

Figures

Boxes

Abstract

Food and nutrition security is one of the 17 Sustainable Development Goals enshrined in the 2030 Agenda for Sustainable Development. In an attempt to contribute to reaching this objective, school feeding programmes are serving meals to over 418 million pre-primary, primary and secondary schoolchildren around the world. The positive experience from a project supported by the Food and Agriculture Organization of the United Nations (FAO) in Angola, Honduras and Peru that incorporated locally procured fish into home-grown school feeding (HGSF) programmes led to the elaboration of this toolkit. This toolkit is designed to support governments, project designers, managers and practitioners involved in the fishery value chain and school feeding, who want to incorporate locally procured, safe, nutritious and affordable fish and fish products into their existing HGSFs. Therefore, this toolkit is expected to assist them during the rapid assessment of the situation of the school feeding and fishery sector, and the identification of challenges and opportunities present while incorporating fish and fish products into HGSFs. To this end, this toolkit adopts three main approaches: the Sustainable Food Value Chain for Nutrition to enhance the consideration of nutrition lens in the value chain approach; the gender-transformative approach to support women fisherfolk in their activities and increase their participation in school feeding programmes; and local and inclusive food procurement to connect public demand for food to small-scale fisherfolk. Specifically, this toolkit proposes 4 phases and 15 flexible and adaptable tools to sustainably serve fish and fish products at schools.

Acknowledgements

This toolkit is the result of collaboration between the FAO Fisheries and Aquaculture Division and the FAO Nutrition Division. Mihasina Harinaivo Andrianarimanana, Andrea Polo Galante, Molly Ahern and Jogeir Toppe collaborated to carefully select the main approaches and concepts used in this toolkit. Mihasina Harinaivo Andrianarimanana took the lead in drafting the content, with guidance of Andrea Polo Galante, Molly Ahern and Jogeir Toppe, who actively participated in shaping the narrative and provided substantial input, making this a collaborative effort. Their collective expertise and insights have enriched the toolkit and ensured its comprehensiveness.

The toolkit was funded by the FAO Flexible Voluntary Contributions (FVC) project "Implementing the Small-Scale Fisheries Guidelines for gender equitable and climate resilient food systems and livelihoods". The authors extend their heartfelt appreciation to Florence Tartanac, Luana Swensson, Melissa Vargas, Diana Carter, Omar Riego Penarubia, Rachel Matheson, and Roxane Misk, among other contributors from the Fisheries and Aquaculture Division, including those from the pilot countries, including Amenye Banda and representatives from various government institutions, for their insightful contributions.

Special recognition is due to Sarah Pasetto for her meticulous copy-editing, and Chorouk Benkabbour for her skilful layout work. These combined efforts have greatly contributed to the quality and impact of this toolkit.

Abbreviations

FAO	Food and Agriculture Organization of the United Nations
GCNF	Global Child Nutrition Foundation
HGSF	Home-Grown School Feeding
IFAD	International Fund for Agricultural Development
NEPAD	New Partnership for Africa's Development
NGO	non-governmental organization
PCB	polychlorinated biphenyl
PCD	Partnership for Child Development
SFVCN	Sustainable Food Value Chains for Nutrition
SFVC	sustainable food value chain
VC	value chain
WFP	World Food Programme

Concepts and definitions

- **School feeding:** the provision of food in the form of meals, snacks, cash transfers, vouchers, in-kind, take-home rations, etc., to school-aged children and adolescents enrolled in a target school. It is a social programme that facilitates equal access to education and learning opportunities (FAO and WFP, 2018).
- **Home-grown school feeding:** a type of school feeding that provides safe, diversified, nutritious, affordable and locally procured foods (even on a small scale) to school-aged children and adolescents at school (FAO and WFP, 2018).
- **Sustainable Food Value Chain for Nutrition:** a value chain approach that considers economic value and nutrition lens (FAO, 2020a).
- **Sustainability-focused:** term referring to the triple "bottom line" of economic, social and environmental sustainability. First, the project must be economically profitable for local fisherfolk and affordable for home-grown school feeding programmes. Second, the project is inclusive, culturally acceptable and improves the nutrition situation of the target communities. Finally, the project contributes to reducing pressure on natural resources by using by-products and underutilized species and parts of fish, and by encouraging environmentally friendly practices all along the value chain, such as those to reduce food loss and waste.
- **Gender-transformative approach:** a gender-transformative approach contributes to increasing women's socioeconomic status within households and communities and improving their participation in decision-making (FAO, 2018a and 2021a). Including a gender-transformative approach in school feeding programmes can contribute to addressing the nutrition issues faced by girls in many low- and middle-income countries, where early marriage and teenage pregnancy are frequent (Ahern *et al.*, 2021; Popkin, 2014).
- **Gender-sensitive approach:** a value chain approach that highlights the contribution of men and women in each stage of the value chain, women's unpaid labor, and the specific constraints and challenges that women face (FAO, 2018a, 2020b).
- **Fisherfolk:** a person (or people) practicing fish-related activities, including fishing, processing of fish, storage of fish, transportation of fish, marketing of fish, etc. for home consumption, sale or both.
- **Healthy diet:** a healthy diet helps to protect against malnutrition in all its forms, as well as noncommunicable diseases. It refers to a balanced, diverse and appropriate selection of foods eaten over some time, which ensures that the specific needs for essential macronutrients (proteins, fats and carbohydrates) and micronutrients (vitamins, minerals and trace elements) of an individual (having regard to gender, age, physical activity and physiological state) are met (WHO and FAO, 2019; WHO, 2020).
- **Food system:** the entire range of activities, people, and institutions involved in the production, processing, marketing, consumption and disposal of food (FAO, 2016).

INTRODUCTION

Rationale

Globally, over 418 million pre-primary, primary and secondary schoolchildren received meals from school feeding programmes (WFP, 2022). According to statistics published by the Global Child Nutrition Foundation (GCNF), worldwide, about 50 percent of school feeding programmes served fish to school-aged children and adolescents (data collected from 139 countries covering 183 SFPs in 2021). Fish was the tenth most served food out of 14 food items and the geographical distribution of school serving fish was uneven. For instance, only 30 percent of schools in low-income countries served fish, compared to 70 percent in high-income countries (GNCF, 2022). However, little is known about how much of this fish is sourced from local producers. In an endeavour to diversify the food basket of school feeding programmes, and particularly home-grown school feeding (HGSF) programmes, which source foods from local producers, the Food and Agriculture Organization of the United Nations (FAO) supported a project in Angola, Honduras and Peru that incorporated locally procured fish into HGSF programmes (FAO, 2020b; Toppe *et al.*, 2021). The positive experiences from this project initiated the elaboration of this toolkit, which would contribute to systematizing the incorporation of locally procured, safe, affordable and nutritious fish and fish products into HGSF programmes (for ease of reading, such products are hereinafter referred to as fish and fish products).

This initiative is an integral part of the FAO School Food and Nutrition Framework that serves as a guiding document for FAO in supporting governments and institutions to develop, transform or strengthen policies, programmes and other initiatives related to school-based or school-relevant matters. Ultimately, the FAO School Food and Nutrition Framework aims to have a positive and synergistic impact on diets, child and adolescent nutrition, community socioeconomic development, and local food systems. The Framework aligns with FAO's mandate and builds upon its areas of expertise and comparative advantage.

More specifically, the FAO School Food and Nutrition Framework encompasses four key areas of work. Work under the first area aims to foster healthier school food environments, through supporting governments in the design and implementation of nutrition standards for school meals and policies to regulate the food offered in schools. Activities under the second area focus on strengthening the capacities of governments to integrate action-focused food and nutrition education in their school systems. Work under the third area aims at stimulating inclusive procurement and nutrition-sensitive value chains (VCs) that involve local small-scale food producers and enterprises, for HGSF programmes. Finally, the work under the fourth area is focused on creating policy, legal and institutional environments that enable the implementation and effectiveness of holistic school food and nutrition initiatives (FAO, 2019a). In this context, the toolkit directly contributes to promoting a healthy school food environment, which includes tools aimed at fostering better diets in schools (Tool 11 and Tool 15). Additionally, it supports inclusive procurement and the fishery VC, specifically by facilitating the involvement of local fisherfolk in the HGSF programmes.

Finally, fish offers an invaluable and cost-effective source of animal protein, particularly in regions where alternative protein sources are scarce or expensive. Given that adequate protein intake is critical for growth, development and overall health, especially during childhood and adolescence, the inclusion of fish and fish products becomes vital in meeting the nutritional needs of school-aged children and adolescents. Integrating fish into HGSF programmes contributes to supporting local

fisherfolk and coastal communities. Fishing activities and post-harvest operations not only provide a source of income for fisherfolk, but also serve as significant economic drivers in coastal and inland areas. By sourcing fish locally for school meals, HGSF programmes foster sustainable livelihoods and creates economic opportunities for fisherfolk, thereby benefiting the entire community.

Objectives

The implementation of HGSF programmes promotes the design and adoption of quality and safety standards for local products. This toolkit is a comprehensive technical package designed to assist countries in need of: (1) a rapid assessment of the situation of the school feeding programme and the fishery sector; and (2) an identification of the constraints and opportunities concerning the sustainable incorporation of fish and fish products into the HGSF programme.

Toolkit target audience

This toolkit is designed to assist governments, project designers, managers and practitioners involved in the fishery VC and school feeding programmes in the integration of fish and fish products into HGSF programmes, supporting the existing initiatives promoting sustainable fisheries. It provides guidance and can aid capacity development efforts for all stakeholders involved at national and local levels.

The structure of the toolkit

The toolkit proposes four phases:

- **Phase I** – **Preparation phase.** Before starting any analysis or making any decisions, users will collate secondary data (used as baselines), at national and regional levels, on the food system.
- **Phase II** – **Planning phase.** At this stage, the data collated during Phase I are screened and analysed to select one or more target schools. The final selection is done after consultation and approval of actors and stakeholders involved in the fishery sectors and the HGSF programme of the target country.
- **Phase III** – **Data collection.** Once the target school(s) have been selected, users will collect data from primary and secondary sources to map the fishery VC with a nutrition lens (FAO, 2020a) and in a gender-sensitive manner (FAO, 2018a); and to characterize the demand (school-aged children and adolescents' diets characteristics and tastes, food environment, quantity needed, etc.).
- **Phase IV** – **Elaboration of intervention options.** The final stage consists of the elaboration of intervention options that are in line with the priorities of the target countries and funders to sustainably and regularly supply fish and fish products to HGSF programmes. The intervention options should be gender-transformative and feasible with positive impacts on the local fisherfolk and school-aged children and adolescents (FAO, 2018a and 2021a).

Approaches adopted by the toolkit

The elaboration of this toolkit followed three main approaches:

- **The Sustainable Food Value Chain for Nutrition:**[1] this enables analysis of the fishery VC considering not only the economic value but also adding a nutrition lens (food safety and nutrient retention, etc.) (FAO, 2020a). Furthermore, Sustainable Food Value Chain for Nutrition (SFVCN) strategies can contribute to meeting the relatively high standards (in terms of both quantity and quality) of HGSF programmes (FAO, 2018b, 2020a and 2021b; De la Peña and Garrett, 2018; De la Peña, Garrett and Geli, 2018). That is, to support local fisherfolk and HGSF programmes, intervention options are tailored to increase the supply and demand for fish and fish products.
- **The gender-transformative approach:**[2] this enables intervention options that support the contribution of women in the fishery VC and HGSF programme (workload gap, unpaid labour, lack of voice in household decision-making, and access to resources, finance, services and producer organizations) (FAO, 2020c). It is worth noting that for the sake of adequate and effective gender-transformative intervention options, users are recommended to analyse the fishery VC in a gender- sensitive manner (Box 1).[3]
- **Local and inclusive food procurement for HGSF programmes:** This approach serves to link the demand for food (fish and fish products) in schools to the most vulnerable categories of suppliers, local small-scale fisherfolk, thereby ensuring inclusiveness. In the context of inclusive public food procurement for HGSF programmes,[4] certain considerations are vital to ensure the effective participation of small-scale fisherfolk:

  1) Assessment of the national regulatory framework for local food procurement.[5] This framework comprises the policies, laws and regulations that govern the local food procurement process and modalities. Since the scope of this toolkit is to provide support to existing HGSF programmes, it is crucial to understand and work within these established rules to ensure compliance and transparency in procurement activities.

  2) Alignment of procurement practices with the specific needs and capacities of small-scale fisherfolk. This involves adapting selection criteria, bidding procedures and contract mechanisms to accommodate the unique challenges faced by small-scale fisherfolk. Flexibility in procurement procedures, especially for smaller quantities or decentralized programmes, can provide opportunities for the inclusion of smallholder fisherfolk.

  3) Consideration of the commodities being procured, the capacity of small-scale fisheries organizations, and the local market structures. These factors influence the choice of procurement approaches, such as direct purchasing from fisherfolk, their associations, or intermediary traders. Establishing direct relationships between fisherfolk and HGSF programmes can minimize the involvement of intermediaries and streamline the food supply process. However, it could also increase transaction costs and hinder the regularity of fish supply and food safety control.

---

[1] More information on SFVCN is available at the FAO elearning Academy module on Sustainable Food Value Chains for Nutrition (FAO, 2020b) and the recording of the International Technical Webinar on Sustainable Food Value Chains for Nutrition (FAO, 2020d).

[2] More information on gender-transformative approaches is available online at FAO, 2020c.

[3] More information on gender-sensitive value chains is available in FAO, 2018a and 2021a.

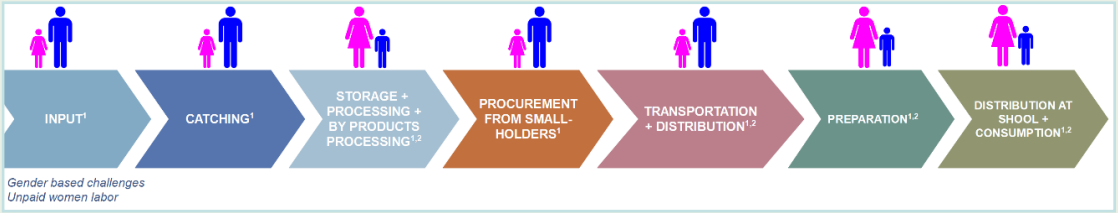
[4] More information on inclusive public food procurement is available in FAO, Bioversity international and UFRS, 2021a, and 2021b.

[5] More information on regulatory issues for school food procurement is available in Swensson, 2018 and Swensson and Tartanac, 2020.

BOX 1. WOMEN IN THE FISHERY VALUE CHAIN

Globally, the contribution of women in the capturing phase is relatively low (about 20 to 25 percent) (Kruijssen, McDougall and van Asseldonk, 2018). Women are mostly present in the post-harvesting phase, in which they perform about 85 to 90 percent of the total share of work (including unpaid work) (FAO, 2014a; Kruijssen, McDougall and van Asseldonk, 2018) (Figure A).

Figure A. Template for a gender-sensitive value chain for home-grown school feeding programmes



Source: Authors' adaptation based on the gender-sensitive approach to VCs (FAO, 2018); the gender division of labour is adapted from FAO, 2022a and Randrianatoandro, Ward and Barrazza, 2022.

In their activity, women fisherfolk face several challenges including: a lack and unequal access to input (core value chain),* external financial support (e.g. credits, loans) and the formal market; insufficient storage space within the producer group; inadequate government support (extended value chain)** and training, and formal registration requirements; and unpaid labour (FAO, 2022b).

Notes:

* The core value chain is the value chain represented in Figure A. It is the succession of each node, from access/use of inputs to final consumption by school-aged children and adolescents (FAO, 2014).

** The extended value chain is the core value chain together with the economic services provided, such as input provision, finance, and service provision (FAO, 2014).

Sources:

FAO. 2014. *Developing sustainable food value chains - Guiding principles*. Rome. https://elearning.fao.org/pluginfile.php/550440/mod_scorm/content/3/story_content/external_files/DevelopingSustainable.pdf

FAO. 2018. *Developing gender-sensitive value chains*. Rome. https://www.fao.org/3/I9212EN/i9212en.pdf

FAO. 2022a. Women and men in small-scale fisheries and aquaculture in Asia. Bangkok. https://www.fao.org/3/cb9527en/cb9527en.pdf

FAO. 2022b. *Mapping women's small-scale fisheries organizations in Malawi*. Rome. https://doi.org/10.4060/cb8499en

Kruijssen, F., McDougall, C.L. & van Asseldonk, I.J.M. 2018. Gender and aquaculture value chains: A review of key issues and implications for research. *Aquaculture*, 493: 328–337. https://doi.org/10.1016/j.aquaculture.2017.12.038

Randrianatoandro, A., Ward, A. & Barrazza, A.S. 2022. *Gender and food loss in sustainable food value chains in Africa*. FAO, Rome. http://www.fao.org/documents/card/en/c/I8620EN/

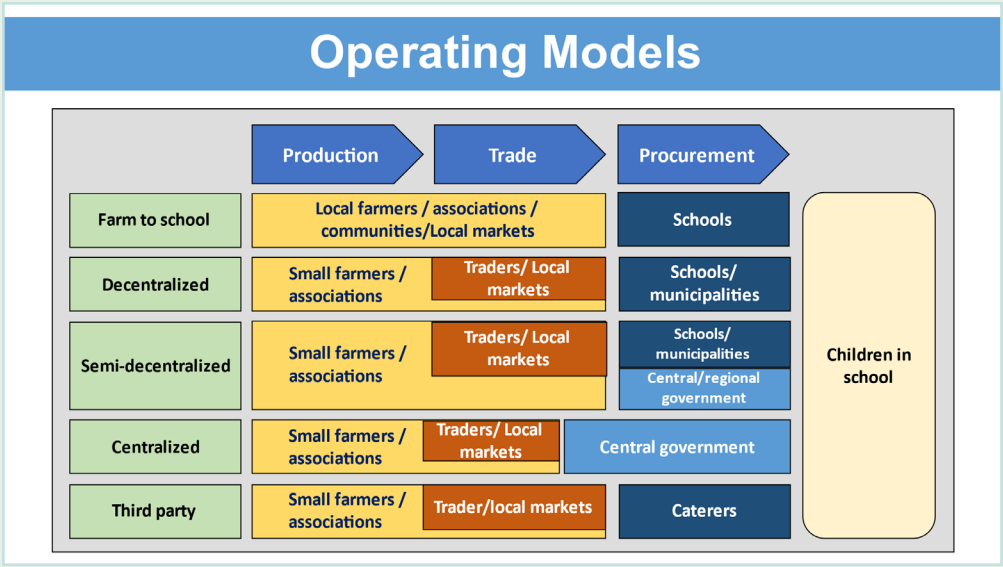
It is worth noting that local, inclusive food procurement must adhere to national public procurement laws and regulations. In addition, efficient use of public funds must be upheld.

For more details, see Box 2.

BOX 2. LOCAL FOOD PROCUREMENT AND OPERATING MODELS OF HOME-GROWN SCHOOL FEEDING PROGRAMMES

Home-grown school feeding (HGSF) programmes can adopt various operating models depending on their specific contexts and objectives. These models are characterized by the degree of centralization or decentralization in programme management, procurement, distribution and monitoring, as well as whether food procurement is performed in-house or by third parties. Each country may develop its own models, and even within a country, multiple models can coexist (Figure B).

Figure B. The operating models of home-grown school feeding programmes



Source: FAO and WFP, 2018.

The HGSF operating model refers to the overall approach and framework used in implementing school feeding programmes. It encompasses the entire process from production and procurement to distribution of food within schools. In HGSF programmes, different operating models have advantages and trade-offs, involving various actors from producers to schools. Procurement can be direct from farmers or intermediaries, with a preference for establishing direct relationships in order to reduce intermediaries. In certain cases, trader involvement can be beneficial. Decentralized models offer flexibility and local linkages, benefiting both producers and end users. Nevertheless, their application may face challenges including weak administrative or technical capacity at local levels, and lack of financial resources (Kelly and Swensson, 2017). From the local supplier perspective, the most common challenges are the supply schedule, food safety standards, and the legal documents needed (e.g. tax invoices) (Swensson, 2018). Furthermore, decentralization models do not benefit from bulk buying or economies of scale.* Centralized processes ensure standardization; however, they pose challenges for smallholders because of requirements and scale limitations.

In summary, the operating model used by HGSF programmes is case-specific, considering factors such as size, economic and market structure, regulatory framework, government (national or local) organization, food volumes and types required according to nutrition criteria, guidelines or standards in place (if any), beneficiaries' needs, and public procurement capacities.

More information on HGSF programmes and public procurement is available in FAO and WFP, 2018 and FAO, 2023.

Sources:

FAO. 2023. Sustainable public food procurement. In: ***FAO***. Rome. [Cited 23 October 2023]. https://www.fao.org/nutrition/markets/sustainable-public-food-procurement/en/#c858497

FAO and WFP. 2018. Home-Grown School Feeding. Resource framework. Technical document. Rome, FAO. https://www.fao.org/3/ca0957en/CA0957EN.pdf

* Swensson's (2020, 2019) reports provides examples of challenges faced in the implementation of public food procurement rules and practices to link smallholders to HGSF in Senegal and Ethiopia

Theory of change

The theory of change (Figure 1) gives a general overview of the impact pathway resulting in the incorporation of fish and fish products into the HGSF programme (Tool 3 is provided to select target school[s]). It illustrates the potential positive changes that can occur through this integration, including food affordability, safety, food basket diversification at schools, and a safe food environment within schools. To facilitate the implementation of this theory of change, this toolkit has been developed to serve as a valuable resource supporting stakeholders in incorporating fish and fish products into HGSF programmes.

The toolkit provides various tools and methodologies to address challenges and seize opportunities enabling stakeholders to make informed decisions and implement evidence-based intervention options. For that, the toolkit provides support in identifying entry points (using Tools 4 and 5) that can benefit local fisherfolk (especially women) by providing them with a predictable and stable market, upgrading their VC activities (e.g. reduction of food and nutrient loss, improvement of food safety and handling practices, sustainability of natural resources, and increase of profitability), and increasing their bargaining power and income.

Nevertheless, many constraints arise in the integration of fish and fish products in HGSF programmes (Figure 1). Among these, food safety and affordability were the concerns that often arose among involved actors (fishery authorities, agencies or ministries responsible for school feeding programmes and stakeholders).[6] These constraints are potential entry points for intervention options to upgrade the fishery VC. One such entry point is helping local fisherfolk and their organizations to meet the relatively stringent requirements and standards of HGSF programmes by upgrading some activities in the VC, in particular in fish processing (although taking into account specific constrains),[7] increasing the economic competitiveness of the fisherfolk. Examples include capacity building on good handling, hygiene and food safety practices, as well as sustainable and inclusive public procurement and use of underutilized species and parts of fish.

The toolkit also offers support to HGSF programmes and stakeholders to procure fish and fish products from local fisherfolk sustainably and regularly. This can be done for example by ensuring the profitability of the project, determined by cost-benefit analysis, see Tool 14. Another way is to ensure the adequacy of the fish and fish products provided, by selecting the fish species and preparations that school-aged children and adolescents appreciate the most, as determined through sensory evaluation using Tools 7 and 9; and that are convenient for school staff to prepare, as determined by the ease of use assessment measurable through Tool 10.

Besides benefiting local fisherfolk, the use of the toolkit also benefits school-aged children and adolescents by contributing to healthy diets. Indeed, by using the toolkit, it is expected that the fish and fish products consumed at school will be safe and nutritious (refer to Tool 7, microbiological analysis and Tool 15, tracing documents), and come from and are served in a safe and healthy environment (refer to Tool 11). Thus, school-aged children and adolescents will have access to safe fish served in a healthy environment. This is expected to diversify their food basket with additional animal-sourced protein and an increase in intake of fatty acids.

Finally, it is worth mentioning that in order to avoid harming local fisherfolk and to ensure that local and inclusive food procurement is profitable for them, this toolkit advocates the consideration of unpaid labour and hidden costs, such as membership fees, land cost, and cost of loss during pricing (as determined by production cost estimation, see Tool 13).

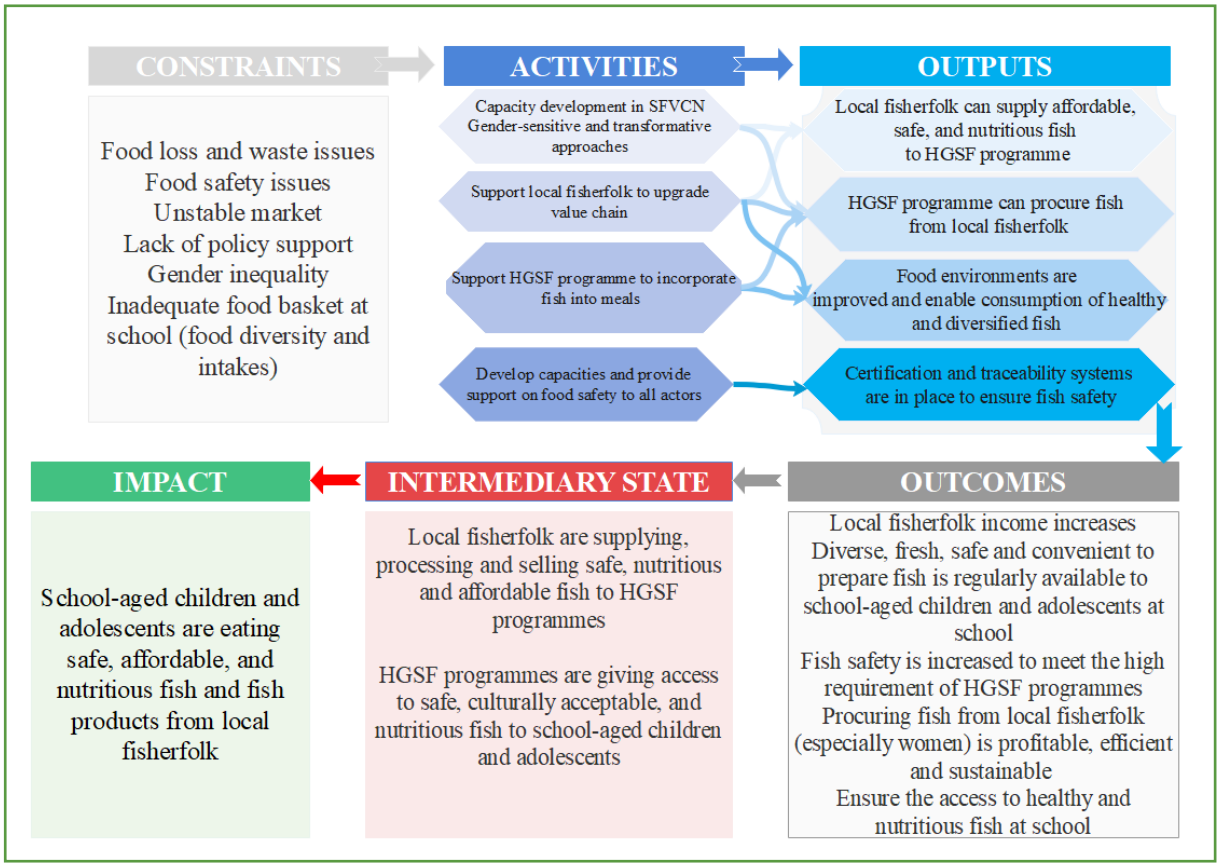
---

[6] Information from various field mission and online meeting with actors and stakeholders during the elaboration of the toolkit.

[7] It is important to consider the maintenance costs of technologies in relation to the market, as for technologies to be sustainable, they will need to respond to the market's needs (in terms of appropriate products as well as price). There is evidence of fish processing technologies that are not sustained beyond external funding as the market price of fish products does not allow for maintenance's costs of technologies (Kimani *et al.*, 2022).

It is important to note that the scope of this toolkit is limited to the incorporation of fish and fish products from local fisherfolk in existing HGSF programmes. Moreover, all tools proposed in this document serve only as a guideline, and need to be adapted to the context specific to the target country. Finally, this toolkit also aims to support the participation of women fisherfolk in HGSF programmes, thus advocating for capacity development with a gender-transformative approach (for example, training of trainers to provide training in a manner sensitive to gender).

Figure 1. Theory of change: incorporation of locally procured fish and fish products into the home-grown school feeding programme



Source: Authors' own elaboration.

SUMMARY OF THE TOOLKIT

Table 1 provides a brief overview of the steps proposed in this toolkit.

Table 1. Presentation of the toolkit

Phase	Step	Objectives	Methodology	Outputs	Tools
Preparation	1. Identification of the general needs of the target country	Identify the major challenges faced by the target country regarding the supply and demand for fish and fish products	Interview with key stakeholders at the national level and collation of secondary data	The general needs of the target country are identified.	Tool 1
	2. Establishment of baselines	Put the project into its national context	Collation of secondary data	The target country profile is set, presenting the situation of the fishery sector by region and arranging the information on local fisherfolk is arranged in a gender-sensitive manner. Existent nutrition guidelines and standards are identified. A list of school feeding programmes and HGSF programmes by region is elaborated. A list of major actors of the school feeding programmes and their contribution is elaborated. The general operating model used by the HGSF programme is identified.	Tool 2
Planning	3. Selection of target school	Identify the target school(s) in which fish and fish products will be incorporated	Workshop with key stakeholders at the national or regional level	The target school(s) are identified (users may select more than one school following the feasibility of the project).	Tool 3
Data collection	4. Collation and collection of data	Collect data to map the fishery value chain (VC) following the Sustainable Food Value Chain for Nutrition (SFVCN) approach and in a gender-sensitive manner; and Collect demand and food environment-related data (at the school level).	Collation of available secondary data and collection of primary data at the local or community level	Available secondary data are identified. Collect all data needed to map the fishery VC and to characterize the demand.	Tool 4 to Tool 11
Elaboration of intervention options	5. Organization of information and data analysis	Map the fishery VC following the SFVCN approach and in a gender-sensitive manner and; Characterize the demand and the food environment at the school level.	Organization and analysis of information collected in Step 4	A map of the fishery VC with the SFVCN approach is elaborated in a gender-sensitive manner. The contributions of women in the fishery VC, including unpaid labour, are highlighted. The characteristics of the relevant school-aged children and adolescents and the target school are known (in terms of quantity and quality). The operation models of local procurement are identified (contract type, payment schedule, buyers, etc.).	Tool 12 to Tool 14
	6. Elaboration of intervention options	To generate intervention options, including gender-transformative intervention options, to sustainably and regularly incorporate fish and fish products into HGSF.	Intervention options are proposed in Section 3.6 of this document. However, the final intervention options must satisfy the specific context of the target country, and be within the means of the target country.	Entry points for intervention options are identified. Intervention options to sustainably and regularly incorporate fish and fish products into HGSF are generated. Gender-transformative intervention options to sustainably and regularly incorporate fish and fish products into HGSF are generated.	Tool 11; Tool 12 to Tool 15

DESCRIPTION OF THE TOOLS AVAILABLE

Table 2 presents a brief description of each tool proposed in this document. However, readers should bear in mind that all tools proposed in this document are flexible and must be adapted to the context specific to the target country.

Table 2. Overview of the tools available

Tools	Brief description
1. Guiding questions to identify the general needs of the target country	Provides nine guiding questions to assess the demand situation and three guiding questions to assess the supply situation. Potential data sources are also proposed.
2. Potential data sources to establish baselines	Provides links and a website to collate secondary data on the fishery sector; school feeding programme (SFP) regulations; and food dietary guidelines.
3. Workshop guidelines to select target schools	Supports users in selecting target schools from the preparation of the workshop to the writing of the final report.
4. Questionnaire for fishery value chain mapping	Provides two questionnaires to map the fishery value chain, one at the ministry level and one at the local fisherfolk level.
5. Questionnaire for demand characterization	Provides two questionnaires to characterize the demand, one at the lead agency level and one at the target school level.
6. Guiding questions for nutrition situation analysis	Provides seven guiding questions to complete a brief nutrition diagnosis of the target school-aged children and adolescents (with special consideration for consumption of fish and fish products).
7. Guidelines for sensory evaluation	Helps users to complete the sensory evaluation, which includes an acceptability trial and a plate waste assessment.
8. Template letter to get clearance from parents	Provides a template of a letter to obtain clearance from parents before starting the sensory evaluation.
9. Guidelines for caregiver perception	Provides 11 guiding questions to obtain the view of caregivers on the incorporation of fish and fish products into the home-grown school feeding programme, and seven questions to screen for allergens among the target school-aged children and adolescents.
10. Guiding questions for ease-of-use assessment	Provides six guiding questions for food handlers at the target school level to assess the feasibility of the project, from the perspective of the staff involved in the school feeding programme.
11. Scoring sheet to assess the quality of facilities and infrastructure	Provides a scoring sheet to assess the quality and safety of the food environment (landing site, transportation process, processing plant, and school).
12. Guideline to estimate minimum quantity needed of fish and fish products	Provides a mathematical method to estimate the minimum quantity of fish and fish products needed per school per week.
13. Guideline to estimate production cost	Provides mathematical methods to estimate the unit production cost of fish and fish products.
14. Guideline for cost–benefit analysis	Provides a methodology to conduct a cost–benefit analysis.
15. Tracing documents	Provides a template document to track all the processes the fish went through, from the capturing phase to the preparation at school.

THE TOOLKIT STEP-BY-STEP

Note that all tools proposed in this document are available in the Annex to this publication. They are all flexible and adaptable to specific country contexts. Furthermore, it is recommended to test and translate the tools into the local language (if required), before using them.

Step 1. Identification of the general needs of the target country

Available tools
Tool 1 supports users in collecting information from key stakeholders (at the national level) and secondary data sources.

Technical note
This toolkit can be used if:

- The target country already has a school feeding programme or HGSF programme.
- The Ministry of Fisheries and school feeding programme lead agency are willing to work together to support the incorporation of fish and fish products into the HGSF programme.

In addition, if the above conditions are met:

- The target school must have enough capacity (capital, infrastructure, knowledge, etc.) to serve fish and fish products, and the school-aged children and adolescents are willing to eat fish, that is, no challenges exist on the demand side. In these cases, no intervention options are needed in terms of the school or the school-aged children and adolescents. Otherwise, interventions on the demand side are needed.
- Local fisherfolk have enough capacity (quantity and quality) to supply fish and fish products to the HGSF programme, i.e. there are no challenges identified at the supply side, no intervention options are needed at the local fisherfolk level. If not, intervention options are needed on the supply side.

Step 2. Establishment of baseline

Available tools
Tool 2 supports users in retrieving information from secondary sources and key informants.

Technical note
The information to be collated (or collected through contacting key informants) is the following.

General situation of the fishery sector

- Regional statistics on the fishery sector, to assess the potential of the fishery sector. Examples of such information are quantity captured by species, number of fishers by gender, number of fishing licenses by gender, and number of fisher organizations.
- Pollution control of capturing sites. This information is used to assess the involvement of local authorities in controlling safety-related issues and to generate intervention options to supply safe fish to school-aged children and adolescents.

– Procedures and cost for obtaining fishing licenses (applicable if the potential local suppliers are fishers). This information is used to describe the process of obtaining fishing licenses and to generate intervention options to facilitate the connection of local fishers to public food and inclusive procurement (that is, the target school sources from local fishers).

– Specific regulations and laws related to the fishing calendar, to safety control and to the sustainability of the natural resources. This information helps to assess the involvement of local authorities in sustaining fishery activities and to ensure the safety of the fish and fish products. Moreover, it is used to generate intervention options to sustainably supply safe and nutritious fish and fish products at school.

– Specific regulations and legislation pertaining to the fishery sector.

Information related to school feeding programmes

This includes school feeding programme regulations, procurement procedures, contracts used to connect local suppliers to schools, school meal nutrition guidelines, and national food-based dietary guidelines.

The following indicators were selected based on the laws and regulations of Brazil, Guatemala and Honduras[8]. Other relevant indicators can be included depending on the context of the target country. The following information should be collated, or collected by contacting key stakeholders:

– **List of school feeding programme actors**, such as the lead agency; funders; managers; and stakeholders. This will help to identify respondents during data collection.

– **School meal nutrition standards and/or guidelines** (nutrient-based, food-based, mixed),[9] and the procedures (and levels) to operationalize standards and guidelines into menus and recipes. Examples are lists of non-recommended foods (if any), to identify any practices to avoid, portions of food recommended by age, serving frequency, etc.

– **National food-based dietary guidelines**, if school meal nutrition standards and guidelines are not available.

– **Operational modalities and arrangements of the school feeding programme**, including budget allocation and estimation, food purchasing management, distribution of food to school-aged children and adolescents, control and monitoring activities, recipe elaboration, etc. These help identify the authorities in charge of the intervention options proposed to sustainably supply fish and fish products from local fisherfolk.

– **Rules and practices related to inclusive public food procurement**. Such information helps to elaborate adequate intervention options to connect local fisherfolk to school food procurement.

[8] Laws and regulations used in this documents are from http://www.planalto.gov.br/ccivil_03/_Ato2011-2014/2014/Lei/L12982.htm; https://extranet.who.int/nutrition/gina/en/node/66502; and https://www.se.gob.hn/media/files/leyes/REGLAMENTO_DE_VENTA_DE_ALIMENTOS_EN_CENTROS_EDUCATIVOS.pdf

[9] The joint FAO and WFP publication Nutrition guidelines and standards for school meals provides several examples of nutrition guidelines and standards from 33 low- and middle-income countries (FAO and WFP, 2019).

Step 3. Selection of target school

Available tools
Tool 3 supports users to select target schools.

Technical note
The selection of the target school is based on a consulting approach with a panel of stakeholders. Users can either contact local authorities (at the national level) via email, set up a meeting online or organize a workshop offline (refer to Tool 3 for guidance on planning such an event), taking into consideration the context of the target country.

Before selecting the target school, it is of utmost importance to identify the target region. To do so, users must score and rank each region according to the potential of school feeding programmes / HGSF programmes and the fishery sector. The following paragraph provides notes on how to select the target region.

First, the regions to be scored are:

1) a region with a school feeding programme or a HGSF programme (government-approved); and
2) a region where the incorporation of fish and fish products is supported by the Ministry of Fisheries and school feeding programme lead agency.

Second, the following proposed selection criteria are given and are detailed in the scoring sheet in Box 3:

1) The region has a high potential for fishery development (a large number of active fishers, a surplus of fish, a large number of active fishers with fishing licenses, a large number of active fisherfolk organizations, etc.).
2) The region has a school with the capacities (capital, infrastructure, skills) to serve fish safely.
3) The region has local fisherfolk that are willing to supply fish and fish products to schools.

Note that the scoring sheets (Box 3) require placing numerical values on the information sought to select the target region. Users can assign the value 0 to “No” and 1 to “Yes”.

BOX 3. SELECTION OF TARGET REGION IN MALAWI

In Malawi, an initial assessment of school feeding programmes and local fish supply chains was done in Mangochi and Salima Regions. Both regions had existing HGSF programmes and were willing to work with local fisherfolk to try to include fish products therein. None of the schools served fish in the HGSF programmes prevailing at the time, and the Ministry of Fisheries was willing to work with HGSF programmes in both regions. Both regions had active fisheries activities and fisherfolk that were willing to supply fish to HGSF programmes, although Mangochi Region had more developed fisherfolk organizations. The fish sourced in the region was sold on regional and national markets. The women's processing organizations noted that they would prefer to sell in local markets if they could get a good price. However, they often resorted to selling fish to wholesalers in the capital city as they could obtain a higher price, although they often felt that the price was not fair and they also had to sustain other costs involved (transport, etc.).

Region	Selection criteria	Yes	No	Score
Mangochi	Has school feeding programmes that have served fish before	☐	☒	0/1
	Has a school with enough capacities and infrastructure to serve fish safely	☐	☒	0/1
	Has active fishers or fisherfolk working in the fishery sector	☒	☐	1/1
	Has an active fisherfolk organization working in the fishery sector	☒	☐	1/1
	Has local fisherfolk that are willing to supply HGSF	☒	☐	1/1
	Has active fisheries activities (inland or marine)	☒	☐	1/1
	Fish produced in the region supplies local markets	☐	☒	0/1
	Fish produced in the region supplies the regional market	☒	☐	1/1
	Fish produced in the region supplies the interregional market	☒	☐	1/1
	Fish produced in the region supplies the international market	☐	☒	0/1
	The region sources imported fish (specify species and form (i.e. whole, fillet only, etc.):	☐	☒	0/1
				6/11
Salima	Has school feeding programmes that have served fish before	☐	☒	0/1
	Has a school with enough capacities and infrastructure to serve fish safely	☐	☒	0/1
	Has active fishers or fisherfolk working in the fishery sector	☒	☐	1/1
	Has an active fisherfolk organization working in fishery sector	☐	☒	0/1
	Has local fisherfolk that are willing to supply HGSF	☒	☐	1/1
	Has active fisheries activities (inland or marine)	☒	☐	1/1
	Fish produced in the region supplies local markets	☐	☒	0/1
	Fish produced in the region supplies the regional market	☒	☐	1/1
	Fish produced in the region supplies the interregional market	☒	☐	1/1
	Fish produced in the region supplies the international market	☐	☒	0/1
	The region sources imported fish (specify species and form (i.e. whole, fillet only, etc.):	☐	☒	0/1
				5/11

Thus, the project found that there were more entry points in Mangochi Region, to support the women's fish processing organizations to connect to local schools as a market for their fish products.

Step 4. Collation and collection of data

Collation of secondary data

Before collecting primary data, the toolkit recommends consulting relevant secondary data sources. These include official reports or statistics of ministries of fishery, mapping of women's organizations,[10] project reports and impact evaluations, school feeding programme reports, fish recipe books, etc. However, before using these documents, it is recommended to check that:

- the data were collected from the target region or reflect the situation of the target region (this can be cross-checked with the panel of experts and professionals from the field);
- the data are up-to-date or reflect the situation of the target region at the time of the projects – in other words, no significant changes have happened between the collection of data and the time when the data are needed; and
- the data were collected following statistics guidance approved by national authorities. Moreover, users are recommended to refer to peer-reviewed studies and reports or assessments published by governments and international organizations such as FAO.

Collection of primary data

Overview of the questionnaire

Available tools

After identifying the secondary data available, primary data collection is conducted to fill in any missing information.[11] For primary data collection, this toolkit proposes:

- Tool 4 to collect data to map the fishery VC;
- Tools 5–8 to collect data to characterize the demand; and
- Tools 9–11 to collect data on the food system.

Technical notes

Questions provided are in the form of semi-structured interviews with multiple-choice questions, yes/no questions and open questions.

Questionnaire for the supply analysis (refer to Tool 4)

- **Tool 4A. Questionnaire for the ministry of fisheries:** data are collected at the most decentralized level possible where the target school operates (Box 4), from a representative of the ministry of fishery. The questionnaire has **26 questions**, used to gain a better understanding of the fishery sector (challenges, place of women, administration procedures, etc.) according to the ministry's perspective. Moreover, the information collected helps during the mapping of the fishery VC.
- **Tool 4B. Questionnaire for local suppliers:** data are collected from the potential local suppliers (local fisherfolk or a representative of local fisherfolk groups, preferably women-dominated groups). The questionnaire has **61 questions**. However, it is strongly recommended that data already available from secondary sources are utilized, thus

[10] For example, secondary data and reports on mapping of women's organizations working in small-scale fisheries are available here for Ghana (Smith, 2022a), Malawi (Smith, 2022b), Sierra Leone (Smith, 2022c) and Uganda (Smith, 2022d).

[11] For primary data collection, it is advised to set a maximum sample size (as a threshold) that is feasible for the team, considering budget, human resources and logistics. Set a final sample size with the assistance of a trained statistician or of a sample size calculator. The best statistical practices relating to field surveys recommend a sample size of a 95 percent confidence level with a 5 percent confidence interval. However, users can also adopt a non-probabilistic sampling methodology such as snowball sampling.

reducing the number of questions to be collected using questionnaires or primary data collection activities. Furthermore, each section is independent, which means that some sections can be skipped if they are not relevant to the local suppliers' situation (for example, Section 4B-IV is skipped if local suppliers do not catch fish). The questionnaire is used to map the fishery VC following the SFVCN approach and in a gender-sensitive manner.

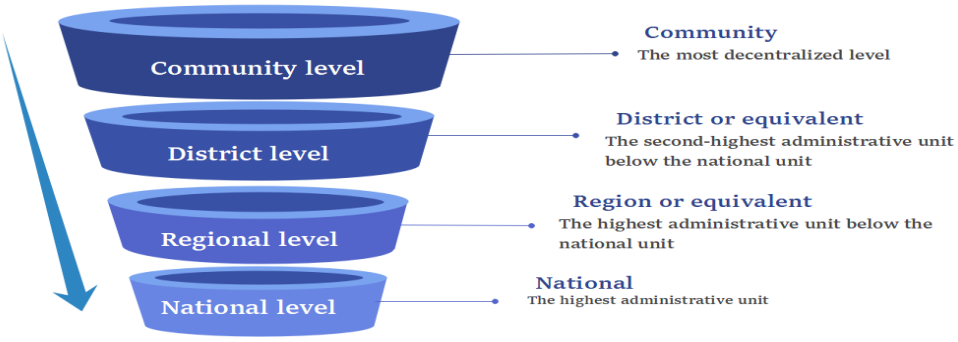
Questionnaire to assess the demand situation (refer to Tool 5)

- **Tool 5A. Questionnaire for school feeding programme lead agency:** data are collected at the most decentralized level possible where the target school operates (Box 4) from a representative of the school feeding program lead agency. The questionnaire has **14 questions** and seeks to obtain a better understanding of the school feeding programme system (regulations, challenges, mechanisms, opportunities, etc.) under which the target school operates.
- **Tool 5.B Questionnaire for the target school:** data are collected from the school director or target school feeding programme manager. The questionnaire has **23 questions**, aimed at obtaining the information (contract used to connect local supplier to school, quantity of fish needed, challenges, etc.) required to sustainably serve fish and fish products at school.

BOX 4. DIFFERENT LEVELS OF STAKEHOLDERS TO CONSIDER

Users should interview key stakeholders from the most decentralized level possible, as suggested in Figure C. First, users should interview at the community level; if this is not possible, they should query at the district level, and so on.

Figure C. The selection order of the target stakeholders



Source: Authors' own elaboration.

Before using the questionnaires, the toolkit recommends to:

- State that participation in the questionnaire is voluntary, requiring the full consent of the interviewee. Generally, questionnaires are anonymous. However, if this is not possible, users are obliged to obtain explicit consent that the interviewee is willing to disclose their identity.
- Adjust the questions based on the local context. The questionnaire provides an exhaustive list of the information needed to incorporate locally procured fish and fish products into the HGSF programme. Therefore, some questions may be not relevant to the local context and need to be adjusted, deleted or added. Thus, with the support of the panel of experts, users should go through the questionnaire and identify its relevance to the local context.
- Verify where the information can be collected. Users are recommended to identify if it is better to collect data at the national, regional or local level (for example, in some cases, the nutrition guidelines or standards are decided at the central level and operationalized at the regional or local levels). Therefore, the selection of the level depends on the country-specific context. Furthermore, in the case that the key informant interviewed fails to give the information required, users can query where this information can be found and interview the proposed key informant.
- Translate the final questionnaire into the local language of the target country.
- Test the final questionnaire on a small number of samples and adjust if necessary.
- Use online survey tools to facilitate data collection, organization and treatment, if the local context allows it.

Collection of primary data to map the fishery value chain

When collecting data to map the fishery VC, users can adopt a focus group discussion or one-on-one interview, depending on the local context (and considering the budget, human capital, etc.). Data are collected in a gender-sensitive manner and following the SFVCN approach, with the support of Tool 4 or the methodology for mapping women's small-scale fisheries organizations and assessing their needs (FAO, 2022a).

Collection of primary data to characterize the demand

The characterization of demand consists of:

1) Obtaining demand-related information, such as the quantity of fish and fish products needed by the target school, the procurement operational system used by the target school, and the challenges and opportunities faced by the HGSF programme (especially those relevant to the incorporation of fish and fish products) (refer to Tool 5).
2) A brief nutrition situation analysis focusing on the causes of malnutrition, such as the dietary gap faced by the target school-aged children and adolescents (malnutrition information can be retrieved from official documents of the school feeding programme lead agency [at the most decentralized level possible]). Users can also use Tool 6 to obtain specific questions to ask identified stakeholders, in order to assess:
    - prevalence in stunting, wasting, overweight and obesity of school-aged children and adolescents;
    - protein deficiencies;
    - micronutrient deficiencies such as anaemia, deficiency in vitamin A, and others; and
    - food consumption pattern and dietary choices.

It is also important to identify whether fish is part of the meals consumed by the local communities. This information can be obtained from secondary data or the government at national and local levels. It is worth emphasizing that conducting an in-depth analysis of the nutrition situation is not necessary, as one of the main reasons for incorporating fish is to diversify the food consumption basket with a nutritious option.

3) Sensory evaluation, to assess school-aged children and adolescents' tastes and preferences through an acceptability trial (see Box 5) and plate waste assessment.

4) Other assessments such as caregivers' perception (refer to Tool 9), ease-of-use assessment (refer to Tool 10 for school canteen workers and caretakers responsible for preparing meals); and quality assessment of facilities and infrastructure (refer to Tool 11).

BOX 5. NOTE ON ACCEPTABILITY TRIAL

The acceptability trial consists of tasting and scoring (based on the appearance, colour, smell, looks, taste, texture, easiness to swallow, and the overall score of the meal) ordinary recipes, which are used as a benchmark, and recipes with fish. Some notes from previous experiences and a systematic review from Santana *et al.* (2023) are presented below:

- Ethical clearance is likely needed before completing the acceptability trials.
- The five-point scale and leftover food assessment are the ones most frequently used in acceptability trials to capture taste, texture, smell, etc.
- Evaluation is often performed during lunchtime, followed by snacks, breakfast and dinner.
- The Peryam and Kroll methodology can be used to capture verbal anchors, such as "super good" to "super bad".
- Emojis are more effective when capturing information among school-aged children and adolescents.
- Caregivers are encouraged to be present, but should be instructed not to influence school-aged children and adolescents' answers.
- Caregivers for the youngest children are strongly recommended to join in, in order to assist the children with filling out the feedback sheet (limits are set with teachers)..
- The feedback sheet is to be translated into the local language. Furthermore, if the use of electronic devices is not possible, it is recommended to print out the sheets in colour if possible.
- The school-aged children and adolescents must remain anonymous.
- School-aged children are recommended to taste a minimum of two times before scoring.
- Filling out the feedback is done individually under the supervision of the facilitators or caregiver (thus, away from peers) to avoid bias.

Source: **Santana, S.A., Batista, S.A., da Costa Maynard, D., Ginani, V.C., Zandonadi, R.P. & Botelho, R.B.A.** 2023. Acceptability of School Menus: A Systematic Review of Assessment Methods. *International Journal of Environmental Research and Public Health*, 20(3): 2242. https://doi.org/10.3390/ijerph20032242

Collection of primary data related to local food procurement

Information is collected using Tool 5. It is worth noting that the toolkit recommends adopting the current procurement operation model used by the target school. Based on the model used, minor adaptations can be considered for the case of local fisherfolk and small-scale fisheries. Box 6 provides some information on inclusive public procurement.

BOX 6. PUBLIC PROCUREMENT REGULATORY FRAMEWORK AND PROCEDURES

Depending on the country's context, there are several legal mechanisms for aligning public procurement regulatory frameworks to local smallholders.

Type	Method	Features and example
Reservation	Set-aside	A quota of government purchases is allocated to a specific category of supplier. Set-asides segregate competition, as targeted suppliers only compete with each other (e.g. HGSF programmes in Brazil).
	Qualification criteria	Suppliers that do not meet specific criteria are excluded from the procurement process, reserving the entirety of government purchases to one category of supplier (for example, school feeding programmes in Paraguay).
	Subcontracting conditions	Governments do not make purchases directly from targeted suppliers; instead, they establish a fixed quota that must be subcontracted or procured from targeted suppliers or producers (for example, the HGSF programme in Ghana)
Preferencing	Bid price preference	Bids from targeted suppliers are discounted by a set of percentage points to make them more competitive. Alternatively, bid prices from non-preferred suppliers are increased by a set of percentage points (such as in the Child Nutrition Programmes in the United States of America).
	Award criteria	At the bid evaluation stage, additional points or weights are assigned to bids from targeted suppliers or that meet specific socioeconomic or environmental criteria (such as the school feeding programme in Peru).

Source: **FAO & DEVCO (Directorate for International Cooperation and Development of the European Commission).** 2018. *Strengthening sector policies for better food security and nutrition results*. Public food procurement. Rome, FAO. https://www.fao.org/3/ca2281en/CA2281EN.pdf

In addition, there are also some procurement procedures and contracting mechanisms that are smallholder-friendly (FAO *et al.*, 2018):

- Soft tenders: competitive procedures in which most of the conditions and requirements of the standard tender procedure are adapted to suit the characteristics and capacities of small suppliers. However, adaptation should not compromise compliance with competitiveness, transparency, and cost-efficiency.
- Direct contracting: non-competitive procurement procedures in which contracts are negotiated directly between the buyer and farmers for agreed quantities of food produce meeting the buyer's standards. It is easier, faster and requires less bureaucracy. However, it is also less transparent and, thus, requires good control instruments against fraud, corruption, etc. (for example, it may be good practice to buy a small quantity of food).
- Forwarding contracting: contracts are signed at planting time with target farmers, for a price that is agreed upon at the time of signature.

Source: **FAO & DEVCO (Directorate for International Cooperation and Development of the European Commission).** 2018. *Strengthening sector policies for better food security and nutrition results*. Public food procurement. Rome, FAO. https://www.fao.org/3/ca2281en/CA2281EN.pdf

Step 5. Organization of information and data analysis

Fishery value chain mapping

Using data collected from Step 4, users will map the VC following the SFVCN approach (highlighting food and nutrition loss, waste and safety) and in a gender-sensitive manner, displaying:

- the actors and stakeholders involved in the fishery VC and their respective contributions;
- the contribution of women to the fishery VC, including their unpaid work;
- the challenges faced all along the fishery VC;
- the opportunities present throughout the fishery VC to sustainably incorporate locally procured fish and fish products into the fishery VC; and
- nutrition aspects such as food safety issues, nutrition loss and fish handling.

Characterization of the demand

Information from the nutrition situation analysis is summarized in a report displaying malnutrition issues faced by school-aged children and adolescents and their related causes (food access and affordability, fish access and affordability, diet characteristics, health indicators, etc.). Special attention is given to the diets of school-aged children and adolescents, such as the intake of animal-sourced protein, foods rich in micronutrients, and foods rich in fatty acids (frequency, quantity, etc.).

Estimation of minimum quantity needed

Available tools

Tool 12 supports users in estimating the minimum quantity needed.

Technical notes

The following steps are proposed to estimate the minimum quantity needed:

- First, users are recommended to consult the national nutrition standards and guidelines to check if there are any defined portions or frequency of consumption of fish and fish products (that may be recommended or required) for the target school-aged children and adolescents.
- If nutrition standards are not available, users can use the information collected from Tool 5 to estimate the minimum quantity needed by the target school (refer to Tool 12). This toolkit recommends consuming fish at least twice a week, with an average serving of 75 grams (g) per student (the serving size varies between 50 g and 100 g by age [FDA, 2021]). The dietary recommendation is based on raw edible parts, while fish products such as dried fish or fish powders will require less quantity as they are more nutrient-dense by weight (Abbey *et al.*, 2017; Byrd, Thilsted and Fiorella, 2021).

Presentation of the results of the acceptability trial

After completing the acceptability trial using Tool 7, users can:

- Present the results in pie charts (Figure 2). It is recommended to have three separate pies: one for all students, one for boys, and one for girls. The overall score is obtained by summing up all scores for appearance, colour, smell, taste and texture. The score range is given as follows: 1 to 5 corresponds to “very bad”; 6 to 10 refers to “bad”; 11 to 15 is “moderate”; 16 to 20 is “good”; and over 20 is “very good”.
- Compare recipes (recipes with fish versus recipes without fish; or recipes with one type of fish versus recipes with another type of fish), using a clustered column (Figure 3).

Note that other useful notes (such as the verbal anchors “super good” and “super bad” can be summarized in the final report. Furthermore, girls and boys are presented apart from one another, to assess whether girls need additional consideration besides the basic recipes. Finally, it is recommended to consider results by different characteristics of the children, such as age or school level (primary, secondary, etc.) since preferences may vary.

Figure 2. Results from the acceptability trial (template)

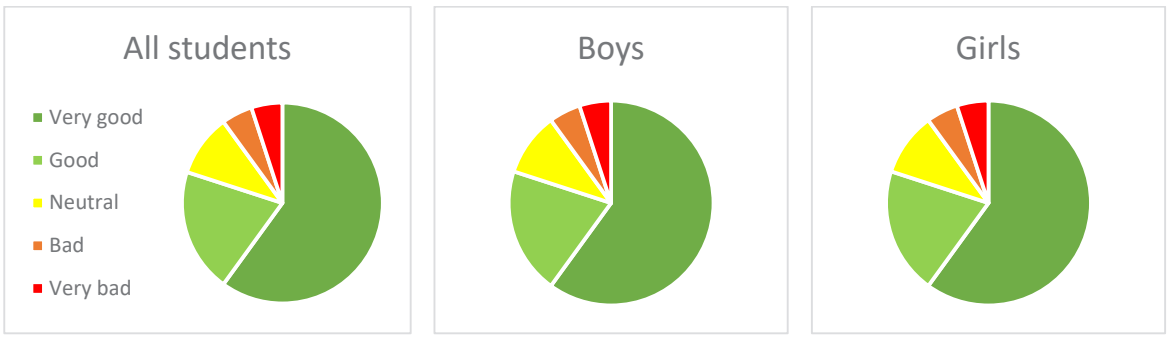
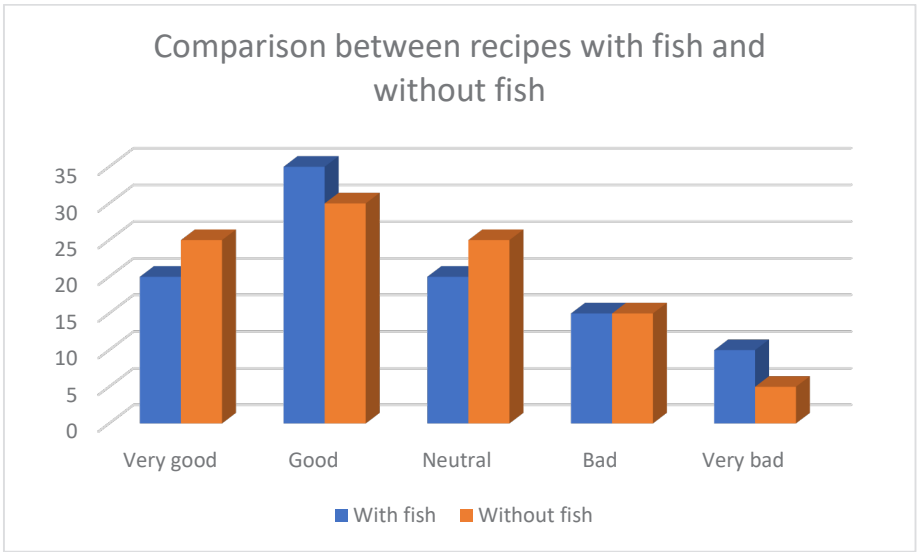


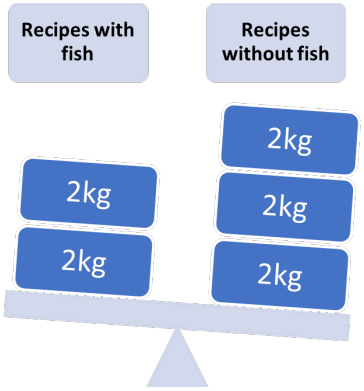
Figure 3. Results from the acceptability trial – recipe comparison (template)



Presentation of the results from plate waste assessment

After completing the plate waste assessment using Tool 7, the qualitative information collected during lunchtime (behaviours during lunchtime, etc.) is summarized in a report. The quantitative assessment (the quantity of fish prepared and the quantity lost) can be presented using Word SmartArt templates (see Figure 4).

Figure 4. Results from the plate waste assessment (template)



Note: Users can highlight which specific foods are wasted. For example, school-aged children and adolescents may eat all of the food except the fish or fish products, signalling that the fish or fish products are not acceptable. See Box 7 for an example of interpretation of these results.

BOX 7. EXAMPLE OF INTERPRETATION FOR THE PLATE WASTE ASSESSMENT

With reference to Figure 4 (in the main text of this publication), the recipes that did not include fish yielded 2 kilograms more of food loss compared to the recipes that did include fish. This may be interpreted to indicate that the children liked the recipe with fish included. Alternatively, the reason could simply be that some children had more appetite than others at the time of testing. Nevertheless, this positive feedback is a good starting point to incorporate fish into the meal.

Estimation of minimum price of fish and fish products

Available tool

Tool 13 provides users with a methodology to estimate production costs.

Technical notes

The minimum price of fish and fish products (estimated using Tool 13) accounts for the cost of raw materials, unpaid work and loss, membership fees for business-related organizations, equipment costs, and land costs.

Tool 13 supports local fisherfolk in setting the minimum price so to reduce harm to them by pricing products below the production cost. It is worth noting that in the early stages of the project, local fisherfolk may need support to estimate their production cost (from the ministry of fisheries and school feeding programme managers). Therefore, users can provide support to local fisherfolk in estimating their production costs using Tool 13. Furthermore, in the long term, capacity development is recommended so that local fisherfolk can estimate their production costs accounting for unpaid work, loss, and other hidden fees.

Assessment of profitability of the incorporation of locally procured fish and fish products into home-grown school feeding

Available tools

Tool 14 provides users with a methodology to complete a cost–benefit analysis. Nonetheless, users can use any other methodology with which they are familiar to assess the profitability of participating in HGSF programmes.

Technical notes

The conditions to be filled to ensure the incorporation of locally procured fish and fish products into HGSF programmes are:

1) Affordability (for HGSF programme) – The price of fish from local fisherfolk is equal to or lower than the average budget allocated to buy fish and fish products per meal (see Tool 14 for estimation of unit price).
2) Profitability for local fisherfolk – The unit price proposed by the target school is higher than the unit production cost of the fish and fish products (see Tool 13 for estimation of unit production cost).
3) The cost–benefit results of consuming fish are higher than zero (cost-efficiency).

However, users can also adopt a more rapid and simplified estimation of the economic sustainability of the incorporation of fish and fish products into school feeding programmes by ensuring:

- **Affordability** – only procure fish and fish products that have a unit price below the maximum budget allocated to buy animal-sourced protein.
- **Profitability** – the unit price proposed by the target school is higher than the unit production cost of the fish and fish products. Note that it is recommended to support local fisherfolk during the estimation of their unit production costs.
- **Cost-efficiency** – working with an operating HGSF programme, users can assume that in general, the programme is cost-efficient. In other words, as long as the HGSF programme buys fish at a lower price than the school's threshold budgets, the operation is cost-effective.

Step 6. Elaboration of intervention options

The elaboration of intervention options consists of:

- Identifying potential entry points for intervention options at the supply side. Each challenge (Box 8) identified during the SFVCN analysis represents an entry point for intervention options. As an example, if local fisherfolk face challenges in accessing inputs, there is a potential entry point at the input access nodes. Note that if the users wish to promote the consumption of underutilized species, entry points would be at the supply and demand side, and nutrition values.
- Identifying potential entry points for intervention options at the demand side, such as the lack of robust dietary data from schoolchildren and adolescents, familiarity and skills of food handlers in preparing fish and fish products, lack of cold chain facilities in schools, low awareness of nutrition value of underutilized species or by-products, etc.
- Generating intervention options to sustainably and regularly incorporate fish and fish products into HGSF programmes.
  - **Case 1**: If the entry points are at the supply side, intervention options focus on increasing the supply of locally procured fish and fish products and/or their nutritional value.
  - **Case 2**: If the entry points are at the demand side (preparation, distribution and consumption), intervention options focus on increasing the demand for locally procured fish and fish products and/or their nutritional value.
  - Note that case 1 and case 2 may be observed together.

BOX 8. MOST COMMON CHALLENGES IN THE FISHERY VALUE CHAIN

The challenges identified during the desk review for the development of this toolkit include:

- **Limited access to resources and services:** this leads to low productivity and nutrition loss.
- **Inadequate skills and handling practices:** this aspect raises concerns about food safety and nutrition loss during the capturing, processing, storage and transportation stages, and can lead to food contamination.
- **Insufficient infrastructure development and technology adoption:** this restricts small-scale fisherfolk from using upgraded processing methods and increases the risk of contamination, which contributes to food and nutrition loss.
- **Lack of cold chain or storage facilities:** this poses challenges in supplying fresh and frozen fish or in storing fish before processing.
- **Unstable supply and irregular delivery time:** such issues create obstacles for local fisherfolk's participation in HGSF programmes.
- **A lack of awareness** regarding underutilized fish species and the nutrition value of by-products: this contributes to the automatic selection of certain species during capturing and processing. This leads to overfishing and puts a strain on natural resources.
- **Gender-specific challenges** that women face, such as cultural beliefs, membership restrictions, limited decision-making power, misinformation about prices, and limited access to technology: such aspects create a gender gap in productivity and limit women's income and participation in local food procurement.

The key points to consider during the generation of intervention options are:

- **Presence of a gender-transformative approach**: The intervention options are expected to support and enhance the participation of local women fisherfolk in HGSF programmes.
- **Feasibility**: The intervention options are economically feasible (within the means of target countries, obtain adequate support from the government, non-governmental organizations [NGOs], international organizations, etc.); consider social aspects (adequacy to the skills of local fisherfolk, etc.); and are environmentally friendly (that is, they do not increase and/or decrease the pressure on natural resources).
- **Impact:** The options have positive impacts on the economy (for example, they increase the income of local fisherfolk); on social life (they increase the nutrition status of school-aged children and adolescents, etc.); and on the environment (for instance, they reduce the pressure on natural resources by using underutilized parts and by-products).
- **Sustainability:** The intervention options are within the means of fisherfolk, projects, and HGSF i.e. economic sustainability (for example, ensuring the supply of fish and fish products to HGSF programmes in the long term and without the support of stakeholders), social sustainability (culturally acceptable to school-aged children and adolescents), environmental sustainability (e.g. sustain the fishery activities by promoting the use of underutilized species and by-products).

In the next subsections, the toolkit will present intervention options for the most common challenges of the fishery VC and HGSF. However, since intervention options are country-specific, this subsection is only for informative purposes. Therefore, each country will be elaborating upon their intervention options with the panel of experts, based on the local context and expert and stakeholder recommendations.

Promote membership to organizations and groups

Rationale: Membership in an organization is a powerful tool that facilitates training, capacity development, and public food procurement activities. Furthermore, the organization facilitates the

application of intervention options and the public local food procurement process. However, this is a long-term intervention option requiring time, strong management and coordination, and a large enough budget.

Proposed approach:

- Promote association membership using arguments such as better access to inputs, credit, services and information, risk sharing, and better bargaining power (Bizikova *et al*., 2020) through workshops, sensitization campaigns and mass media to disseminate information (using the sources of information most familiar to small-scale fisherfolk, such as the radio, newspapers or phone messages).
- Facilitate and support the creation of organizations by providing adequate, affordable and effective services (administrative procedures, registration campaigns, etc.).
- Support the implementation of standardized criteria to normalize the definition of organizations and groups, such as the characteristics of the members (gender, age, income, etc.), their main activities (fishing, processing fish, trading fish, etc.), and so on. This is expected to facilitate public food procurement when identifying potential suppliers. Note that this may require legislative interventions; therefore, its application should consider the country-specific context.

Coordinator: The ministry of fishery, with the assistance of other stakeholders in the school feeding programme.

Training, services and technical support of local fisherfolk

Rationale: Providing training and technical support to VC and school feeding programme actors can overcome the safety issues from inadequate handling all along the VC and at school, and nutrition and productivity loss from inadequate processing methods. Furthermore, facilitating access to services (e.g. financial services) can trigger VC upgrades, increasing the supply of fish and fish products to HGSF programmes.

Proposed approach

- Provide training to local fisherfolk on good practices and handling (Box 9, for example) using materials such as the Code of Practice for Fish and Fishery Products (FAO and WHO, 2020) and The Code of Conduct for Responsible Fisheries and Post-harvest Practices and Trade (FAO, 2015).[12]
- Provide training on the construction and use of low-cost upgraded technology such as raised covered racks or perforated jerry cans.
- Provide training to food handlers at the target school on good handling practices (fileting techniques and conservation of processed fish, etc.);
- Provide subsidies and facilitate access to financial services for local fisherfolk so that they can upgrade their inputs (motorized boats, processing plants, isothermal bags, upgraded ovens, solar dryers, upgraded smoked processing methods [FAO-Thiaroye], etc.) (FAO, 2019b).
- Facilitate access to fishing licenses and the registration of fisherfolk organizations through a registration campaign for group application.

[12] Examples are an adequate use of ice, adequate gutting of fish, use of insulated and separated containers, plastic perforated jerry cans (Kimani et al., 2022), use of covered salting bins, and optimization of processing times (Randrianantoandro and Ouadi, 2015).

– Provide training on marketing and public procurement procedures to facilitate the participation of local fisherfolk in public food procurement opportunities.

– Provide training on financial management to support local fisherfolk in estimating their production cost, accounting for unpaid labour and hidden costs such as membership fees, land costs, depreciation of equipment, etc.

Coordinator: Ministry of fishery

BOX 9. INTERVENTION OPTIONS TO REDUCE FISH LOSS DURING THE POST-HARVEST PHASE

Table A displays a summary of post-harvest losses.

Table A. Post-harvest losses

Causes of loss	Intervention options
– Destructive, harmful or inadequate fishing methods (e.g. setting fish gear for a long period)	– Use adequate and authorized fishing methods – Use environmentally friendly fishing methods
– Delay of landing after capturing fish – Exposure to high ambient temperature at sea	– Use good-quality ice and good icing practices – Reduce delay of landing – Use insulated containers
– Animals eating the fish captured and processed – Failure to gut, wash and chill the fish on board – Fishers stepping on fish on board	– Gut and wash fish with clean water, and avoid using beach water – Use perforated fish containers – Pack fish in an insulated container with enough ice as soon as it is caught
– Fish falling from pan or basket – Poor hygienic practices	– Handle the fish with care – Prevent the fish from being contaminated with dirt, fuel and any other harmful substances – Avoid placing the fish directly on the bare ground
– Inadequate application of ice – Use of non-insulated container – Limited preservation capacity	– Use good-quality ice and good icing practices – Store fish in an insulated container – Use perforated fish containers
– Delay in processing – Processing of spoiled fish – Processing under unhygienic conditions – Over-smoking and burning during smoking – Drying on ground, rocks or herbs – Consumption of fish by insects, birds and animals – Contamination of fish during processing	– Split fish to dry quickly – Wash fish with clean water before processing – Properly cover salting bins – Protect the processing site during drying – Use improved equipment – Pack processed products using clean and protective material or containers – Store processed fish in a clean and proper environment, free from contaminants, vermin and pests

Source: **Akande, G. & Diei-Ouadi, Y.** 2010. *Post-harvest losses in small-scale fisheries: case studies in five sub-Saharan African countries*. Rome, FAO. https://www.fao.org/3/i1798e/i1798e.pdf

Awareness-raising

Rationale: Awareness-raising on the economic, nutritional and environmental value of underutilized species and by-products of local fisherfolk and communities contributes to reducing pressure on natural resources. Moreover, awareness-raising on fish safety (for example, on possible foodborne disease from polluted capturing sites) and natural resource management is expected to sustain and promote the supply of fish and fish products for HGSF programmes.

Proposed approach

The proposed approach is to:

- Disseminate and share knowledge on the importance of underutilized species and by-products, and the threats from polluted capturing sites, using mass media (radio, television, flyers, journal, messages, posters, etc.).
- Strength the management of capturing sites by performing random visits to hazardous capturing sites, elaborating a map to locate hazardous capturing sites (including inland water near villages, industries, etc.), and initiating a labelling system to identify the origin of fish.
- Strengthen the management of natural resources by performing random visits to capturing sites during the off-season, putting posters of fish calendars for each capturing site and local community hub area, and performing random control of fish captured (checking for juveniles, fish with eggs).
- Sensitize fishers to capture fish only during the fishing period and to capture underutilized species in order to reduce pressure on overexploited fish, through mass media, workshops, etc.
- Sensitize school feeding programmes to avoid buying juvenile fish or fresh fish during the off-season and to elaborate recipes using underutilized species and by-products (for example holding a cooking contest using only underutilized species and by-products.
- Sensitize local communities and fishers not to pollute capturing sites (especially inland water) to avoid foodborne diseases, using mass media.
- Raise awareness on good handling practices and SFVCN to reduce food and nutrition loss.
- Provide nutrition education and awareness-raising on the consumption of underutilized species and processing of by-products.
- Provide training on the use of by-products and underutilized parts of fish to make fish powder.

Coordinators: Ministry of fishery, school feeding programme lead agency and other stakeholders

Capacity development

Rationale: Capacity development of local fisherfolk and school feeding programme actors promotes the adoption of new approaches and harmonization of the VC, to ensure that the fish and fish products served at school are culturally acceptable, and served on time and regularly.

Proposed approach

- Develop capacity on SFVCN to contribute to supplying fish and fish products to HGSF programmes. Examples include a standardized approach to supplying school of fish, use of tracing documents (See Tool 11 and Tool 15), standardized handling of fish at school (such as a booklet on cooking freshwater fish [Signa, 2013]), and training to reduce nutrition and food loss.

– Strengthen the vertical linkage of the VC and target school to ensure that adequate fish and fish products are supplied to the target school by local fisherfolk (for example, if there are no cold chain facilities, schools are recommended to serve smoked or dried fish from local fisherfolk; if the menu at the target school is in the form of porridge, propose fish powder to the school; if fresh fish is to be supplied, the school feeding programme committee can adopt the concept of "catch of the day" and use flexible recipes).

– Support local producers to select the most adequate processing methods (Box 6).[13]

Coordinators: Ministry of fishery and school feeding programme lead agency

Intervention options related to inclusive and public food procurement

Rationale: The complexity and relatively high requirements of local food procurement are acknowledged as a barrier to connecting local fisherfolk to HGSF programmes. Furthermore, local fisherfolk have low bargaining power, such that adapting procurement procedures and practices and setting adequate prices to fish and fish products is of utmost importance to avoid harming local fisherfolk. Finally, local fisherfolk also lack knowledge of procurement opportunities.

Proposed approach

The proposed approach is to:

– Support national and local authorities to assess and, when necessary, revise the public procurement rules and practices to facilitate the connection of local fisherfolk to HGSF programmes. Examples include the use of alternative procurement procedures, rationalization of participation requirements, adaptation of the contract sizes, and flexibility in the location of delivery and payment conditions that meet local fisherfolk needs (Swensson, 2019 and 2020).

– Other administrative adjustments can be also considered, such as:

  • Improving communication on HGSF procurement opportunities by publishing and disseminating tender announcements (if any) in locations that local fisherfolk (especially women) often frequent. Note that if the tender announcements are not in the local language, the school feeding programme may publish a certified translation of the document into the local language. However, the original announcements should always be published next to the translation. Furthermore, to support suppliers that have difficulty reading, it is encouraged to use adequate communication materials (national radio, television, etc.).

  • Increasing the time allowed for local fisherfolk to prepare responses to tender requests (FAO *et al.*, 2018).

– Develop the capacity of local fisherfolk to increase their participation in food procurement, to support the connection of local fisherfolk to HGSF. Examples include training and workshops on HGSF procurement procedures, participation requirements, tendering (including setting product prices that account for unpaid works and hidden costs if required), etc.

[13] FAO (2021c) provides information on food loss and waste in the fisheries VC. The webpage provides guidance on best practices to reduce food loss and waste in the fisheries VC, including: supporting policy; appropriate technology; knowledge and skills needed for food safety; good handling and hygiene; services and infrastructure; regulatory environment; social and gender equity; and markets (on how to have access to more market, store product, etc.).

– Develop the capacity of school feeding programme actors and local fisherfolk to set prices considering social, economic and environmental benefits, and recognize award criteria beyond the lowest price (see Section 5.3).[14]

– Develop public institutions' capacity to link school food demand to local fisherfolk, which includes training on the available legal instruments and procurement strategies to support the linkage.

– Promote supply-side measures to support local fisherfolk to meet the quality and quantity standards of HGSF (see Step 6 on elaboration of intervention options that increase the quantity and quality of fish and fish products).

It is worth noting that legal intervention options can also facilitate the connection of local fisherfolk to HGSF (by reserving contractual opportunities or adapting the selection process and related rules). However, the implementation of intervention options is country-specific and requires legal underpinning (see Swensson, 2018), which is beyond the scope of the toolkit.

Food and nutrition education

Rationale: Food and nutrition education on the importance of fish, especially underutilized species and by-products, can make the diet of the local communities healthier. Furthermore, it can sustain natural resources.

Proposed approach

The proposed approach is to:

– Raise awareness and advocacy on the importance of underutilized species and by-products for the environment and health, for the local community and actors involved in the fishery sector (a practical example is a cooking contest).

– Develop the capacity of school staff, processors and the local community to process by-products (e.g. fish powder processing) and to adopt good food handling and practices.

– Support the integration of fish (especially underutilized species and by-products) at school.

– Train fish processors and school staff in good handling and practice.

Gender-transformative approach

Rationale: Gender-transformative intervention options support local women fisherfolk to overcome their challenges in the fishery VC and increase their participation in HGSF.

Proposed approach

The proposed approach is to:

– Sensitize women to gather into an organization and organize registration campaigns for women fisherfolk, to facilitate the creation of women-dominated associations.

– Facilitate the creation of women-dominated groups.

[14] Each category is accorded a specific weight in the overall decision to award a contract. Behind the decision of local fisherfolk to work with HGSF, lies their opportunity cost. In an economic sense, the opportunity cost of fisherfolk is defined as the value of what they have to give up to work with HGSF. Thus, "value" here refers to: (1) the waiting period for payment; (2) the opportunity to sell in other regions at a higher price; (3) the "easy money" (with low fish requirements and control) they could receive by selling their products through the legal or illegal market. On the other hand, the opportunity cost of connecting local fisherfolk to HGSF helps the local authority to: (1) end cyclic poverty; (2) achieve inclusive development; (3) reduce public health expenditure; and (4) sustain the use of natural resources.

- Develop capacities on the gender-sensitive approach of the fishery VC and recognize all unpaid labour when pricing fish products.
- Provide training in a gender-sensitive manner to women local fisherfolk.
- Support women's voices during the selection of species to capture (this will help to harmonize the VC as women have a better knowledge of the tastes of school-aged children and adolescents).
- Support women's access to information, training, services and credits because women often outnumber men in the context of post-harvest activities (FAO, 2021c; Grever, 2021). Examples of interventions are applying lower interest rates for women and allowing other forms of collateral on credit given.

CONCLUSION

Incorporating fish and fish products in the HGSF is of paramount importance for several compelling reasons. First, fish is a nutrient powerhouse, abundant in vital micronutrients such as iron, zinc, vitamin A, essential fatty acids and high-quality protein. By incorporating fish and fish products into school meals, HGSF programmes play a crucial role in addressing nutritional deficiencies among school-aged children and adolescents, especially in developing countries where access to diverse and nutrient-rich foods may be limited.

To facilitate the successful incorporation of fish and fish products into HGSF, the proposed toolkit offers systematic guidelines. However, it is important to note that the tools and methodologies proposed are adaptable and flexible, tailored to suit the specific contexts of individual countries. To ensure effective implementation, the toolkit recommends establishing a panel of experts at the project's inception. This multidisciplinary approach enables the design, support, management and coordination of activities, recognizing that incorporating fish into HGSF is a multisectoral endeavour. Moreover, to ensure a sustainable and consistent supply of fish and fish products from local fisherfolk, strengthening the vertical linkage of the VC is of utmost importance. This emphasis on the VC reinforces the profitability of both local fisherfolk and schools. It is crucial to underscore that the objective is not to burden school feeding workers, including cooks and managers, nor to harm the social, economic and environmental well-being of local fisherfolk. Instead, the integration of fish and fish products should foster mutually beneficial relationships and sustainable practices.

By incorporating fish into HGSF, not only is it possible to enhance the nutritional value of school meals, but also support local economies, promote sustainable livelihoods and natural resources (by advocating for the consumption of underutilized species and by-products), and contribute to the well-being of communities. This collective effort ensures that children receive the vital nutrients they need, while simultaneously fostering women's empowerment, economic development and environmental stewardship. Thus, this toolkit is expected to provide important tools to help achieve the Sustainable Development Goals.


FISH
POWDER

ANNEX 1. Tools available

TOOL 1. Guiding questions to identify the general needs of the target country

Guiding questions to assess the demand situation

1. Does the national school feeding programme have, or is currently developing, nutrition standards or guidelines? If yes:
   a. Do they state food or food group targets? If so, please specify.
   b. Is there an explicit reference to fish and fish products?
   c. What is the degree of flexibility for integrating new food groups or foods?
2. Is there a government-approved school feeding programme or home-grown school feeding programme willing to serve fish and fish products?

   If yes:

   a. How did they express their interest? (For example, they may have explicitly expressed their interest during an official or unofficial meeting, or after a project or government asked them.)
   b. Can you specify where these schools are located?

   If no:

   a. Can you elaborate more on why they are not willing to serve fish and fish products?
3. For the school identified in Question 2, which ones are willing to work with local fisherfolk?
   a. Are food purchasers (which can be national or local governments, caterers, etc.) willing to procure fish and fish products from local fisherfolk? If not, why?
   b. Do food purchasers (national or local governments, caterers, etc.) have enough capacity to procure fish and fish products from local fisherfolk? If not, why?
   c. Can the school's current management or operational model be used or adapted for local fisherfolk? If not, why?
4. For the school identified in Question 2, are school-aged children familiar with fish and fish products?
   a. Do school-aged children and adolescents usually eat fish and fish products at home? If not, why?
   b. Are school-aged children and adolescents familiar with underutilized species? If not, why?
   c. Are school-aged children and adolescents familiar with by-products (e.g. fish heads)? If not, why?
   d. Do school-aged children and adolescents eat the whole fish or only part of it? If part, specify which part. If not, why?
5. For the school identified in Question 2, do they have enough budget to sustainably serve fish and fish products? If so:
   a. Will fish and fish products be used as a substitute for existing food?
   b. Will fish and fish products be added to the current school meal as an independent food?
   c. Will the incorporation of fish and fish products receive budget support from governments or other stakeholders?

6. Do you have, or are you currently developing, national food-based dietary guidelines? If yes, are there any sections that encourage the consumption of fish?
7. Do you have, or are you currently developing, nutrition policies or programmes that support or regulate the school feeding programme system? If not, why?
8. Do schools have enough capacity to serve fish safely? If not, why?
9. Does the target country have experience with serving fish and fish products at school? If yes, can you specify where these schools are located?

Data sources

Data are collected from key informants such as the representative of the national school feeding programme lead agency. Depending on the local context, users can ask for an official meeting or contact the representative by phone or e-mail. If information is not available, users can query where they can get the data and ask the proposed key informants.

Question 4 can be collected from key informants (nutritionists, local health centres, etc.).

Questions 6 and 7 can be collated from secondary sources such as:

- The School food global hub of the Food and Agriculture Organization of the United Nations (FAO), which has a country repository showcasing nutrition guidelines and standards and their process of development (FAO, 2023a);
- The World Health Organization (WHO) Global Database on the Implementation of Nutrition Action (GINA) (FAO, 2023b). The database contains 3 143 published nutrition-related policies from 203 countries (WHO, 2022);
- FAO's database on Food-based dietary guidelines (FAO, 2023c), which provides food-based dietary guidelines for more than 100 countries.
- If not available online, users can query the relevant government department, such as the ministry of health or the school feeding programme lead agency at the national level.

Guiding questions to assess the supply situation

1. Is the ministry of fisheries willing to work with the school feeding programme? For example, is the ministry of fishery willing to provide technical assistance to increase the quantity and quality supplied to meet HGSF requirements, or to assist and support in every aspect needed to improve the participation of local fisherfolk in public food procurement? If not, why?
2. Can local fisherfolk sustainably supply enough affordable fish and fish products to HGSF? If not, why?
3. Can local fisherfolk sustainably supply safe, diversified and nutritious fish and fish products to HGSF? If not, what capacity development do they need?

Data sources

Data are collected from key informants such as the representative of the ministry of fisheries. Depending on the local context, the user can ask for an official meeting or contact the representative by phone or e-mail.

Usage note

- The answers to the questions may be collected from different key informants. Therefore, before collecting data, it is recommended that users review the questionnaire and identify where they can obtain the most accurate answers, depending on the country context.
- If the school feeding programmes in the target country are not willing to serve fish and fish products in the country, the project is not feasible.
- If one of the answers to the supply-related guiding questions is negative, intervention options are generally required in the fisheries supply chain.
- If one of the answers to the demand-related guiding questions is negative, intervention options are generally required at the target school level.
- Finally, when respondents elaborate on their answers, users are recommended to note such statements carefully, as they might contain essential information.

TOOL 2. Potential data sources to establish baselines

Information	Potential data sources
Regional statistics on the fishery sector	– Statistical yearbook of the target country – Key informant from the fishery sector – FAO FishStat and the FAO Fisheries and Aquaculture Statistics Yearbook, [a] (FAO, 2021d)
Pollution control of capturing sites	Key informant from the fishery sector
Procedures for and cost of obtaining fishing licenses	Key informant from the fishery sector
Specific regulations and laws related to the fishing calendar, safety control, and sustainability of the natural resources	Key informant from the fishery sector
Regulations and legislation on the fishery sector	– FAOLEX database, an online database of national legislation and policies – FAO SSF-LEX database, if relevant to the target country; this is a subset of the FAOLEX database that focuses on provisions relevant to small-scale fisheries
Information and food dietary guidelines related to school feeding programmes	– Key informant from school feeding programme lead agency or relevant health and education ministry staff – National nutrition standards and guidelines for school meals (policy or regulatory documents) – FAO School food global hub – National food dietary guidelines and school feeding programme legal and regulation documents – World Health Organization (WHO) Global Database on the Implementation of Nutrition Action (GINA) – FAO Repository of National Food Based Dietary Guidelines for relevant policies
Public procurement and school food and nutrition resources	– FAO School Food and Nutrition website, which provides resources on the policy, legal and institutional environments surrounding school feeding programmes, food and nutrition education, inclusive procurement and value chains, and healthy school food environments – FAO Sustainable public food procurement website, which provides resources on procurement, HGSF, etc.

[a] These resources were the most updated resources at the time of publication and are given as examples of sources of secondary data.

TOOL 3. Workshop guidelines to select target school(s)

The workshop is an inception workshop aiming to initiate stakeholders to the project and to select the target region(s) or school(s).

A. Preparing for the workshop

Selecting participants

Participants are local authorities at the national level:

- Lead agency of the school feeding programme (SFP);
- Ministry of education representative;
- Ministry of fishery representative;
- Ministry of health representative;
- Other relevant stakeholders, such as funders and international organizations; and
- Toolkit users.

These participants are expected to be the future members of the panel of experts to coordinate, monitor and evaluate the project.

Informing and inviting participants

Organize a preliminary meeting (offline or online) with the expected participants to explain briefly the workshop's objectives, and listen to any suggestions they have regarding the agenda, participants selected, process, time and place of the workshop.

Create a panel of experts to supervise the incorporation of fish and fish products into the home-grown school feeding programme. It is recommended that the panel of experts be composed of the workshop participants.

Send a formal invitation and attach the toolkit so that participants can have a general overview of the project.

Selecting venue

The venue depends on participants' preferences. It can be online or offline. Furthermore, if the workshop requires a field visit, the venue is selected according to convenience in terms of transportation and logistics.

Preparing supplies

Before the workshop, prepare:

- A list of regions with government-approved school feeding programmes that are willing to serve fish (from Tool 1)
- Pre-filled scoring sheet (see Box 3 for a template) of the listed regions, following the school feeding programme potential (information collected using Tool 1), for each participant.
- Pre-filled scoring sheet of the region with school feeding programmes following their fishery potential, for each participant.
- Other useful materials such as notebooks, pens and cameras.

B. Conducting the workshop

- Introductory plenary session
  - Present the booklet briefly to the participants and anticipate a possible discussion about the participants' perception of the project.
- Working Session 1 – Selection of target region(s)
  - Score the regions with the panel of experts, following the potential of their school feeding programme and fishery sector.
  - Discuss the results and double-check if there are any inconsistencies in the results.
  - Select one to five regions as the target regions. The number of target regions depends on the scope of the project and the economic feasibility. To select the target region, users must rank the regions according to their final score in decreasing order; that is, regions with the highest score achieve the best rank (first rank).
- Working Session 2 – Selection of target school(s)
  - From the target regions selected during Working Session 1, list the school feeding programmes that are willing to serve fish and fish products from local fisherfolk, willing to work with the ministry of fishery, and that are located in the proximity of local fisherfolk or trading places that are selling the products from local fisherfolk. The latter requirement serves to respect any distance regulation regarding the place of procurement. Then, select one to five schools with the panel of experts. The number of target schools depends on the scope of the project and the economic feasibility.
  - For the selection of target schools, it is recommended to invite regional-level authorities. However, if the workshop is done in one workshop, the regional-level representative should be invited later to join the panel of experts after the selection of the target schools.

The workshop can include field visits if required. The visit can extend to places including landing sites, markets, processing facilities, schools, etc.

C. After the workshop

Ask for feedback and any other comments

The workshop can be done in one day. Once the workshop is done, users must elaborate a report that has, as a final output, the selection of the target school(s).

D. Write final report

Users can now write a final report displaying:

- the list of participants and their main responsibilities;
- the score of each region and school;
- the list of target regions selected and the reasons why they were shortlisted; and
- the list of target schools selected and the reasons why they were shortlisted.

TOOL 4. Questionnaire for fishery value chain mapping

TOOL 4A. Questionnaire for the ministry of fisheries

Interviewee: Ministry of fisheries representative

N.B. The interviewer should disclose that the discussion will be recorded, but that it will be anonymized and that all data will be used in a general format only (as diagrams, spreadsheets, etc.). The voice and participation of respondents are very important to us.

The interviewer should disclose the following information before starting the interview: "Please note that we are particularly interested in learning about small-scale fisherfolk and their specific situation, as we are exploring opportunities to link local fisheries products to school feeding programmes. Please make sure that your answer will reflect the small-scale fisherfolk situation and small-scale fisherfolk organization."

Name of data recorder: _____ _____ _____ **Survey date:** *(DD/MM/YYYY)* _____

4A-I. Basic information

Country: _____
Region: _____ **(***or equivalent highest administrative unit below national level)*
District: _____**(***or equivalent second-highest administrative unit below national level)*
Community:
Agency name:
Professional title of interviewee:
Gender of key informant:

4A-II. Introduction

This section collects information related to the role of the ministry of fishery in fish-related activity. The information collected will be used to assess the role of the ministry of fishery in the incorporation of fish and fish products into the home-grown school feeding (HGSF) programme.

1. What are your organization's works and attributions? *(Check all that apply.)*

☐ Issue fishing licenses
☐ Monitor the management of natural resources
☐ Monitor the respect of fishing calendar
☐ Monitor the safety level of capturing site
☐ Monitor the safety of fish supplied on the market
☐ Provide support to local small-scale fisherfolk
☐ Others, specify: _____

2. Are you or your ministry or organization willing to support local fisherfolk in connecting their services and products to school feeding programmes? If no, explain.
    i. If yes, what kind of support are you thinking of providing?
    ii. If not, why?

4A-III. Fishing licenses

This section collects information related to fishing licenses (cost, requirement, period, etc.). The information collected will be used to facilitate the connection of local fishers to the HGSF programme.

1. How much does it cost to obtain a fishing license? *(Input value in local currency and include the precise exchange rate in the following format: XX local currency – (1 local currency = XX USD).)*
2. How long does it take to obtain a fishing license? *(Input value in weeks.)*
3. For how long is a fishing license valid? *(Input value in years.)*
4. What is the minimum requirement to obtain a fishing license? *(Check all that apply.)*

☐ Conformity of gear
☐ Vessel types
☐ Capturing sites
☐ Species to capture
☐ Quantity allowed to capture
☐ Others: _____

4A-IV. Producer organization characteristics

Note: *This section is only relevant for fisherfolk members of an organization, association, cooperative, group, etc. For the sake of simplicity, these groupings are referred to as "organizations".*

This section collects information related to fisherfolk organizations in the target community. The information collected will be used to identify potential suppliers, to identify entry points regarding the challenges faced by fisherfolk organizations, and to generate interventions related to the agglomeration of local fisherfolk into the organization.

1. What types of fisheries organizations are dominant in your community? *(Check all that apply.)*

☐ Union
☐ Association
☐ Community-based organization
☐ Cooperatives
☐ Savings, credit and loan groups
☐ Subcommittee of the village fisheries governance body
☐ Other, specify: _____

2. Could you enumerate the requirements to create an organization? (Check all that apply.)

☐ Fishing license
☐ Tax number
☐ Living in the local communities
☐ Engage at _____ (input %) share in fishing-related activities
☐ Have a boat
☐ Other, specify_____

3. Are there any women-dominated fisheries organizations in the local community?

☐ Yes ☐ No ☐ Do not know

a. If yes, please specify the type of fisheries organization. *(Check all that apply.)*

☐ Union
☐ Association
☐ Community-based organization
☐ Cooperatives
☐ Savings, credit and loan groups
☐ Subcommittee of the village fisheries governance body

4. How would you describe the challenges faced by local fisherfolk regarding following administrative procedures of any kind (registration of the organization, getting supports from the government or non-governmental organizations, etc.)? Please elaborate on your answer.

a. Low administrative literacy

☐ Highly relevant ☐ Relevant ☐ Not a problem

i. Who is affected?
☐ Women ☐ Men ☐ Both

ii. Do you agree with the following statement? Please explain your answer. "*Women are more affected than men by this challenge.*"
☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

b. High cost of administrative procedures

☐ Highly relevant ☐ Relevant ☐ Not a problem

i. Who is affected?
☐ Women ☐ Men ☐ Both

ii. Do you agree with the following statement. Please explain your answer. "*Women are more affected than men by this challenge.*"
☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

c. Long physical distance to local authorities

☐ Highly relevant ☐ Relevant ☐ Not a problem

i. Who is affected?
☐ Women ☐ Men ☐ Both

ii. Do you agree with the following statement? Please explain your answer. "*Women are more affected than men by this challenge.*"
☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

d. Long duration of administrative procedures

☐ Highly relevant ☐ Relevant ☐ Not a problem

i. Who is affected?
☐ Women ☐ Men ☐ Both

ii. Do you agree with the following statement? Please explain your answer. "*Women are more affected than men by this challenge.*"
☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

e. Other specify

☐ Highly relevant ☐ Relevant ☐ Not a problem

i. Who is affected?
☐ Women ☐ Men ☐ Both

ii. Do you agree with the following statement? Please explain your answer. "*Women are more affected than men by this challenge.*"
☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

4A-V. Challenges and loss in the fishery value chain

This section collects information related to the challenges and losses faced by the fishery sector along the entire value chain. The information collected will be used to identify entry points for the intervention options proposed in the toolkit.

1. Considering the fishing phase, what are the main causes of loss? *(Check all that apply.)*

☐ Long exposure to the sun after catching
☐ Damage because of rough handling and unloading
☐ Lack of storage facilities on board
☐ Lack or absence of ice and preservation methods on board
☐ Spoilage of a part of the capture, leading to a larger loss of the capture
☐ Spoilage of the capture because of the use of inadequate water to clean fish
☐ Spoilage of the fish from insect infestation or others
☐ Physical loss from birds, pests or other animals
☐ Others, specify:

2. Considering the processing phase, what are the main causes of loss? *(Check all that apply.)*

☐ Inadequate processing methods (exposure on the direct ground, storage facilities, etc.)
☐ Poor quality of raw material
☐ Bad weather leading to a delay in processing (rain, cloud cover, etc.)
☐ Absence or lack of appropriate processing facilities
☐ Insect infestation
☐ Attack by animal pests such as rats
☐ Attack by other livestock and poultry
☐ Physical damage and chemical changes leading to the oxidation of fats
☐ Fish falling into the fire when smoked
☐ Contamination from the water used to wash fish
☐ Others, specify:

3. Considering the transportation phase, what are the main causes of loss? *(Check all that apply.)*

☐ Excessively long transportation time
☐ Lack of storage equipment
☐ Delay because of mechanical breakdown
☐ Poor weather conditions
☐ Lack of ice or cold chain during transport
☐ Physical damage because of poor handling and rough transportation
☐ Others, specify:

4. Considering the marketing phase, what are the main causes of loss? *(Check all that apply.)*

☐ Unsold fish
☐ Insect infestation
☐ Attack by animal pests such as rats, or mould growth
☐ Physical damage because of poor handling or loss in value because of breakage
☐ Oxidation of fats, which changes the colour and taste of fish
☐ Selling fish on the ground
☐ Lack of hygiene and sanitation
☐ Lack of storage facilities
☐ Others, specify:

5. What are the main challenges faced by the fishery sector in the region? *(Check all that apply.)*

a. Input access

i. Challenges faced by men

☐ Lack of access to fish
☐ Lack of access to training
☐ Lack of access to equipment (gears, boat, fishing vessel, etc.)
☐ Lack of access to storage facilities
☐ Lack of access to adequate inputs (processing inputs, fishing inputs, etc.)
☐ Lack of skills
☐ Lack of access to credit for investments or working capital
☐ Lack of access and control over financial capital
☐ Others, specify: _____

ii. Challenges faced by women

☐ Lack of and unequal access to fish
☐ Lack of and unequal access to training
☐ Lack of and unequal access to equipment
☐ Lack of and unequal access to storage facilities on board
☐ Lack of and unequal access to adequate inputs
☐ Lack of skills
☐ Lack of and unequal access to credit for investments or working capital
☐ Lack of and unequal access and control over financial capital
☐ Burden of unpaid work
☐ Risk of gender-based violence and sexual harassment, specify:
☐ Others, specify: _____

b. Fishing/capturing phase

i. Challenges faced by men

☐ Lack of skills leading to inadequate fishing practices/ harvesting practices (including illegal, unreported and unregulated [IUU] fishing)
☐ Poor weather conditions
☐ Lack of access to training or inadequate training
☐ Lack of access to equipment or inadequate equipment (adequate gears, boat, fishing vessel, etc.)
☐ Lack of access to or inadequate storage facilities on board
☐ Lack of access to credit for investments or working capital
☐ Lack of access and control over financial capital
☐ Others, specify: _____

ii. Challenges faced by women

☐ Lack of skills leading to inadequate fishing practices or harvesting practices (including IUU)
☐ Poor weather condition
☐ Lack of or unequal access to training
☐ Lack of or unequal access to equipment (adequate gears, boat, fishing vessel, etc.)
☐ Lack of or unequal access to storage facilities on board
☐ Lack of access or unequal access to credit for investments or working capital
☐ Lack of or unequal access to, and control over, financial capital
☐ Domestic and unpaid care work burden, and social and gender norms (e.g. women have to stay close to home)
☐ Burden of unpaid work
☐ Risk of gender-based violence and sexual harassment, specify:
☐ Others, specify: _____

c. Post-harvest phase

i. Challenges faced by men:

☐ Lack of access to fish
☐ Lack of access to or inadequate training
☐ Lack of access to or inadequate equipment
☐ Lack of access to land
☐ Lack of access to credit for investments or working capital
☐ Lack of access to and control over financial capital
☐ Lack of access to storage facilities
☐ Lack of skills leading to inadequate handling practices
☐ Fish contamination
☐ Others, specify: _____

ii. Challenges faced by women

☐ Lack of or unequal access to fish
☐ Lack of or unequal access to training
☐ Lack of or unequal access to equipment
☐ Lack of or unequal access to land
☐ Lack of or unequal access to storage facilities
☐ Lack of or unequal access to credit for investments or working capital
☐ Lack of or unequal access and control over financial capital
☐ Inadequate handling practices
☐ Domestic and unpaid care work burden, and social and gender norms (e.g. women have to stay close to home)
☐ Burden of unpaid work
☐ Risk of gender-based violence and sexual harassment
☐ Others, specify: _____

d. Processing phase

i. Challenges faced by men

☐ Lack of access to fish
☐ Lack of access to or inadequate training
☐ Lack of access to or inadequate equipment
☐ Lack of access to land
☐ Lack of access to or inadequate storage facilities
☐ Lack of access to credit for investments or working capital
☐ Lack of access to and control over financial capital
☐ Lack of skills leading to inadequate processing techniques and practices
☐ Others, specify: _____

ii. Challenges faced by women

☐ Lack of or unequal access to fish
☐ Lack of or unequal access to training
☐ Lack of or unequal access to equipment
☐ Lack of or unequal access to land
☐ Lack of or unequal access to storage facilities
☐ Lack of or unequal access to credit for investments or working capital
☐ Lack of or unequal access to and control over financial capital
☐ Domestic and unpaid care work burden, and social and gender norms (e.g. women have to stay close to home)
☐ Burden of unpaid work
☐ Risk of gender-based violence and sexual harassment
☐ Others, specify: _____

e. Marketing and transportation phase

i. Challenges faced by men

☐ Lack of access to fish to sell
☐ Lack of access to or inadequate training
☐ Lack of access to or inadequate equipment
☐ Lack of access to land
☐ Lack of access to or inadequate storage facilities
☐ Lack of or inadequate cold chain equipment
☐ Lack of access to or inadequate market facilities
☐ Lack of access to credit for investments or working capital
☐ Lack of access to and control over financial capital
☐ Lack of skills leading to inadequate handling practices
☐ Lack of access to transportation
☐ Difficulty of access because of distance
☐ Difficulty of access because of the poor road quality
☐ Others, specify: _____

ii. Challenges faced by women

☐ Lack of or unequal access to fish to sell
☐ Lack of or unequal access to training
☐ Lack of or unequal access to equipment
☐ Lack of or unequal access to land
☐ Lack of or unequal access to storage facilities
☐ Lack of or inadequate cold chain equipment system
☐ Lack of or unequal access to market facilities
☐ Lack of or unequal access to credit for investments or working capital
☐ Lack of or unequal access to and control over financial capital
☐ Lack of skills leading to inadequate handling practices
☐ Lack of or unequal access to transportation
☐ Difficulty of access because of distance
☐ Difficulty of access because of road quality
☐ Domestic and unpaid care work burden, and social and gender norms (e.g. women have to stay close to home)
☐ Burden of unpaid work
☐ Risk of gender-based violence and sexual harassment
☐ Others, specify: _____

4A-VI. Natural resource management and food safety

This section collects information related to capturing sites (pollution and users). The information collected will be used to identify, in a map, which capturing sites are highly polluted or overexploited.

1. Considering the current fishing season:
   a. Is there any fishing site that has concerning levels of water pollution or contamination in the region? (*List the answer below.*)
   b. Considering [*insert answer from* ***Question 4A-VI.1.a****, reading out one location after another*]:
      i. What pollutants or contamination is predominant? (*List the answer below.*)
      ii. What is the measure to control safety-related matters? (*List the answer below.*)

Note: Ask Question 4A-VI.1.b for all of the capturing sites mentioned for Question 4A-VI.1.a.

2. Considering the current fishing season:
   a. Is there any fishing site with a concerning level of overexploitation of natural resources (fish stocks)? (*List the answer below*)
   b. Considering [*ask this question for each of the capturing sites from* ***Question 4A-VI.2.a****, one after the other*]:
      i. Which species are overexploited? (*List the answer below.*)
      ii. What are the measures to control fishing activity? (*List the answer below*)

Note: Ask Question 4A-VI.2.b again for all of the species mentioned for Question 4A-VI.2.a .

3. Does the basic law provide for any of the following?

☐ Ban of destructive fishing gears
☐ Penalties for infringements
☐ Use of fisheries-specific management plans
☐ Closure of specific fisheries for stock recovery purposes
☐ Establishing exploitable portions of stocks
☐ Other, specify: _____

4A-VII. Market situation

This section collects information related to the market (fish demand, market characteristics, etc.). The information collected will be used to classify fish according to the level of supply and demand and to understand the informal market.

1. Considering the current fishing season:
   a. Could you list the overexploited species?
   b. Considering [*ask this question for each of the fish species cited in* ***Question 4A-VII.1.a***]:
      i. Why are they overexploited?
      ☐ High demand
      ☐ Sale of species fetches high prices
      ☐ Widely available
      ☐ Other, specify: _____
      ii. In which period of the year are they available?
   c. Could you list the underexploited species?
   d. Considering [*ask this question for each of the fish species cited in* ***Question 4A-VII.1.c***]:
      i. Why are they underexploited?
      ☐ Low demand
      ☐ Sale of species fetches low prices
      ☐ Low availability
      ☐ Cultural beliefs (fish for the poor, fish for animals, etc.)
      ☐ Religious beliefs (ex. religion says to not eat scale-less fish, etc.)
      ☐ Other, specify: _____
      ii. In which period of the year are they available?

Note: Ask Question 4A-VII.1.b and 4A-VII.1.d for each of the species mentioned in Question 4A-VII.1.a and 4A-VII.1.c.

2. Considering the current fishing season:
   a. Could you enumerate the most popular fish species among the households in the market around the target school? (*List the answer below.*)
   b. Considering [*ask this question for each of the fish species mentioned in* ***Question 4A-VII.2.a***]:
      i. In which market can we buy them? (*List the answer below.*)
      ii. From which capturing site do they come? (*List the answer below.*)
      iii. Who supplied (local small-scale fishers, local large-scale fishers, imported fish supplied by wholesaler, etc.) it to the market? (*List the answer below.*)
      iv. In which form (fresh, dried, smoked, etc.) are they most sold? (*List the answer below.*)

Note: Ask Question 4A-VII.2.b for each of the species mentioned in Question 4A-VII.2.a.

3. Considering the current fishing season:
   a. Could you enumerate the most popular fish products (dried [SPECIES], smoked [SPECIES], etc…) in the market? Please indicate the species used. (*List the answer below.*)
   b. Considering [*ask the question for each of the fish mentioned in* ***Question 4A-VII.3.a***]:
      i. In which market can we find them? (*List the answer below.*)
   c. Who supplied it to the market? (List the answer below.)

Note: Ask Question 4A-VII.3.b for each of the species mentioned in Question 4A-VII.3.a.

4. Could you describe the most common market channel that the local fisherfolk use?

5. Are there any informal markets in the region?

☐ Yes ☐ No ☐ Do not know

a. If yes, can you enumerate the main actors of the informal markets?

b. If yes, can you briefly describe the mechanism of the informal market?

c. If yes, can you briefly describe the product flow in the informal market?

d. If yes, what motivates fisherfolk to trade in the informal structure? *(Check all that apply.)*

☐ Need immediate cash
☐ Formal market is too far
☐ Catch is too low to trade in the market
☐ Other, specify: _____

e. If yes, how does the informal market affect fish safety? (Check all that apply.)

☐ Do not use ice
☐ Do not use storage equipment
☐ Bad hygiene habits
☐ Inadequate handling
☐ Other, specify: _____

4A-VIII. Processing methods

This section collects information related to the processing of fish. The information collected will be used to obtain a general overview of the processing situation in the target community.

1. Which of the following processing methods are usually used by fisherfolk?

☐ Freezing ☐ Salting ☐ Drying ☐ Smoking ☐ Fermenting
☐ Canning ☐ Powdering ☐ Frying ☐ Other, specify:

2. Is there a processing method that more used by women?

☐ Freezing ☐ Salting ☐ Drying ☐ Smoking ☐ Fermenting
☐ Canning ☐ Powdering ☐ Frying ☐ Other, specify:

3. What are the main challenges encountered in processing fish?

☐ Lack of cold chain facilities
☐ Lack of energy or electricity
☐ Lack of financial capital
☐ Inadequate packaging
☐ Lack of clean or potable water and sanitation measures when cleaning fish
☐ Drying on the ground, or inadequate or no equipment for drying or smoking fish
☐ Insect infestation
☐ Poor quality of salt
☐ Bad weather or climatic changes
☐ Other, specify:

4A-IX. Women empowerment

This section collects information related to women's situation in the fishery value chain. The information collected will be used to map the value chain in a gender-sensitive manner and identify entry points for a gender-transformative intervention.

1. Could you talk about the situation of women in the following areas:

a. Input access

i. How would you quantify women's contribution?
☐ Very low ☐ Low ☐ Moderate ☐ Hig ☐ Very high

ii Approximately, how much percent of the total work was not paid?
☐ Over 75% ☐ Between 50 and 75% ☐ Between 25 and 50%
☐ Less than 25%

iii What challenges do they face? (Provide your answer below.)

b. Capturing phase

i How would you quantify women's contribution?
☐ Very low ☐ Low ☐ Moderate ☐ High ☐ Very high

ii Approximately, what percent of the total work was not paid?
☐ Over 75% ☐ Between 50 and 75% ☐ Between 25 and 50%
☐ Less than 25%

iii What challenges do they face? (List your answer below)

c. Processing phase

i How would you quantify their contribution?
☐ Very low ☐ Low ☐ Moderate ☐ High ☐ Very high

ii Approximately, what percent of the total work was not paid?
☐ Over 75% ☐ Between 50 and 75% ☐ Between 25 and 50%
☐ Less than 25%

iii What challenges do they face? (Provide your answer below.)

d. Transportation phase

How would you quantify their contribution?
☐ Very low ☐ Low ☐ Moderate ☐ High ☐ Very high

i Approximately, what percent of the total work was not paid?
☐ Over 75% ☐ Between 50 and 75% ☐ Between 25 and 50%
☐ Less than 25%

ii What challenges do they face? (Provide your answer below.)

e. Marketing phase

i How would you quantify their contribution?
☐ Very low ☐ Low ☐ Moderate ☐ High ☐ Very high

ii Approximately, what percent of the total work was not paid?

☐ Over 75% ☐ Between 50 and 75% ☐ Between 25 and 50%
☐ Less than 25%

iii What challenges do they face? (Provide your answer below.)

TOOL 4B. Questionnaire for local fisherfolk

Interviewee: Local fisherfolk

N.B. *The interviewer should disclose that the discussion will be recorded, but that it will be anonymized and that all data will be used in a general format only (as diagrams, spreadsheets, etc.). The voice and participation of respondents are very important to us.*

The general purpose of this questionnaire is to map the fishery value chain from the access to input to the connection to the market (or school, for school feeding programmes).

This questionnaire is used to obtain data from local fisherfolk and producer organizations according to the specific context of the target school. The questions in this questionnaire can be adapted, deleted or added, if required.

Note: *Organizations, associations, cooperatives, groups, etc. are referred to as "organization" here, for the sake of simplicity.*

Name of data recorder: _____ _____ _____ **Survey date:** *(DD/MM/YYYY)* _____

4B-I. Basic information

Filled in by toolkit user or producer association representative (if focus group discussion)

Geographical localization

Country: _____
Region: _____ *or equivalent highest administrative unit below national level*
District: _____ *or equivalent second-highest administrative unit below national level*
Community:

Producer information

For survey (Filled in by toolkit user)

Gender: ☐ Man ☐ Woman
Age: ☐ Under 25 ☐ 25 to 35 ☐ 35 to 45 ☐ Over 45
Civil status: ☐ Married ☐ Single ☐ Divorced ☐ Widowed
Education level: ☐ Primary ☐ Secondary ☐ High school ☐ University ☐ Other
Membership in an organization: ☐ Yes ☐ No

For focus group only (filled in by each producer and collected by toolkit user at the end of the focus group):

Gender: ☐ Man ☐ Woman
Age: ☐ Under 25 ☐ 25 to 35 ☐ 35 to 45 ☐ Over 45
Civil status: ☐ Married ☐ Single ☐ Divorced ☐ Widowed
Education level: ☐ Primary ☐ Secondary ☐ High school ☐ University ☐ Other
Average Age: ☐ Under 25 ☐ 25 to 35 ☐ 35 to 45 ☐ Over 45

For fishers only

Do you (or your organization) have the following:

Fishing license: ☐ *Yes* ☐ *No* ☐ *Not relevant*

Boat license number: ☐ *Yes* ☐ *No* ☐ *Not relevant*

Fisherfolk organization *(for fisherfolk members of organization only)*

Organization name:

Organization type: *(Check all that apply)*

☐ Union
☐ Association
☐ Community-based organization
☐ Cooperative
☐ Savings, credit and loan groups
☐ Subcommittee of the village fisheries governance body
☐ Other: _____

Main activity

☐ Pre-harvest (cleaning boats, meals for fishers)
☐ Access to input
☐ Harvesting
☐ Processing fish
☐ Storing fish
☐ Trading fish

4B-II. General information about the producer organization

This section is for producer organizations only. It collects information related to the fisherfolk organization (legal documents, benefits, etc.). The information collected will be used to identify entry points for intervention options such as connecting local fisherfolk to the HGSF programme, sensitizing and supporting fisherfolk in gathering into an organization, ensuring gender equality in an organization, etc.

1. Is your group formally registered?

☐ Yes ☐ No

2. Where is your group registered?

☐ Registrar general
☐ Ministry: _____ *(Please specify which ministry.)*
☐ District local council
☐ Other: _____ *(Please specify which entities.)*

3. Does your organization have any of the following? *(Check all that apply.)*

	Yes	No	Do not know
Constitution or by-laws	☐	☐	☐
Bank account	☐	☐	☐
Tax number	☐	☐	☐

4. Considering this current year:

a. How many members does your organization have?

b. Out of these [*insert the answer from* ***Question 4B-II.4.a.***], what is the share of fishers with a fishing license?

☐ Less than 25% ☐ Between 25 and 50% ☐ Between 50 and 75%
☐ Over 75% ☐ Not relevant

c. Out of these [*insert the answer from* ***Question 4B-II.4.a.***], how many are men?

d. Out of these [*insert the answer from* ***Question 4B-II.4.a.***], how many are women?

e. How many leadership positions are there in the organization? Of these leadership positions, how many are held by women? Please describe their role.

5. What is the objective of your organization? *(Check all that apply.)*

☐ Better access to inputs
☐ Better access or rights to raw materials (e.g. fish)
☐ Better access to financial support
☐ Better access to training and transfer of technology
☐ Better access to market
☐ Greater visibility and support from the government
☐ Better access to equipment and facilities (processing equipment and cold chain)
☐ Better bargaining power
☐ Other, specify: _____

6. What are the eligibility criteria for joining your organization? *(Check all that apply.)*

☐ Having fishing licenses
☐ Engaged in fisheries or fish-related industries
☐ Being a resident of the community, village or region
☐ Willing to pay membership fees
☐ Good reputation
☐ Sponsorship by a member
☐ Gender criteria
☐ Other, specify: _____

7. Recalling the last time the organization was invited to workshops, trainings and meeting:

a. Who was usually selected or nominated to represent the organization?

☐ Men
☐ Women
☐ Both

b. If only men, please explain why.

Note: This question is only asked if the organization has both men and women members.

8. How is information gained on behalf of the group shared with the other members?

☐ Shared at regularly scheduled meetings
☐ Special meeting
☐ Informal way
☐ Letters, messages and phone calls
☐ Other, specify: _____

9. Is the information shared within the group communicated in a way that is accessible to all members?

☐ Accessible to all
☐ Accessible to most
☐ Accessible to half
☐ Accessible less than half
☐ Accessible exclusively to men
☐ Other, specify: _____

10. Why is the accessibility of information or information-sharing an issue within the group?

☐ Lack of internal organization
☐ Levels of literacy
☐ Low access to technology
☐ Lack of trust
☐ Other, specify: _____

11. Does the member receive any of the following benefits through their membership? (*Check all that apply.*)

☐ Training
☐ Information, workshop
☐ Credits, loans from organizations
☐ Social support
☐ Equipment
☐ More empowerment or respect
☐ A voice to engage in decision-making
☐ Market access
☐ Better access to fish
☐ Better access to inputs (packaging, spices, fuel)
☐ Formal fisheries governance consultation or decision-making process
☐ Monitoring or surveillance of fishing areas or regulations
☐ Study of fish stocks
☐ Study of alternative fishing methods or technologies
☐ Study of alternative processing methods or technologies
☐ Other, specify:

12. How does the association make decisions? (Check all that apply.)

a. General assembly (voting approach)

☐ Yes ☐ No

i. Do you agree with the following statement? Please explain your answer.
"Women's and men's voices are considered equally."
☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

b. Board (composed by a limited number of people)

☐ Yes ☐ No

i. Do you agree with the following statement? Please explain your answer.
"Women's and men's voices are considered equally."
☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

c. President initiative

☐ Yes ☐ No

i. Do you agree with the following statement? Please explain your answer.
"Women's and men's voices are considered equally."
☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

d. Other, specify:

☐ Yes ☐ No

i. Do you agree with the following statement? Please explain your answer.
"Women's and men's voices are considered equally."
☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

13. Please describe the challenges faced during the creation of the organization. Please emphasize the administration challenges as well as the social challenges. *(Input answer.)*

   a. Are there any specific challenges that women face? Please describe, if any.

14. Do you pay a membership fee?

   ☐ Yes ☐ No

   a. If yes, how much is the membership fee per year or month? *(input value in local currency, and precise exchange rate in USD.)*

Note: *Question 4B-II.14* is used to estimate the farm overhead cost, used for the computation of the total production cost.

4B-III. Access to input

This section collects information related to access to input. The information collected will be used to characterize local fisherfolk and identify entry points. This section is designated for all fisherfolk.

1. Do you or your organization have access to the following list of equipment? If yes, how do you access them? *(Check all that apply.)*

	No access	Own or collectively for association	Rent or collectively for association	Separate negotiation (for organization only)	Other (please specify)
Non-motorized fishing boat	☐	☐	☐	☐	
Motorized fishing boat	☐	☐	☐	☐	
Drying equipment	☐	☐	☐	☐	
On-shore container	☐	☐	☐	☐	
Separated on-shore container	☐	☐	☐	☐	
Raised drying equipment	☐	☐	☐	☐	
Smoking kiln	☐	☐	☐	☐	
Processing equipment	☐	☐	☐	☐	
Dry storing equipment	☐	☐	☐	☐	
Cold storage with ice	☐	☐	☐	☐	
Cold storage with electricity	☐	☐	☐	☐	
Market stall	☐	☐	☐	☐	
Vehicle for transportation	☐	☐	☐	☐	
Motorbike for transportation	☐	☐	☐	☐	
Bicycle for transportation	☐	☐	☐	☐	
Other, specify:	☐	☐	☐	☐	

2. How often do women use this equipment, compared to men? please explain your answer. *(Check all that apply.)*

	Use it more	Use it equitably	Use it less	Never have access
Non-motorized fishing boat	☐	☐	☐	☐
Motorized fishing boat	☐	☐	☐	☐
Drying equipment	☐	☐	☐	☐
On-shore container	☐	☐	☐	☐
Separated on-shore container	☐	☐	☐	☐
Raised drying equipment	☐	☐	☐	☐
Smoking kiln	☐	☐	☐	☐
Processing equipment	☐	☐	☐	☐
Dry storing equipment	☐	☐	☐	☐
Cold storage with ice	☐	☐	☐	☐
Cold storage with electricity	☐	☐	☐	☐
Market stall	☐	☐	☐	☐
Vehicle for transportation	☐	☐	☐	☐
Motorbike for transportation	☐	☐	☐	☐
Bicycle for transportation	☐	☐	☐	☐
Other, specify:	☐	☐	☐	☐

3. Could you enumerate the challenges that you or your organization face regarding access to input? (Provide your answer below.)

   a. Do you agree with the following statement? Please explain your answer.
   "Women are more affected by [*ask for each of the challenges cited in* ***Question 4B-III.3***]?

   ☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

4B-IV. Fishing phase

This section collects information related to the fishing activity (period, catch, loss, etc.). The information collected will be used to characterize local fishers, assess fish safety, and assess the sustainability of the fishing activity. This section is for fishers only.

1. In which months of the year is fish more available or harvested? *(Check all that apply.)*

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

2. Considering the current fishing season:

   a. Could you list the species you or your organization usually harvested? Please provide at least 3 species. *(List your answers below.)*

   b. In which month of the year they are available?

   c. Considering [*ask for each of the species from* ***Question 4B-IV.2.a***]:

      i. Where did you or your organization catch them?

      ii. How many kilograms (kg) did you or your organization catch?

iii. Out of these [*insert answer from* ***Question 4B-IV.2.c.ii***] kg, how many kg were discarded?

iv. In case of discard, why did you or your organization discard the catch?
☐ Exposure to the sun after catching
☐ Contamination on board from bad handling
☐ Contamination from water used to wash fish
☐ Contamination of fish on board from insect infestation or others
☐ Physical loss from bird, pests or other animals
☐ Others, specify

Note: Ask *Question 4B-IV.2.c* for all species provided in *Question 4B-IV.2.a.* See Box A1.1 for a template of recording sheet.

BOX A1.1. TEMPLATE TO RECORD ANSWERS FROM QUESTION 4B-IV.2

Species name	Capture site name	Quantity harvested	Quantity discarded	Reasons for discard
[input each answer from **Question 2.a**]	[fill in answer from **Question 2.b**]	[fill in answer from **Question 2.c**]	[fill in answer from **Question 2.d**]	[fill in answer from **Question 2.e**]
[fill in the table until all species are listed]				
(…)	(…)	(…)	(…)	(…)

3. Recalling the last time you went fishing:

a. Did you store all the fish together?

☐ Yes ☐ No

i. If yes, did you use any of the following? (*Check all that apply.*)
☐ Container
☐ Covered container
☐ Clean bag
☐ Perforated jerry cans
☐ Other, specify: _____

ii. If you answered No, did you separate them into batches?
☐ Yes ☐ No

iii. If you separated them in batches, did you use any of the following? (*Check all that apply.*)
☐ Container
☐ Covered container
☐ Clean bag
☐ Perforated jerry cans
☐ Other, specify: _____

b. If you or your organization fish using a boat, after the fish is captured, how long did it take to land the catch?

☐ Less than 30 minutes' travel
☐ 30 to 60 minutes' travel
☐ 60 to 120 minutes' travel
☐ More than 120 minutes' travel
☐ Other:

c. If you or your organization fish using a boat, were the fish stored disposed on ice on board? If not, why?

☐ Yes ☐ No ☐ Do not know

d. If you or your organization fish using a boat, were the fish cleaned on board? If not, why?

☐ Yes ☐ No

i. If yes, with what kind of water did you clean the fish?
☐ Saltwater ☐ Freshwater (from lake or river) ☐ Other, specify

e. If you or your organization fish using a boat, were the fish gutted on board? If not, why?

☐ Yes ☐ No

f. Were any other parts of the fish removed on board?

☐ Yes ☐ No
If yes, please specify:

4. Considering the current fishing season:

a. Could you or your organization think of species that were present but that you did not catch or keep? (Provide your answer below.)

b. Why did you or your organization not capture or keep the catch? (Ask for each of *the species from* ***Question 4B-IV.4.a.***)

☐ Low demand ☐ Low prices ☐ Other, specify:

5. Recalling the last time you or your organization went fishing, what did you do with your catch? (If a combination of the below answers is given, please ask for an estimate of the percentage sold and the percentage kept for own consumption.)

☐ Kept for own consumption ☐ Sold ☐ Other

6. Recalling the last time you or your organization went fishing:

a. What challenges did you face? (Provide your answer below.)

b. Do you agree with the following statement? Please explain your answer.
"Women are more affected by [*ask for each of the challenges cited in* ***Question 4B-IV.6.a***]".

☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

4B-V. Processing phase

This section collects information related to fish processing (fish used, processing methods, challenges, etc.). The information collected will be used to characterize local fish processors, identify fish forms available and identify entry points for the intervention proposed by the toolkit. This section is for fish processors only.

1. How are fish resources accessed?

☐ Harvested ourselves
☐ Harvested by a crew we hire
☐ Bought from fishers
☐ Bought from middlemen or traders
☐ Bought from wholesalers
☐ Other, specify: _____

2. Which of the following processing methods do you or your organizations often use? *(Check all that apply.)*

☐ Freezing ☐ Canning ☐ Powdering (making fish powder) ☐ Salting
☐ Smoking (Traditional Kiln) ☐ Smoking (Improved Technology)
☐ Drying (on the ground) ☐ Drying (on raised racks) ☐ Fermenting
☐ Fried ☐ Other, specify

3. How are fish sun-dried? *(Check all that apply.)*

☐ Directly on the sand or ground
☐ On the ground on tarps or cloth
☐ On rocks
☐ Raised open racks
☐ Raised covered racks
☐ Other, specify: _____

4. What are the main problems you or your organization experience concerning sun-drying fish? *(Check all that apply.)*

☐ Loss because of rain
☐ Loss because of animals or pests
☐ Theft
☐ Cold storage space (for fresh fish before drying)
☐ Dry storage space (for storing value-added products)
☐ Lack of access to improved drying racks
☐ Other, specify: _____

5. How is fish smoked?

☐ Traditional kiln ☐ Improved technology

6. What are the main problems you or your organization experience concerning smoking fish? *(Check all that apply.)*

☐ Access to fuelwood or price of fuel
☐ Access to improved oven technology
☐ Quality issues
☐ Negative health effects from smoke (affecting eyes or lungs)
☐ Cold storage space (for fresh fish before smoking)
☐ Lack of access to improved drying racks
☐ Dry storage space (for storing value-added products)
☐ Other, specify: _____

7. What do you or your organization do with the by-products?

☐ Transform (drying, smoking, salting, fermenting, etc.)
☐ Eat
☐ Throw away or dispose of
☐ Sell
☐ Share between members
☐ Other, specify:

8. Recalling the last time you or your organization made [*Insert the name of the products based on answer 4B-V.2., so fish powder or smoked fish, etc.*]

   a. What species of fish did you or your organization use? (Please provide the top three species.)

   b. Considering (ask for each of the species from **Question 4B-V.8.a**):

      i. Did you or your organization capture them? *(If yes, proceed with **Question 4B-V.9**)*
      ☐ Yes ☐ No

      ii. If you answered No, where did you or your organization buy fresh fish to make [*Insert the name of the product, for example fish powder*]?

      iii. How many kg did you or your organization buy?

      iv. How much does *it* cost per kg? (Input value in local currency.)

Note: Ask *Question 4B-V. 8* for each of the products produced by fisherfolk. Ask *Question 4B-V. 8.b* for each of the species cited.

9. Recalling the last time you or your organization made [*insert the name of the products based on answer **4B-V.2.***, so fish powder, smoked fish, etc.],

   a. How many kg of fresh fish did you or your organization use?

   b. And out of these [*insert the number of kg from **Question 4B-V. 9.a***], how many kg of [*insert the name of the products, e.g. fish powder*][i] did it produce?

Note: Ask *Questions 4B-V. 9.a* and *4B-V. 9.b* for each of the products and species cited.

[i] If another processing method is involved, the user should ask Question 4B-V.9.b for each processed fish. For example, for fish powder, the processor first makes smoked fish, then fish powder. Users will ask question 4B-V.9.b for smoked fish and fish powder.

10. Recalling the last time you/your organization made *{Insert the name of the products, e.g. fish powder},*

   a. What other raw materials (excluding fresh fish) did you/your organization use?

Note: Raw materials refer to products that are used to process fish such as salt, oil, wood, matches, etc.

   b. Considering *[fill in the products cited from **Question 4B-V.10.a** one after the other]:*

      i. How many kg/pieces/sets did you/your organization use?

      ii. Did you/your organization buy them? (if no proceed to **Question 4B-V.11**)
      ☐ Yes ☐ No

      iii. If yes, where did you buy *them from?*

      iv. If yes, how much does one unit cost?

Note: Ask *Question 4B-V. 10.b* for each of the raw materials cited.

11. Recalling the last time you or your organization made [*insert the name of the products, e.g. fish powder*],

   a. What were the main tasks required to make [insert the name of the products, e.g. fish powder, smoked fish] (from fresh fish to [insert the name of the products, e.g. fish powder, smoked fish])? (Provide the answers below.)

   b. Considering *[ask again for each the tasks from **Question 4B-V.11.a**]:*

      i. How many people are needed for the task?

ii. Out of these [*fill in the answer from* ***Question 4B-V.11.b.i***], how many are women?

iii. How many hours per person[i] are needed to *complete the task?*

iv. Out of *[fill in the number of labourers from* ***Question 4B-V.11.b.i****]* persons, how many did you or your organization hire? (If the answer is none, *proceed to* ***Question 4B-V.12***)

v. Out of [*fill in the number from* ***Question 4B-V.11.b.iv***] labourers you hired, how many were women?

vi. If none, please explain why no women were hired.

c. How do you or your organization remunerate labour? *(Check the one that applies)*

☐ Salary ☐ Compensation[ii] ☐ Other

d. How much is the salary per day for men?

e. How much is the salary per day for women?

f. In the case you or your organization do not remunerate in the form of a salary, can you explain to us how you or your organization pay for their services?

g. Approximately, what is the equivalent monetary value of the remuneration? That is, if part of the fish catch/processed fish is exchanged for labour, what is the approximate monetary value of the fish?

[i] The unit can be days per person, months per person, or any other unit used by the local fisherfolk. Thus, the question can be adapted to the local context.

[ii] Compensation can be in the form of part of the fish processed given to the service provider, mutual aid (for example, the processors who hired labour will soon work for the service provider), etc. In the case of remuneration not in form of salary, users should ask Question 4B-V.11.g to estimate the value of the compensation.

Note: Ask *Question 4B-V.11* for all products cited. Ask *Questions 4B-V.11.b* for all tasks and products cited.

12. Recalling the last time you or your organization made [*insert the name of the products, e.g. fish powder*]

a. What equipment did you use? (Provide the answers below.)

b. Considering *[ask for each of the answers from* ***Question 4B-V.12.a****]*:

i. How many units did you use?

ii. For how long *was it used?*[i]

iii. Did you or your organization rent *it*?
☐ Yes ☐ No

iv. If yes, how much does it cost to rent *it* per day?[ii]

v. If No, how much is its price *in the local market?*

vi. If you own *it, h*ow long does *it* last until you need to replace it?

[i] The unit can be in days or hours depending on the tasks and the equipment used. Thus, the question can be adapted to the local context.

[ii] The unit depends on the agreement between processors and owners of the equipment. It can be per hour, per kg of fish processed, or per local unit measurement. Thus, the question can be adapted to the local context.

Note: Ask *Question 4B-V.12.b* for all equipment cited in response to *Question 4B-V.12.a.*

13. Is the processing centre located on land owned by you or your organization?

☐ Yes ☐ No

a. If no, do you rent land?

☐ Yes ☐ No

i. If yes, how much is the rent for land per month or year?

ii. If no, how can land be accessed?

14. Recalling the last time you or your organization made [*insert the name of the products, e.g. fish powder]*:

a. How many kg of fresh fish were lost or wasted during transportation to the processing site?

i. What are the origins of these losses?
☐ Excessively long transportation time
☐ Lack of storage equipment
☐ Lack of cold chain facilities
☐ Others, specify:

b. How many kg of fresh fish were lost or wasted during the processing phase?

i. What are the origins of these losses?
☐ Inadequate processing methods (direct exposure on the ground, storage facilities, etc.)
☐ Insect infestation
☐ Contamination from water used to wash fish
☐ Others, specify:

c. How many kg of processed fish were lost or wasted after the processing phase until they were sold?

i. What are the origins of these losses?
☐ Unsold fish
☐ Selling fish on ground
☐ Lack of storage facilities
☐ Others, specify:

d. How much does fresh fish cost?

e. How much does your processed fish cost?

Note: *Questions 4B-V.3* to *4B-V.14* are used to compute production cost.

15. Recalling the last time you or your organization processed fish, how many hours, days or months does a processing cycle take (from buying fresh fish to getting [*insert the name of the products, e.g. fish powder*]?

Note: *Question 4B-V.15* will be used to compute the production cost.

16. Recalling the last time you or your organization processed fish

a. What challenges did you face? *(Provide the answers below.)*

b. Do you agree with the following statement? Please explain your answer.
"Women are more affected by [*fill in with each of the challenges cited in* ***Question 4B-V.16.a***]?

☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

4B-VI. Marketing

This section collects information related to fish marketing (market type, localization, transportation, fish accessibility, etc.). The information collected will be used to assess fish availability and fish usage, which are opportunities for HGSF. This section is dedicated to fish traders.

1. Recalling the last time you or your organization produced fish or fish products:
   a. What final products did you get?
   b. How many kg of [*fill in with each of the products cited in* ***Question 4B-VI.1.a***] did you produce?
      i. Out of [*insert answer from* ***Question 4B-VI.1.b***] kg, how many kg did you allocate for your own consumption?
      ii. Out of [*insert answer from* ***Question 4B-VI.1.b***] kg, how many kg did you sell?
      iii. Out of *[insert answer from* ***Question 4B-VI.1.b***] kg, how many kg were lost?
      iv. Why were these [*insert answer from* ***Question 4B-VI.1.iii***] lost?

Note: Ask *Question 4B-VI.1.b* for all products cited in *Question 4B-VI.1.a*.

2. Recalling the last time you or your organization sold [*insert each of the products cited in* ***Question 4B-VI.1.a***]:
   a. Where did you or your organization sell it?

      ☐ Local market in the area
      ☐ Local market that is far away (more than 2 hours travel)
      ☐ Medium or large market (in the region)
      ☐ Interregional market
      ☐ Middlemen
      ☐ Local food vendors
      ☐ Informal markets
      ☐ Other, specify: _____

   b. If you are an organization (to be filled in by a member of the organization only): How are the profits distributed within the organization?
   c. If you are not a member of an organization, how are the profits distributed among the household?

      ☐ All profits are kept by the trader
      ☐ All profits are given to spouse or partner (please specify gender)
      ☐ Profits are equally distributed between the trader and another household member (specify:)
      ☐ Profits are equally distributed by husband and wife
      ☐ The trader has a joint account with another household member (specify:), with equal management of money
      ☐ Other, specify:

3. Recalling the last time you or your organization brought fish to the market:

a. Did you or your organization transport all the fish together?

☐ Yes ☐No

i. If yes, did you or your organization use any of the following?

☐ Container
☐ Covered container
☐ Clean bag
☐ Perforated jerry cans
☐ Other, specify: _____

ii. If not, did you or your organization separate them into batches?
☐ Yes ☐No

iii. If you separated them into batches, did you or your organization use any of the following?

☐ Container
☐ Covered container
☐ Clean bag
☐ Perforated jerry cans
☐ Other, specify: _____

b. Did you transport fish on ice (to be asked only for fish requiring cold chain i.e. fresh and frozen fish products)?

☐ Yes ☐ No

4. Recalling the last time you or your organization sold fish,

a. How did you or your organization dispose of your fish?

☐ Elevated market stall with ice
☐ Elevated market stall without ice
☐ Elevated covered market stall
☐ Elevated uncovered market stall with ice
☐ Directly on the ground with ice
☐ Directly on the ground without ice

b. Can you or your organization give an approximate figure of your fish loss every day?

☐ Over 75% ☐ Between 50 and 75% ☐ Between 25 and 50%
☐ Less than 25%

c. What is the origin of these losses? (Check all that apply.)

☐ Unsold fish
☐ Selling fish on the ground
☐ Lack of storage facilities
☐ Insect infestation
☐ Contamination from water used to wash fish
☐ Species are not demanded by the buyer
☐ The fish are too small (size)
☐ Other, specify:

d. What do you do with the unsold fish?

☐ Share between the members of the organization for home consumption (for organization only)
☐ Share between the members of the organization for individual selling (for organization only)
☐ Throw away
☐ Other, specify:

5. What challenges did you or your organization face during the marketing phase?

6. Do you agree with the following statement? Please explain your answer.
"Women are more affected by [*fill in with each of the challenges cited in* ***Question 4B-VI.5*** *one after the other*]?

☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

4B-VII. Training and services

1. Did you or your organization receive any of the following training?

☐ Technical training
☐ Financial management training
☐ Administrative training
☐ Harvest-related training
☐ Processing-related training
☐ Marketing training
☐ Resource conservation training
☐ Environmental awareness training
☐ Gender-related training
☐ Nutrition awareness training

2. Recalling the last time you or your organization received [*insert each of the trainings checked in* ***Question 4B-VII.1***]

a. Who provided the training?

☐ Fisheries department
☐ Government
☐ NGO
☐ Academia
☐ Other, specify:

b. How was the access to the training?

☐ Exclusively for men
☐ Prioritized men
☐ Exclusively for women
☐ Prioritized women
☐ No restriction

c. Did you try to use, or are you able to use, the knowledge from the training?

☐ Successfully put the training into practice
☐ Tried but failed
☐ Did not try

3. Have you or your organization participated in any of the following fishery management or governance activities?

☐ Formal fisheries governance consultation or decision-making process
☐ Monitoring or surveillance of fishing areas or regulations
☐ Study of fish stocks
☐ Study of alternative fishing methods or technologies
☐ Study of alternative processing methods or technologies
☐ Other, specify: _____

4. How does the technical government contact you or your organization for training you in providing support?

☐ Phone call
☐ Field visits
☐ Meeting or training
☐ None
☐ Other, specify: _____

5. Are you willing to work with the school feeding programme?

☐ Yes ☐ No

If no, explain: _____

☐ Do not know

4B-VIII. Geographical factors

This section collects information related to the physical distance of fisherfolk to local authorities and schools. The information collected will be used to estimate the monetary value of travelling and to generate adequate strategies to support local fisherfolk.

1. Recalling the last time you or your organization captured fish:

a. How did you get to the capturing site?

☐ Walk ☐ Bicycle ☐ Motorcycle ☐ Vehicle ☐ Other, specify

b. How long did it take to get there?

☐ 0 to 15 minutes ☐ 15 to 20 minutes ☐ 30 to 60 minutes
☐ 60 to 120 minutes ☐ Over 120 minutes

2. Recalling the last time you or your organization bought fish:

a. How did you get to the landing site?

☐ Walk ☐ Bicycle ☐ Motorcycle ☐ Vehicle ☐ Other, specify

b. How long did it take to get there?

☐ 0 to 15 minutes ☐ 15 to 20 minutes ☐ 30 to 60 minutes
☐ 60 to 120 minutes ☐ Over 120 minutes

3. Recalling the last time you or your organization sold fish:

a. How did you get to the trading site?

☐ Walk ☐ Bicycle ☐ Motorcycle ☐ Vehicle ☐ Other, specify

b. How long did it take to get there?

☐ 0 to 15 minutes ☐ 15 to 20 minutes ☐ 30 to 60 minutes
☐ 60 to 120 minutes ☐ Over 120 minutes

4. Recalling the last time you or your organization went to the local authority's office:

a. How did you get there?

☐ Walk ☐ Bicycle ☐ Motorcycle ☐ Vehicle ☐ Other, specify

b. How long did it take to get there?

☐ 0 to 15 minutes ☐ 15 to 20 minutes ☐ 30 to 60 minutes
☐ 60 to 120 minutes ☐ Over 120 minutes

5. Recalling the last time you or your organization went to the communal authority's office:
   a. How did you get there?

      ☐ Walk ☐ Bicycle ☐ Motorcycle ☐ Vehicle ☐ Other, specify

   b. How long did it take to get there?

      ☐ 0 to 15 minutes ☐ 15 to 20 minutes ☐ 30 to 60 minutes
      ☐ 60 to 120 minutes ☐ Over 120 minutes

6. Recalling the last time you or your organization went to the regional authority's office:
   a. How did you get there?

      ☐ Walk ☐ Bicycle ☐ Motorcycle ☐ Vehicle ☐ Other, specify

   b. How long did it take to get there?

      ☐ 0 to 15 minutes ☐ 15 to 20 minutes ☐ 30 to 60 minutes
      ☐ 60 to 120 minutes ☐ Over 120 minutes

7. How far from [insert name of the target school]
   a. Is your home located?
   b. Is your processing centre located?

4B-IX. Women empowerment

This section collects information related to women's situation in the fishery value chain. The information collected will be used to adopt a gender-sensitive approach.

1. Is there a gender division of labour within your organization or household?

   ☐ Yes ☐ No

2. Can you briefly describe the gender division of labour emphasizing the tasks and the contribution of each member by gender?
3. Recalling the last time you or your organization captured fish, how would you describe women's participation in:
   a. Selection of species to capture

      ☐ Very high ☐ High ☐ Moderate ☐ Low ☐ Very low

4. Recalling the last time you or your organization processed fish, how would you describe women's participation in:
   a. Selection of species to process

      ☐ Very high ☐ High ☐ Moderate ☐ Low ☐ Very low

   b. Selection of processing methods

      ☐ Very high ☐ High ☐ Moderate ☐ Low ☐ Very low

5. Recalling the last time you or your organization sold fish, how would you describe women's participation in:
   a. Selection of the market to sell fish

      ☐ Very high ☐ High ☐ Moderate ☐ Low ☐ Very low

b. Price setting

☐ Very high ☐ High ☐ Moderate ☐ Low ☐ Very low

6. Recalling the last time you or your organization capture fish, how would you quantify the contribution of women to:

a. Cleaning the boat

☐ Very high ☐ High ☐ Moderate ☐ Low ☐ Very low

b. Capturing the fish

☐ Very high ☐ High ☐ Moderate ☐ Low ☐ Very low

c. Cleaning the fish

☐ Very high ☐ High ☐ Moderate ☐ Low ☐ Very low

d. Collecting the fish on board at the landing site

☐ Very high ☐ High ☐ Moderate ☐ Low ☐ Very low

7. How would you quantify the contribution of women to:

a. Fish processing

☐ Very high ☐ High ☐ Moderate ☐ Low ☐ Very low

b. Fish transportation (to market)

☐ Very high ☐ High ☐ Moderate ☐ Low ☐ Very low

c. Fish marketing

☐ Very high ☐ High ☐ Moderate ☐ Low ☐ Very low

8. Considering the whole fishery value chain:

a. What are the main tasks of women in the value chain?

b. Approximately, how many hours or days do women spend to [*ask for each of the tasks mentioned in* ***Question 4B-IX.8.a*** *one*]?

i. Did they get pay or compensation for the task?
☐ *Yes* ☐ N*o*
If No, please explain.

ii. If Yes, how much did they get per hour or day? (Input value in local currency.)

TOOL 5. Questionnaire for demand characterization

TOOL 5A. Questionnaire for school feeding programmes (SFP) lead agency

Interviewee: Representative of school feeding programme (SFP) lead agency – most decentralized level possible

N.B. The interviewer should disclose that the discussion will be recorded, but it will be anonymized and all data will be used in a general format only (as diagrams, spreadsheets, etc.). If not possible, users are required to obtain the full consent of the interviewee to participate. *The voice and participation of respondents are very important to us.*

Name of data recorder: _____ _____ _____ **Survey date:** *(DD/MM/YYYY)* _____

5A-I. Interviewee basic information

Country: _____
Region: _____ **(***or equivalent highest administrative unit below national level)*
District: _____**(***or equivalent second-highest administrative unit below national level)*
Community:
Agency name:
Professional title of interviewee:
Gender of key informant:

5A-II. General information

This section collects information on school feeding programmes. The information collected will be used to understand the mechanism of the school feeding programmes and identify the main actors involved. Furthermore, these data will be used to assign the main coordinators of the intervention options proposed in the toolkit to sustainably incorporate fish and fish products into home-grown school feeding (HGSF) programmes.

1. Can you tell us more about what your organization's work involves? *(Check all that apply.)*

☐ Coordination of school feeding (plan meeting with stakeholders, test recipes, work with stakeholders, assist individual schools in local food procurement, work with local suppliers, etc.)
☐ Management of school feeding (plan, implement and supervise operation; ensure adherence to nutrition standards and guidelines; ensure adherence to school feeding programme regulation and sanitation requirements, etc.; ensure that meals are served or food supplies are delivered as planned and on time; etc.)
☐ Implementing of school feeding programme
☐ Monitoring of school feeding programme
☐ Capacity development of school feeding programme
☐ Development of terms of references (composition, roles and responsibilities) for different committees and working groups
☐ Management of school feeding programme infrastructure
☐ Selection of the schools based on minimum requirements for schools' readiness for school feeding programme
☐ Setting nutrition standards or guidelines
☐ Developing menu
☐ Other, specify: _____

2. Considering the current school year:

   a. Who are the actors involved in the school feeding programme (funders, lead agency, suppliers, etc.)?

   b. What is the contribution of [*fill in with each of the actors cited in* ***Question 5A-II.2.a***]?

Note: Ask *Question 5A-II.2.b* for all actors cited in response to *Question 5A-II.2.a.*

5A-III. Challenges of the home-grown school feeding programme

This section collects information related to the challenges, in a gender-sensitive manner, faced by HGSF. The information collected will be used to identify the entry points for the intervention options proposed in the toolkit.

1. Considering the current school year, did you face the following challenges? (*Check all that apply.*)

   a. Lack of access to accurate and timely information regarding the tenders issued by the programme

   ☐ Yes ☐ No

   i. Do you agree with the following statement? Please explain your answer.
   "*Women are more affected than men by this challenge.*"
   ☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

   b. Low competitiveness because of lack of bidding experience

   ☐ Yes ☐No

   i. Do you agree with the following statement? Please explain your answer.
   "Women *are more affected than men by this challenge.*"
   ☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

   c. Lack of documents for legal compliance

   ☐ Yes ☐ No

   i. Do you agree with the following statement? Please explain your answer.
   "*Women are more affected than men by this challenge.*"
   ☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

   d. Low administration literacy

   ☐ Yes ☐ No

   i. Do you agree with the following statement? Please explain your answer.
   "*Women are more affected than men by this challenge.*"
   ☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

   e. Inadequate payment schedule

   ☐ Yes ☐ No

   i. Do you agree with the following statement? Please explain your answer.
   "*Women are more affected than men by this challenge.*"
   ☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

   f. High probability of default risk

   ☐ Yes ☐ No

   i. Do you agree with the following statement? Please explain your answer.
   "*Women are more affected than men by this challenge.*"
   ☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

g. Conformity to quality and food safety standards

☐ Yes ☐ No

i. Do you agree with the following statement? Please explain your answer.
"*Women are more affected than men by this challenge.*"
☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

h. Lack or irregular quantity supplied

☐ Yes ☐ No

i. Do you agree with the following statement? Please explain your answer.
"*Women are more affected than men by this challenge.*"
☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

i. Lack of liquidity to pre-finance delivery

☐ Yes ☐ No

i. Do you agree with the following statement? Please explain your answer.
"*Women are more affected than men by this challenge.*"
☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

j. Other, specify:

i. Do you agree with the following statement? Please explain your answer.
"*Women are more affected than men by this challenge.*"
☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

k. Lack of robust dietary data from schoolchildren and adolescents. Please explain your answer.

☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

l. Relatively low familiarity and skills of food handlers. Please explain your answer.

☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

m. Lack of cold chain facilities that limit the types of fish or fish products to be incorporated. Please explain your answer.

☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

n. Low acceptability of underutilized species and by-products. Please explain your answer.

☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree

o. Other, specify:

Note: Fill in *Question 5A-III.1.o* until all challenges cited by the interviewee have been recorded.

5A-IV. Services offered to local suppliers

This section collects information related to the services provided to local suppliers. *The information collected will be used to identify the existing action supporting local suppliers. Thus, it helps to generate intervention options in accordance with the current practices.*

1. Is your organization or entity conducting work to sensitize local suppliers on working with HGSF?

☐ Yes ☐ No ☐ Do not know

a. If yes, can you briefly describe it?

b. If not, why?

2. Did your organization provide any of the following to local suppliers? For each option proposed, please provide an example and brief description of the most successful actions. If no option was not provided, please explain why.

   a. Input provision

      ☐ Yes ☐No

      i. Approximately how many of the beneficiaries were women? (*Input value as a percentage.*)

   b. Technical support

      ☐ Yes ☐No

      i. Approximately how many of the beneficiaries were women? (*Input value as a percentage.*)

   c. Monitoring

      ☐ Yes ☐No

      i. Approximately how many of the beneficiaries were women? (*Input value as a percentage.*)

   d. Equipment provision

      ☐ Yes ☐No

      i. Approximately how many of the beneficiaries were women? (*Input value as a percentage.*)

   e. Training in administrative literacy, bidding, tendering

      ☐ Yes ☐No

      i. Approximately how many of the beneficiaries were women? (*Input value as a percentage.*)

   f. Other specify:

      i. Approximately how many of the beneficiaries were women? (*Input value as a percentage.*)

5A-V. Food safety

This section collects information related to food safety. *The information collected will be used to assess the capacity of the school to serve safe fish and fish products at school.*

1. How do you ensure the quality and safety of food supplied to the school?
2. Is there any nationwide system for monitoring school feeding?

   a. Does the system include the following components? *(Check all that apply.)*

      ☐ School visits
      ☐ Electronic reporting
      ☐ Paper reporting
      ☐ Other, specify:
      ☐ None

   b. How often do you do [*fill in each of the answers from* ***Question 5A-V.2.a***]?

      ☐ Monthly ☐ Quarterly ☐ Biannually ☐ Annually ☐ Other

Note: If the answer to *Question 5A-V.2.a* is None, go to Section 5A-VI. Otherwise, ask *Question 5A-V.2.b* for all of the answers provided to *Question 5A-V.2.a.*

5A-VI. Feasibility of the incorporation of locally procured fish and fish products into home-grown school feeding

This section collects information related to the steps required to incorporate locally procured fish and fish products into HGSF. The information collected will be used to facilitate the incorporation of locally procured fish and fish products into HGSF.

1. What are the main steps required to incorporate a new recipe into the school feeding programmes? (Provide your answers below.)
2. Who is responsible for [*fill in the step cited from* ***Question 5A-VI.1*** *one after the other*]?

Note: Ask *Question 5A-VI.2* for all steps mentioned in *Question 5A-VI.1*.

3. Are local fisherfolk willing to work with the school feeding programme personnel?

   ☐ Yes ☐ No ☐ Do not know
   If No, explain _____

4. Are you are your agency willing to work with small-scale fisherfolk and their organizations for public food procurement programmes?

   ☐ Yes ☐ No ☐ Do not know
   If No, explain_____

5. Does the school serve fish or plan to incorporate fish into HGSF?

   ☐ Yes ☐ No ☐ Do not know
   If No, explain_____

6. What do you think about incorporating fish into HGSF? What concerns do you have? What opportunities do you see?
7. Do you have any other concerns that you want to share with us?

TOOL 5B. Questionnaire for target school

Interviewee: Target school responsible

The interviewer should disclose that the discussion will be recorded, but it will be anonymized and that all data will be used in a general format only (as diagrams, spreadsheets, etc.). The voice and participation of respondents are very important to us.

Name of data recorder: _____ _____ _____ **Survey date:** *(DD/MM/YYYY)* _____

5B-I. Interviewee basic information

School name:
Enrolment system:
- ☐ **For boys only**
- ☐ **For girls only**
- ☐ **No gender restriction (all genders of children are accepted for enrolment)**

Professional title of interviewee:
Country: _____
Region: _____ **(***or equivalent highest administrative unit below national level)*
District: _____**(***or equivalent second-highest administrative unit below national level)*
Community:
Gender of key informant:

5B-II. School information

This section collects information related to the number of meals served at school. The information collected will be used to quantify the quantity of fish needed to supply the school.

1. How many students are enrolled at the school?
2. How many school days are there in a year? *(Input number of days.)*
3. Are the students at school all day or only half a day?

☐ *All day* ☐ *Half a day*

4. Considering the last time you served foods, how many meals were distributed to [insert the age or grade of target school-aged children and adolescents to be served fish] per meal time?
5. How many times a day does the school serve meals for students?

☐ *Once* ☐ *Twice* ☐ *Three times* ☐ *Other, specify:*

6. At what time does the school serve meals to students? (Check all that apply.)

☐ *Breakfast* ☐ *Snacks* ☐*Lunch* ☐ *Other, specify:*

7. Recalling the past month's activity, what are the different meals served? *(Please provide the answer as a list, or provide the schedule if you already have one)*
   a. From the meal served, was there any meal planned that had been not served?
      i. If, yes, why were they not served?
   b. Are the meals served to girls different from the meals served to boys?

      ☐ *Yes* ☐ *No*

      i. If Yes, please explain why.

5B-III. Local public food procurement

This section collects information related to food procurement from local suppliers. The information collected will be used to facilitate the connection of local fisherfolk to HGSF and identify the most adequate contract to connect local fisherfolk to HGSF.

1. Recalling the last time you call for local suppliers:
   a. How do you usually select local suppliers for the school? *(Check all that apply.)*

      ☐ Standard open bid or tender procedure
      ☐ Request for quotation
      ☐ Direct purchase
      ☐ Other, specify: _____

   b. How often do [*insert questions checked in* ***Question 5B-III.a***.] happen?

      ☐ Every six months
      ☐ Every year
      ☐ Every two years
      ☐ Other, specify: _____

   c. Which operating model did you use?

      ☐ Farm-to-school
      ☐ Decentralized
      ☐ Centralized
      ☐ Third-party

d. Did you have any prequalification stage or participation requirements during the tender process?

e. If you had a prequalification stage, did it involve any of the following:

☐ Previous experience with procurement
☐ Financial resources concerning procurement
☐ Managerial capability concerning procurement
☐ Reputation and work history for the commodities procured
☐ Legal capacity to enter into the contract
☐ Registered on the supplier list
☐ Bank account and VAT registration certificate
☐ Other, specify

2. Considering the current school year:

a. What schemes are usually used for HGSF?[a] *(Select all that apply)*

☐ Reservation set-asides
☐ Reservation qualification criteria
☐ Reservation subcontracting conditions
☐ Preferencing – bid price preference
☐ Preferencing – award criteria

b. Could you provide a brief description of [*fill in the contract checked in* ***Question 5B-III.2.a***] *(input a brief description.)*

c. Who is responsible for purchasing food from local suppliers?

d. How does [*insert answer from* ***Question 5B-III.2.c***] purchase food from local suppliers?

☐ Buy directly from local suppliers
☐ Buy from farmers' markets
☐ Buy directly from producers' group
☐ Buy through caterers
☐ Buy from shops and supermarkets that prioritize local procurement
☐ The commune (fourth-highest administrative level) buys from local suppliers for the school
☐ The district (third-highest administrative level) buys from local suppliers for the school
☐ The region (second-highest administrative level) buys from local suppliers for the school
☐ Other, specify:

e. How is the food transported to the school?

☐ Delivered by the local supplier
☐ Transported by food buyer
☐ Agreed to a pick-up point with local supplier
☐ Other, specify:

3. Considering local food purchases:

[a] Reservation set-asides allocate a quota of government purchases to a specific category of supplier. Set-asides segregate competition, as targeted suppliers only compete with each other.
Reservation qualification criteria mean that suppliers that do not meet specific criteria are excluded from the procurement process, reserving the entirety of government purchases to one category of supplier.
With reservation subcontracting conditions, governments do not make purchases directly from targeted suppliers; instead, they establish a fixed quota which must be subcontracted or procured from targeted suppliers or producers.
With preferencing, bid price preferences, bids from targeted suppliers are discounted by a set of percentage points in order to make them more competitive. Alternatively, bid prices from non-preferred suppliers are increased by a set of percentage points.
Preferencing award criteria assign additional points or weights at the bid evaluation stage to bids from targeted suppliers or that meet specific socioeconomic or environmental criteria. For all definitions, see FAO and DEVCO (2018).

a. Does your government impose a minimum share of food to be sourced from local suppliers?

☐ Yes ☐ No ☐ Do not know

b. If yes, what is the percentage? *(Input the value as a percentage.)*

4. Considering the current school year:

a. How much percent of the food you buy is from local suppliers? *(Input value as a percentage.)*

b. What legal documents do local suppliers need to supply the school?

☐ Legal invoice
☐ Tax number
☐ Other, specify: _____

c. When did you pay local suppliers?

☐ Upfront payment
☐ At the order date
☐ At the delivery date
☐ After *(input number of days)* ___ of the order date
☐ After *(input number of days)* ___ of the delivery date
☐ Other, specify: _____

5. Do you use information and communication technologies to source food from suppliers, including local suppliers and other suppliers?

☐ Yes ☐ No

a. If yes, can you provide a brief description of the system?

5B-IV. Food purchase management

This section collects more detailed information related to food procurement. The information collected will be used to get an estimate of how much money can be allocated to procure fish and fish products from local suppliers.

1. Considering the current school year:

a. Which food groups did you source from local producers? *(Check all that apply.)*

Grains, cereals	☐	Green, leafy vegetables	☐
Roots, tubers	☐	Other vegetables	☐
Legumes, nuts	☐	Fruits	☐
Dairy products	☐	Oil	☐
Eggs	☐	Salt	☐
Meat	☐	Sugar	☐
Poultry	☐	Other	☐
Fish	☐		

b. Why did you source [*fill in each of the food groups provided in response to* ***Question 5B-IV.1.a***] from local suppliers?

☐ Ability of local smallholders to supply a given food
☐ Demand for food of school feeding programme
☐ Price of food from local smallholders
☐ Other, specify: _____

Note: Ask *Question 5B-IV.1.b* for all food groups provided in response to *Question 5B-IV.1.a.*

2. Recalling last month's activity:
   a. How many days have you served meals to students? *(Input value in days.)*
   b. How many times per day have you served meals? *(Input answer here.)*
   c. How much in total (per month for all students) did you spend on purchasing food? *(Input value in local currency, and precise exchange rate in USD.)*
3. From the animal-source protein listed below:

   ☐ Chicken ☐ Beef ☐ Goat ☐ Sheep ☐ Pig
   ☐ Other, specify: _____

   a. Which one is served at school? *(Check all that apply.)*
   b. Considering [*fill in the food mentioned in response to* ***Question 5B-IV.3.a***]:
      i. How many times a week is it served? *(Input answer here.)*
      ii. Approximately, how many grams are served per student for each meal?
      iii. Approximately, how much it cost per kg? *(Input value in local currency, and precise exchange rate in USD.)*

Note: Ask *Question 5B-IV.3.b* for all food mentioned in response to *Question 5B-IV.3.a.*

4. Recalling last month's activity:
   a. Which micronutrient-rich foods were served to school-aged children and adolescents?
   b. Considering [*insert each of the foods cited in response to* ***Question 5B-IV.4.a***]:
      i. For which recipe do you usually use it?
      ii. Considering [*insert each of the recipes cited in response to* ***Question 5B-IV.4.b.i***]:
         – How many times a week do you serve it?
         – For one preparation of this recipe, how many grams of [*insert food cited in response to* ***Question 5B-IV.4.b.ii***] is needed? (*Input answer here.)*
         – How much does [*insert food cited in response to* ***Question 5B-IV.4.b.ii***] cost per kg? *(Input value in local currency, and precise exchange rate in USD.)*
         – What other food is included in this recipe? And how many grams of each food was used? How much does each food cost per kg?

Note: Ask *Question 5B-IV.4.a* for all food listed.

5. If you or your school/purchasing agent were to incorporate fish into the school meal, how much per kg would you be willing and able to pay for the fish and fish products? (*Input value in local currency, and precise exchange rate in USD.)*[b]
6. Recalling last month's activity, was there any change in the meal contents, compared to what was planned? If yes, why the planned meal was not served?

[b] If not available, please ask the interviewee where or from whom the information can be retrieved.

5B-V. Food safety

This section collects information related to food safety. *The information collected will be used to assess the capacity of the school to serve safe fish at school.*

1. How do you ensure the quality and safety of food supplied to the school?
2. Is there any nationwide system for monitoring school feeding programmes?
   a. Does the system include the following components? *(Check all that apply.)*

   ☐ School visits ☐ Electronic reporting ☐ Paper reporting
   ☐ Other, specify ☐ None

   b. How often do [*fill in with each answer from* ***Question 5B-V.2.a***]

   ☐ Monthly ☐ Quarterly ☐ Biannually ☐ Annually ☐ Other

Note: If the answer from *Question 5B-V.2.a* is None, go to the next section. Ask *Question 5B-V.2.b* for all answers provided in response to *Question 5B-V.2.a*.

5B-VI. Feasibility of the incorporation of locally procured fish and fish products into home-grown school feeding

This section collects information related to the perception of the interviewee about the incorporation of locally procured fish and fish products into HGSF. The information collected will be used to identify the steps required to incorporate new recipes with fish, and assess the willingness of the local authorities to support the project.

1. What are the main steps to incorporate a new recipe?[c]
2. Who is responsible for [*fill in with each of the steps from* ***Question 5B-VI.1***]?

Note: Ask Question 5B-VI.2 for all steps from Question 5B-VI.1.

3. Is the school willing to work with small-scale fisherfolk and their organization?

   ☐ Yes ☐ No ☐ Do not know
   If No, explain_____

4. Does the school serve fish or plan to incorporate fish into the HGSF programme?

   ☐ Yes ☐ No

5. What do you think about incorporating fish into HGSF? What concerns do you have? What opportunities do you see?

5B-VII. Women empowerment

This section collects information related to women's contribution to school feeding programmes. The information collected will be used to generate gender-transformative interventions.

1. Considering the current school year:
   a. How many local suppliers do you have?
   b. Out of these [*insert answer from* ***Question 5B-VII.1.a***], how many are women?
   c. What are the challenges when connecting local women suppliers to school feeding programmes?

[c] If not available, please ask the interviewee where or from whom the information can be retrieved.

2. Considering the current school year:
    a. How many staff do you have to run the school feeding programme?
    b. Out of these [*insert answer to* ***Question 5B-VII.2.a***], how many are women?
    c. What is their role in the school feeding programme?
    d. What challenges do they face during their work?
    e. How much (per day) do they get paid? *(Input value in local currency, and precise exchange rate in USD.)*
    f. How much (per day) do men staff get paid if they do the same tasks? *(Input value in local currency, and precise exchange rate in USD).*

TOOL 6. Guiding questions for nutrition situation analysis

Guiding questions:

1. What are the malnutrition issues faced by school-aged children and adolescents?
2. Can you talk about the causes of these malnutrition issues? Please highlight the contribution of food access (affordability, availability), diet characteristics and diet gaps, and food environment to these issues.
3. To which of these food groups did school-aged children and adolescents have access (at home)? *(Check all that apply.)*

☐ Grains, cereals	☐ Dairy products	☐ Oil
☐ Roots, tubers	☐ Eggs	☐ Salt
☐ Legumes, nuts	☐ Meat	☐ Sugar
☐ Green, leafy vegetables	☐ Poultry	☐ Other
☐ Other vegetables	☐ Fish	
☐ Fruits		

   a. In a week, how often do they eat [*insert each food group cited in response to* ***Question 3***] *?*

4. Which of these food groups are not accessible to school-aged children and adolescents (at home)? Please explain why.

☐ Grains, cereals	☐ Dairy products	☐ Oil
☐ Roots, tubers	☐ Eggs	☐ Salt
☐ Legumes, nuts	☐ Meat	☐ Sugar
☐ Green, leafy vegetables	☐ Poultry	☐ Other
☐ Other vegetables	☐ Fish	
☐ Fruits		

5. Do you agree with this statement? "Fish and fish products are affordable food for local households."

   ☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree
   – Please explain your answer.

6. Do you agree with this statement? "Fish and fish products are widely available at the market."

   ☐ Strongly agree ☐ Agree ☐ Moderately agree ☐ Disagree ☐ Strongly disagree
   – Please explain your answer.

7. How does the local household perceive fish compared to other foods (quality, preference, taste, norms and taboos, care and feeding practices, etc.)?

Data sources: Information is collected from key informants, including ministry of health representatives, nutritionists, local health centres, etc.

TOOL 7. Guidelines for sensory evaluation

Tool 7 includes an acceptability trial and plate waste assessment (to assess the leftovers or lack thereof during the acceptability trial) to complete the sensory evaluation.

Note that:

- The incorporation of new recipes will comply with existing nutrition guidelines and standards of the target country (if any).
- An acceptability trial and plate waste assessment are not required if a fish recipe book reflecting the tastes and preferences of the target school-aged children and adolescents preferences is available. Nevertheless, microbiological analysis is always recommended before the incorporation of fish and fish products into HGSF.
- School-aged children and adolescents accept a recipe if they consume more than 75 percent of the food served (Konyole *et al.*, 2012);
- It is necessary to ensure that food products served in acceptability trials are tested for safety. If the product is available on the market and has already been certified compliant with food safety standards, it can be used. If not, it is necessary to conduct microbiological analyses[d] to ensure their safety.
- It is necessary to obtain clearance from the parents or caregivers of school-aged children and adolescents to participate in the acceptability trial (see Tool 8).

To conduct the sensory evaluation, the following human capital is needed:

- ***Coordinator.*** The coordinator coordinates tasks, manages logistics and deliverables, assigns tasks, monitors activity, prepares the sensory evaluation, etc. The coordinator reports to upper management.
- ***Facilitators.*** These monitor sensory evaluation under the supervision of the coordinator. At least four facilitators are needed: one to monitor girls during the acceptability trial and one to monitor boys; and one facilitator to monitor the plate waste assessment for girls, and one to monitor the plate waste assessment for boys. Facilitators report to the coordinator.
- ***Third party.*** These third party actors (such as universities, food safety authorities or others with laboratory facilities) perform the laboratory analysis (microbiological and nutrient analysis). The third party reports to the coordinator.
- ***Caregivers.*** Caregivers assist the youngest children during the sensory evaluation. Caregivers are in constant communication with facilitators during the sensory evaluation.
- ***Target school staff and school meal preparation committee.*** These prepare and serve the meal.
- ***Trainers.*** Trainers train food handlers (if necessary), enumerators and facilitators.

The sensory evaluation is completed through:

- An acceptability trial to select recipes to serve to school-aged children and adolescents by evaluating their preferences following taste, smell, touch, etc.
- Plate waste assessment, to select recipes to serve school-aged children and adolescents by evaluating the leftovers (or lack thereof) from the acceptability trial.

[d] Microbiological analyses must be conducted in a certified laboratory to assess the safety of the fish and fish products (heavy metal and microbiological) and the nutritional value of the fish in terms of protein and micronutrient composition (such micronutrients being calcium, iron, zinc, iodine, retinol, vitamin D3, vitamin B12, EPA fatty acids and DHA fatty acids). This analysis is called the nutrition composition analysis. Microbiological analyses can be done with the collaboration of a third party.

Preparation for the acceptability trial

1. Obtain clearance documents from local authorities

The sensory evaluation is an experimental process conducted with school-aged children and adolescents. Therefore, it is necessary to obtain clearance from:

- the ministry of health;
- the school feeding programme lead agency;
- the target school; and
- the local authority for education.

Besides clearance documents, users are recommended to obtain information on the minimum quality standard requirements for food served by the school feeding programme.

2. Select recipes to test

a. *Select fish species and forms*: The users, the target school representative and stakeholders will select the fish species and forms according to the following criteria:

- **Compliance with school meal nutrition standards and recommendations:** if standards exist, users must follow those established in recipe elaboration.

If no school meal nutrition standards or recommendations are available, the toolkit proposes the following criteria to support users in selecting recipes:

- **Availability:** produced by local fisherfolk with a surplus or with the opportunity for development (refer to Tool 4A, Section VII);
- **Feasibility:** profitable for local fisherfolk and affordable for home-grown school feeding (HGSF) (refer to Tool 12 for general guidelines to estimate production cost);
- **Convenience:** easy to incorporate into the existing menu, i.e. do not add to the work of the target school's food handlers (refer to Tool 10);
- **Ingredients:** the recipe should follow the principles of a healthy diet, and avoid excess ingredients such as oil, salt and sugar.

b. *Quality assessment*: After selecting fish species and forms, a quality assessment of the food item is done. The quality assessment ensures that the fish and fish products supplied meet the minimum sanitary standards and avoid foodborne diseases. However, if the local fisherfolk fail to meet the HGSF standards, users can source from other suppliers. Note that this is only recommended during the sensory evaluation. In the long term, intervention options (see Section 2.3.5) are needed to support local fisherfolk in meeting the HGSF programme requirements.

c. Elaborate on the recipes. Criteria to consider are:

- **Feasibility:** the cost is within the HGSF programme budget (refer to Tool 12 on the estimated budget allocated to buy fish from local fisherfolk).
- **Culturally acceptable:** the recipes respect all habits and customs of the target population (refer to Annex 1).
- **Ease of use (refer to Tool 9):** adding fish does not add to the work of school feeding programme workers. To this end, users will identify the existing menu, which can be used as a baseline to understand how fish can be incorporated into the existing recipes (as a substitute or complement).

3. Set sample size

Ideally, the sample size is no lower than 20 percent of the target school capacities. However, the sample size can be adapted following the feasibility assessment. It is recommended to have a half-boy-half-girl sample and representation of every age group (in other words, the sample ensures representation from all sections of the school). Finally, the school-aged children and

adolescents to be selected must be: with no known fish allergens; have no infections or congenital disorders; and be capable of swallowing foods. Learners with infections such as diarrhoea, sporadic cold or fever, sore throat, stomach flu and headache are to be excluded from the study (Chidziwisano *et al.*, 2019). Sickness leads to loss of sensory acuity, loss of appetite, and eating less than usual or nothing at all.

4. Obtain clearance from parents or caregivers

Once the maximum sample size has been set, the toolkit user will apply for clearance from parents or caregivers. Users can use Tool 8 or any means that the target school uses to share information with parents and caregivers.

5. Prepare logistics and train facilitators

This step consists of checking for the logistics, human capital, and product requirements needed for the sensory evaluation. This step involves:

Verification

- In particular:
  - the quantity of fish and fish products is enough;
  - quality standards required are met; and
  - school logistics are adequate (see Table A1.1).

If these conditions are not met, users can support local suppliers in meeting the quality standards or increasing their production to meet the quantity demanded for the sensory evaluation (for example, the raw materials needed to make fish powder can be sourced in the local market, if the quantity of fish powder produced by the women's organization involved is not enough).

Training

- This serves to ensure that facilitators, teachers, school feeding programme staff and caregivers have the skills needed to support the sensory evaluation. Examples include food handling, feedback sheet filling (sensory attributes and texture), supervision of children, etc.

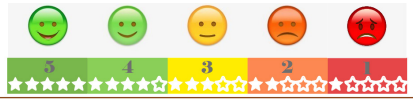
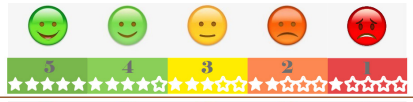
Table A1.1. Proposed logistics for the acceptability trial

	Same-day test	Two-day test
Sample	Different sample group	Same sample group
Logistics	Two separate lunch rooms for the evaluation (one for regular school feeding programme [SFP] without fish, one for meals with fish)	Two separate rooms for the evaluation (one for regular school feeding programme, one for tasting trial)
Human capital	Double what is needed for a two-day test	Caregiver, facilitator, moderator
Meal preparation	One preparation per day	One preparation per day
Advantage	Time-saving Less expensive	Requires less human capital Less workload per day
Disadvantages	The logistics may be challenging Plate waste assessment may be challenging	Include two-round trips or hotel facilities and security May be more expensive

6. Conduct the acceptability trial

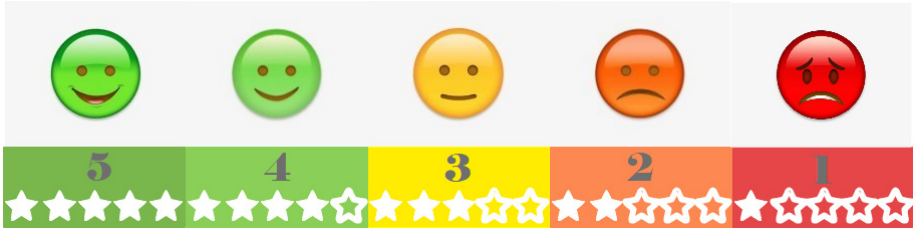
a. Scoring sheet

Users can use the following materials to collect data from school-aged children and adolescents.

Age: Gender: ☐Girl ☐Boy	
Choose the face that represents what you think about the dish you tasted	
Appearance	
Colour	
Smell	
Taste	
Texture	
What did you like most in the preparation: What did you not like in the preparation:	

Usage note: Figure A1.1 is used to assign a score to the smiley faces.

Figure A1.1. Supporting materials to convert smiley faces into scores



Note: The material is to be translated into the local language.

Methodology for plate waste assessment

Third-party and school feeding staff will:

– Before lunchtime:

- check if the fish powder used was accurately added during the preparation of the meal;
- weigh the recipe without fish and record the weight; and
- weigh the recipe with fish and record the weight.

Methodology 1

– During lunchtime:

- all school-aged children and adolescents will receive the same quantity of food; and
- facilitators and caregivers will assess the behaviours of school-aged children and adolescents, in particular the eating behaviours (eating as normal, reluctant, etc.), verbal or non-verbal anchors (smiles, words such as “super good” to “super bad”; “smells good” to “smells bad”, etc.).

- After lunchtime:
  - the collection of leftovers is coordinated (placed in one container at the end of lunch when children give back plates);
  - the leftovers are weighed separately (for both fish recipes and ordinary recipes); and
  - it is checked if some dishes were left aside on the table.

Methodology 2

- During lunchtime:
  - provide all school-aged children and adolescents with the same quantity of food (to be weighed and recorded);
  - facilitators and caregivers:
    - assist the school-aged children and adolescents during lunchtime, and if they stop eating, the facilitators and caregivers should wait for 30 seconds and encourage them to consume a second time;
    - if they refuse, wait for 30 seconds, and encourage them to consume a third time;
    - if they refuse, collect the plate and weigh the leftovers.
  - facilitators and caregivers assess the behaviours of school-aged children and adolescents, in particular the eating behavioirs (eating as normal, reluctant, etc.), and verbal and non-verbal anchors (smiles, words such as “super good” to “super bad”; “smells good” to “smells bad”, etc.).

TOOL 8. Template letter to obtain clearance from parents

Dear Parents,

As a part of the efforts of our school feeding programmes to improve the quality and nutritional value of our school meals, our school, with the assistance of the Food and Agriculture Organization of the United Nations (FAO) is about to incorporate fish into the school menu. As part of this project, we are calling for your valuable help to identify the best way possible to incorporate fish into our school meals. For this purpose, our school and FAO are organizing a sensory evaluation involving our students to taste healthy and nutritious recipes using fish products and our normal recipes. The sensory evaluation was cleared by all entities involved and now requires your agreement in order to go forward.

For more information, the fish species to be tested is [add species here], and it will be incorporated into our daily porridge in the form of fish powder processed by [entity].

If you would like any additional information, please feel free to ask us in person at school or call [phone number].

If you agree that your kids participate in the sensory evaluation, please return the following form to us before [date].

I,_____(input name), parents/tutor of (input student name)_____ agree that he/she will participate in the sensory evaluation. If you agree, please note below if the students have any cultural or religious beliefs to be respected.

School feeding programme lead agency seal and signature	Ministry of health seal and signature	Target school seal and signature	FAO seal and signature
We place your child's health and well-being above everything.			

Parent signature/fingerprints
Date:

Notes: Students who were recently ill from diarrhoea, cold or fever, sore throat or headache, or who have an allergy, cannot participate. You can withdraw your child at any time, without penalty to you or your child.

When sharing this letter with students, the teacher or school staff must let students know that the school can assist parents who have difficulty reading to fill out the form.

Note: The letter is to be translated into the local language.

TOOL 9. Guidelines for caregiver perceptions

Participants: Caregivers of school-aged children and adolescents who participate in the acceptability trial

Methodology

The methodology proposed is the following:

- The caregivers' perception analysis consists of a focus group discussion and an acceptability trial.
- This methodology is to be completed on the basis of voluntary participation.
- Questions are to be translated into the local language, tested and culturally adapted before undertaking the focus group discussion.

Results presentation: The results are summarized in a report.

General information: General information on the caregivers is collected

Relationship with the student:
Employment:
Age:
Gender:
Education level:
Marital status:
Number of children:
Occupancy/work:

Guiding questions

1. How often do you eat fish in your household?
2. If you do not eat fish, can you explain why?
3. If you do eat fish:
   a. How many days do you eat fish in a week? (Mention number of days.)_____
   b. If fish is not eaten in a week, mention the number of days it is eaten in two weeks (_____) or in a month (_____).
   c. How many kg of fish do you use in one preparation?
   d. How many members are there in your household?
   e. Does every member eat fish when you serve fish at home? If not, why?
4. Do you agree with this statement: "Fish and fish products are affordable food for local households."

☐ Strongly agree ☐Agree ☐Moderately agree ☐Disagree ☐Strongly disagree

- Please provide a brief explanation for your answer.

5. Do you agree with this statement? "Fish and fish products are widely available at the market."

☐ Strongly agree ☐Agree ☐Moderately agree ☐Disagree ☐Strongly disagree

- Please provide a brief explanation for your answer.

6. How do you perceive fish compared to other foods (quality, preference, taste, norms and taboos, care and feeding practices, etc.)?
7. In your opinion, what is the best age to introduce fish to your child? Please describe the reasons for your answer.
8. How do you feel about adding the [insert fish and fish products to be tested, such as fish powder] to the school feeding menu? Do you think it is a good idea or a bad idea? Please describe the reasons for your answer.

9. Do you have any concerns about [insert fish and fish products to be tested, such as fish powder] and its impact on your child? If so, please describe the reasons for your answer. Do you think other family members or community members have concerns about [insert fish and fish products to be tested, such as fish powder] for small children?
10. What do you understand to be the health and nutrition benefits of small fish for children?
11. Do you think that the home-grown school feeding programme should continue to provide fish to your child? If not, why not?

Screening for allergens (to be performed before the acceptability trial when obtaining clearance from parents)

1. Does the child have any symptoms of [insert fish and fish products to be tested, such as fish powder] allergy?
2. If yes, what are the symptoms?

☐ Rash ☐ Diarrhoea after eating ☐ Vomiting ☐ Other, specify: _____

3. Has the child ever had symptoms of fish allergy?
4. If yes, what are the symptoms?

☐ Rash ☐ Diarrhoea after eating ☐ Vomiting ☐ Other, specify: _____

5. In the past seven days, has the child been ill?
6. In the past seven days, has the child taken any medication?
7. Does the child have any difficulties in swallowing?

Acceptability trial (best held the same day as the acceptability trial of school-aged children and adolescents)

Age: Gender: ☐Woman ☐Man Sample code:	
Choose the face that represents what you think about the dish you tasted	
Appearance	
Colour	
Smell	
Taste	
Texture	
What did you like most in the preparation: What did you not like in the preparation:	

– At the end of the tasting, please rank the dishes in order of preference, 1 being the most preferred.

#	Sample code	Rank
01		
02		
03		
04		

TOOL 10. Guiding questions for ease-of-use assessment

Goals: To assess if the incorporation of fish and fish products into the HGSF programme adds to the work of the school feeding programme (SFP) staff. Also, it helps to assess their experience when incorporating fish into the meals.

Participants: school feeding programme staff, cook, food handler

Methods: Semi-structured interview

General information: General information on the cook or food handler is collected.

Age:
Gender:
Education level:
Marital status:
Number of children:
Occupancy/work:

Guiding questions: Do you agree with the following statements? Please explain why.

1. I found the fish [or FISH PRODUCT] easy to use.

☐Strongly disagree ☐Disagree ☐Moderately agree ☐Agree ☐Strongly disagree
Why?

2. I found the fish [or FISH PRODUCT] easy to store.

☐Strongly disagree ☐Disagree ☐Moderately agree ☐Agree ☐Strongly disagree
Why?

3. The fish [or FISH PRODUCT] I was provided with was culturally appropriate for my community.

☐Strongly disagree ☐Disagree ☐Moderately agree ☐Agree ☐Strongly disagree
Why?

4. Adding fish [or FISH PRODUCT] to the recipes did not increase the time needed to prepare the dish.

☐Strongly disagree ☐Disagree ☐Moderately agree ☐Agree ☐Strongly disagree
Why?

5. Adding fish [or FISH PRODUCT] to the recipes did not increase the time needed to distribute the meal.

☐Strongly disagree ☐Disagree ☐Moderately agree ☐Agree ☐Strongly disagree
Why?

6. The menu with fish [or FISH PRODUCT] is more expensive than our existing menu.

☐Strongly disagree ☐Disagree ☐Moderately agree ☐Agree ☐Strongly disagree
Why?

TOOL 11. Scoring sheet to assess the quality of facilities and infrastructure

Methodology: Visit the processing centre of the potential suppliers with the panel of experts and involved entities (ministry of health, bureau of standards, stakeholders). This tool provides an assessment of the landing site and of handling during transportation. Furthermore, this is a physical observation of the infrastructure and a short interview of key informants.

Goals: To assess the general quality of the food environment.

Period of usage

- The assessment of facilities and infrastructure is done before the sensory evaluation. If there is no sensory evaluation, the assessment is done before the incorporation of fish and fish products into the HGSF programme.
- Tool 11 can be also used by schools as a tracing document to assess the process through which the fish and fish products went. Therefore, the school may require such documents from local fisherfolk before procuring fish and fish products.

Participants: Users

LANDING SITE						
Score	1	2	3	4	5	Comments
Condition	Very bad	Bad	Moderate	Good	Very good	
The fish are laid out at an acceptable level from the ground.						
The landing site has road or railway access to the landing site.						
The landing site has access to clean water.						
The landing site has an adequate cleaning table.						
The landing site has access to electricity.						
The landing site is clean and has a good hygiene level.						
The landing site has dedicated spaces to prepare fish (gutting, washing, etc.).						
The landing site has washing and sorting tables.						
The landing site is bird-proof, insect-proof and animal-proof.						
The waste management facilities are adequate (dedicated spaces for waste, no accumulation of waste of any sort, etc.).						
Toilet facilities separated from the handling area and with no direct access to fish, are available to the fish handlers.						
Fishing vessels use ice on board, fishers have good handling practices, and adequately store fish on board to avoid infestation from insects, animals, etc.						
The landing site has storage facilities with ice and/or production of ice (that the ice is produced with potable water should be another point).						
The landing site has adequate lighting.						
Food handlers wear clean protective clothing, cover their hair, wear boots and follow good hygiene practices.						
Food handlers and staff receive regular training on food hygiene and handling practices.						
The landing site has a well-defined cleaning and disinfection schedule.						
The landing site uses labels and record keeping for cleaning and disinfection, and a recall system when needed.						
				Total	**/90**	

Total score:
1–18 very bad; 19–36 bad; 37 to 54 moderate; 55 to 72 good; 73 to 90 very good

TRANSPORTATION TO THE PROCESSING FACILITY						
Score	1	2	3	4	5	Comments
Condition	Very bad	Bad	Moderate	Good	Very good	
From the landing site to the processing facility						
Food handlers wear clean protective clothing and gloves, cover their hair, and wear boots at all stages of transportation.						
Food handlers follow good hygiene practices.						
Food handlers and staff receive regular training on food hygiene and handling practices.						
Fish are protected from insects, animals and pests.						
Food handlers use ice to transport fresh fish.						
The containers used by food handlers are clean.						
Food handlers have well-defined cleaning and disinfection schedules for all materials that are in contact with fish.						
Food handlers use labels and record keeping for cleaning and disinfection of all materials that are in contact with fish; and a recall system when needed.						
Fish are not transported together with hazardous elements and other foods that may cause cross-contamination.						
Fish are transported in separated batches, to avoid cross-contamination if some batches are contaminated.						

Total score:
1 to 10 – very bad; 11 to 20 – bad; 21 to 30 – moderate; 31 to 40 – good; 41 to 50 – very good

PROCESSING PLANT						
Score	1	2	3	4	5	Comments
Condition	Very bad	Bad	Moderate	Good	Very good	
All surfaces with which fish and fish products are in contact are made of corrosion-resistant materials, lighted, smooth, and easy to clean impervious materials.						
The processing plant has access to clean and potable water for all processing lines.						
The water drainage of the processing centre is adequate (for example, no apparent puddles are observed).						
Non-potable water lines and potable water lines are separated.						
The processing plant has storage facilities with ice and/or production of ice (that the ice is produced with potable water should be another point).						
The processing centre is well ventilated and windows are insect-proof, bird-proof and pest-proof.						
The processing plant is bird-proof, insect-proof and animal-proof (that is, there are no hidden spaces for pests).						
Waste management is adequate (dedicated spaces for waste, no accumulation of waste of any sort, etc.).						
Toilet facilities separate from the handling area and with no direct access to the production area exist, and are available to fish handlers.						
Food handlers wear clean protective clothing, cover their hair, and wear boots at all stages of processing, and follow good hygiene practices.						
The processing centre has a well-defined cleaning and disinfection schedule.						
The processing centre uses labels and record keeping for cleaning and disinfection, and a recall system when needed.						
Food handlers and staff receive regular training on food hygiene and handling practices.						
				Total	**/65**	

Total score:
1 to 13 – very bad; 14 to 26 – bad; 27 to 39 – moderate; 40 to 52 – good; 53 to 65 – very good.

TRANSPORTATION TO SCHOOL						
Score	**1**	**2**	**3**	**4**	**5**	**Comments**
Condition	**Very bad**	**Bad**	**Moderate**	**Good**	**Very good**	
From the processing facility to the school						
Food handlers wear clean protective clothing, gloves, cover their hair, and wear boots at all stages of transportation.						
Food handlers follow good hygiene practices.						
Food handlers and staff receive regular training on food hygiene and handling practices.						
Fish and fish products are protected from insects, animals and pests.						
The packaging is well-sealed and insect-proof, pest-proof and animal-proof.						
The container used by food handlers are clean.						
Food handlers have well-defined cleaning and disinfection schedule for all materials that are in contact with fish.						
Food handlers use labels and record keeping for cleaning and disinfection of all materials that are in contact with fish; and use a recall system when needed.						
Fish are not transported with hazardous elements and other foods that may cause cross-contamination.						
Fish are transported in separated batches to avoid cross-contamination, if some batches are contaminated.						
				Total	**/50**	

Total score:
1 to 10 – very bad; 11 to 20 – bad; 21 to 30 – moderate; 31 to 40 – good; 41 to 50 – very good.

SCHOOL						
Score	**1**	**2**	**3**	**4**	**5**	**Comments**
Condition	**Very bad**	**Bad**	**Moderate**	**Good**	**Very good**	
From the processing facility to school						
Food handlers wear clean protective clothing, gloves, cover their hair, and wear boots at all stages of transportation.						
Food handlers follow good hygiene practices.						
Food handlers and staff receive regular training on food hygiene and handling practices.						
Fish and fish products are protected from insects, animals and pests.						
The school has storage facilities that are insect-proof, pest-proof, and animal-proof.						
Storage facilities are clean with a good waste management system.						
The school has a well-defined cleaning and disinfection schedule for all spaces in contact with food.						
Food handlers use labels and record keeping for cleaning and disinfection of all spaces in contact with food; and use a recall system when needed.						
Fish are not stored with other products (they are kept in different containers or a dedicated space) to avoid cross-contamination.						
The school has a labelling and record-keeping system to keep track of the perishability of the products, and use a recall system when needed.						
				Total	**/50**	

Total score:
1 to 10 – very bad; 11 to 20 – bad; 21 to 30 – moderate; 31 to 40 – good; 41 to 50 – very good.

TOOL 12. Guidelines to estimate the minimum quantity of fish and fish products needed

Goals: This tool helps to estimate the minimum quantity of fish and fish products needed per school.

Methodology

First, if nutrition standards or guidelines recommend or require a certain frequency or quantity of fish consumption, users can use the formula:

$$\textit{Quantity needed per school per week} = \textit{Recommended quantity per student per serving} \times \textit{Recommended number of servings per week} \times \textit{Number of students}$$

If there is no such recommended or required frequency and quantity, users can adapt the above formula. The methodology proposed is as follows.

Guiding questions

The target school responsible collects the information required to estimate the quantity needed per school per week using **Tool 5B** (Sections II and IV).

Estimation: If there is no recommended or required frequency and quantity of fish consumption, this toolkit proposes serving 50 grams (g) to 100 g of raw edible parts of fish at least two times a week. Note that for fish products such as dried fish or fish powders, the quantity is lower and must be set with a nutritionist. Furthermore, the quantity needed varies according to age and weight. Thus, this toolkit uses the average value (75 g) as a baseline for estimation. Thus, the minimum quantity per school per week is:

$$\textit{Minimum quantity needed per school per week, or } 75\ g \times 2 \times \textit{Number of students}$$

To obtain the minimum quantity needed by each school for a school year, the toolkit user will multiply the minimum quantity needed per school per week by the number of weeks in one school year.

$$\textit{Minimum quantity needed per school year} = 75\ g \times 2 \times \textit{Number of students} \times \textit{Number of weeks in a school year}$$

TOOL 13. Guideline to estimate production cost

Guiding questions

The information to estimate the production cost are from Tool 4.

The production cost is equal to the total cost of all inputs used for the production of processed fish. The cost includes:

- **Cash costs**: the cost of all purchased raw materials (fresh fish, salt, woods or fuel to smoke fish, etc.), hired labour, rented equipment used for one processing cycle.
- **Non-cash costs:** the cost of owned raw materials and unpaid labour used during one processing cycle. The monetary value of non-cash cost is estimated using the local market average price.
- **Capital costs:** the depreciation cost of owned equipment. Since the equipment's lifetime is relatively long and equipment can be used multiple times (for example, smoking kiln can be used for numerous processing cycles), the depreciation cost is used to estimate capital cost.
- **Farm overhead costs:** the costs of fishing licenses and membership fees. Note that these fees are generally paid on a yearly or monthly basis. Therefore, users should convert them in days.

$$\textit{Farm overhead cost per day} = \frac{\textit{(Annual fee)}}{263} \textit{ or } \frac{\textit{(Monthly fee)}}{22}$$

The global average working hour in a week is about 43.9 hours (ILO, 2022). Considering that one working day is equivalent to 8 hours, in this toolkit, it is considered that there are 263 working days in a year (ILO, 2022). Nevertheless, users can adapt these numbers according to the local context.

- **Land costs:** the land rents and taxes paid by processors if they rent land or the opportunity costs[e] if they own the land. The land cost is also converted into days.
- **Loss value:** the potential value of loss and waste during the processing cycle. It is the quantity of loss or waste multiplied by the unit selling price at the local market.

$$\textit{Loss Value} = \textit{Quantity lost in kg} \times \textit{unit selling price in kg}$$

Notes

- **Time unit:** It is recommended that users adopt the same time unit when estimating the production cost.

Table A1.2. Time conversion table

Time unit	Working days
Hour	(Number of hours)/8
Week	Number of weeks×5.4
Month	Number of months×22
Year	Number of years×263

[e] The opportunity cost is the expected value (at local market price) of owned land if the processors rent their land.

– **Monetary unit:** if the answers collected are in the form of compensation, materials or other, users should estimate the monetary value of the latter based on local prices. However, for the final report, the monetary unit should always be converted to USD. Therefore, users should refer to the current exchange rate to convert the local currency amount into USD.

– **Total cost:** each cost is obtained using the product's unit price, multiplied by the quantity used. The total cost is obtained by adding up all costs.

– **Unit production cost:** the estimated production cost to produce 1 kilogram (kg) of processed fish.

Unit production cost = ***(Total production costs)/(Total output in kg)***

– **Environmental costs:** these account for environmental sustainability and can be useful to place an environmental weight (refer to Box A1.2). For that, the subjective weight methodology is used. Subjective weight determination is based on expert opinions, experiences and judgement.

Environmental cost = ***Unit production cost* Environmental weight***
Final cost = ***Unit production cost*** – ***Environmental cost***

BOX A1.2. GUIDING QUESTIONS TO SET ENVIRONMENTAL WEIGHT

1. What is the current stock status of the species? *(Circle the one that applies.)*

Score	-3	0	3	6
Status	Underfished	Normal	Maximum sustainably fished	Overfished

2. Is the species part of a protection or management plan or project? *(Circle the one that applies.)*

Score	0	2
Status	Yes	No

3. Do the processors use by-products? *(Circle the one that applies.)*

Score	-2	2
Status	Yes	No

Final weight determination: add up all circled answers and convert the points into weights using Table A1.3.

Table A1.3. Weight conversion table

Point	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10
	Positive impact on the environment				**Normal impact on the environment**				**Fully exploited**				**Highest impact on the environment**			
Weight	-0.5	-0.4	-0.3	-0.2	-0.1	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1

Box A1.3 provides an example of the estimation of the environmental cost and final cost including environmental sustainability.

BOX A1.3. A PRACTICAL EXAMPLE TO ESTIMATE THE FINAL COST WITH AN ENVIRONMENTAL COST

1. What is the current stock status of the species? Answer: Maximum zustainably fished -> score equal to 3

2. Is the species part of a protection or management plan or project? Answer: No -> score equal to 2

3. Do the processors use by-products? Answer: Yes -> score equal to -2

Total equal to 3+2+(-2) = 3. The equivalent weight from Table A1.3 is 0.3.

Let us assume that the unit production cost is equal to 1.50 USD per kg. Thus, the environmental cost is equal to USD 1.50*0.3 = USD 0.45

The final cost is equal to USD 1.50 – USD 0.45 = USD 1.05

TOOL 14. Guideline for cost–benefit analysis

The cost–benefit analysis enables assessment of the profitability and economic viability of the incorporation of fish and fish products into the HGSF programme.

Estimation of cost

The total cost of incorporation of fish and fish products into HGSF is the sum of:

- the budget to buy fish and fish products; and
- additional costs linked to additional infrastructure, training on food handling, etc.

Estimation of budget to buy fish and fish products

- **Method 1:** Estimation based on the current budget allocation of the target school

To estimate the cost allocated to buy fish, the toolkit proposes considering the current budget allocation of the school feeding programme (SFP). In other words, the cost of fish is expected not to exceed the current budget allocated to buy animal-source protein, micronutrients, and fatty acids per meal per student per week. However, it might be difficult to capture the exact cost of micronutrients for each meal. Thus, only protein is selected for the average budget per meal, because protein is the main (or most recognized) nutrient component of fish. However, to account for measurement errors, the toolkit proposes a margin of 10 percent, which allows to account for the cost of micronutrients and fatty acids. The margin can be adapted following the local context and according to the panel of expert recommendations.

$$\textit{Maximum budget allocated per week} = 1.10 \times \textit{Cost of animal-source protein per week}$$

The average budget for one serving of fish per meal can be obtained using the formula:

$$\textit{Budget per meal to buy fish} = \textit{(Maximum budget allocated per week)/(Total number of meals with animal sourced protein per week in the curent menu)}$$

- **Method 2:** Direct inquiries to the food purchase manager of the target school about the estimated budget they could allocate to buy fish and fish products

Estimation of cost of additional infrastructure, training

The costs of training and infrastructure are estimated based on the target country's past experiences and set with a panel of experts. However, as these are long-term investments, they are depreciated using the formula:

$$\textit{Cost of training per school year} = \textit{(Total cost of training)/(Average period food handlers work for SFP)}$$

Note that the average period food handlers work for the school feeding programme can be retrieved from school feeding programme managers at the target school level.

$$\textit{Cost of infrastructre} = \textit{(Total cost of infrastructure)/(Average lifetime of the infrastructure)}$$

Estimation of benefits

The benefits[f] of incorporating fish into HGSF programmes are given as follows:

$$\textit{Total benefit} = \textit{Social benefit} + \textit{Economic benefit} + \textit{Environmental benefit}$$

[f] User can refer to the WFP poster on cost-benefit analysis methodology for more information (WFP, 2016)

Note that here, the toolkit refers to benefits that are linked to the incorporation of locally procured fish and fish products into HGSF programmes. Thus, all measurement is done considering only the possible or expected effects that fish can bring to school-aged children and adolescents, the local community, etc. Box A1.4 provides some metrics – value transferred, return on household assets, etc. – that can be used to quantify the benefits. It is worth noting that these are only some of the benefits of the incorporation of fish into HGSF programmes, not an exhaustive list. Moreover, research on the advantage of incorporating fish into HGSF programmes is still lacking; the toolkit expects to contribute to fostering more research in the field.

BOX A1.4. BENEFITS OF THE INCORPORATION OF LOCALLY PROCURED FISH AND FISH PRODUCTS INTO HOME-GROWN SCHOOL FEEDING PROGRAMMES AND POSSIBLE MEASUREMENT

1. Social sustainability

Contributes to improving the performance of school-aged children and adolescents in school (Bath *et al.*, 2013; VKM, 2014) as fish consumption helps to avoid intelligence quotient (IQ) loss because of iron deficiency and iodine deficiency (around 6 points). Refer to Ahern *et al.* (2021) and scientific research evidence (Liu *et al.,* 2017).

Possible measurement

To estimate an approximation of the monetary value of education benefits, the toolkit proposes to use the average cost of one year of schooling per student in the target region. One year of school is equivalent to an increase of 1 to 5 IQ points (Ritchie and Tucker-Drob, 2018). Information can be collected from key information from the ministry of education.

Contributes to fighting micronutrient deficiencies such as vitamin B12, calcium, vitamin D, iodine, selenium and essential fatty acids in the omega-3 family (Aakre *et al*., 2020; Hasselberg *et al*., 2020; Reksten *et al.*, 2020), protein deficiencies (Ahern *et al*., 2021; Ahern, Thilsted and Oenema, 2021; Atikpo *et al.*, 2011) and providing easily digested protein (especially small dried fish) (Kolding, *et al*., 2020; Ryckman *et al*., 2021b, 2021a; Sigh *et al.*, 2018).

Possible measurement

To estimate an approximation of the monetary value of health benefits, the toolkit proposes:

Health benefit per year=(Money spent by adults treating non-communicable diseases in their lifetime)/ (Average life expectancy)

Information can be collected from key informants such as the ministry of health or local health centres. The formula is not used if the key informants already have an approximation of the money spent by adults treating non-communicable diseases per year. Note that since fish is not the only factor that contributes to preventing non-communicable diseases, it is strongly recommended to weight this value following expert recommendations. Thus, users should consult experts on the importance of fish in preventing non-communicable diseases.

Contributes to empowering women, for example providing economic support, as in the case of a Ghana project that targeted women farmers to supply food (Devereux, Sbates-Wheeler and Martinez, 2010). Also, it may open more opportunities and decision-making power (De Lara, 2020). This can be quantified by the increase in income that woman-headed local suppliers obtain through working with school feeding programmes.

BOX A1.4. *(continuous)*

2. Economic sustainability

The economic opportunity cost of consuming fish at school can be estimated using:
Number of days lost being sick, with the formula:

Cost of illness per year=(Number of days being sick from non-communicable diseases in their lifetime×Average daily salary per person)/(Average life expectancy)

Information can be collected from key informants from the ministry of health.

This formula is not used if the key informants already have an approximation of the number of days they are sick from non-communicable diseases per year.

Note that since fish is not the only factor that contributes to preventing non-communicable diseases, it is strongly recommended to weight this value following expert recommendations. Thus, users will consult experts on the importance of fish in preventing non-communicable diseases.

Deaths prevented per million people from the intake of eicosapentaenoic acid- (EPA) plus Docosahexaenoic acid (DHA): the metrics benefit the local economy as it provides an additional working force to the local communities.

Deaths prevented per million people (DP) (FAO and WHO, 2010)

$$DP=([EPA+DHA]\times 0.75\times X/7)/250\times 0.36\times D$$

- [EPA+DHA] is the total concentration of EPA+DHA in 100 g of fish (mg/g).
- The figure 0.75 is the estimated fish serving size (g) divided by 100. Note that this is only used if the nutrition guidelines/standards do not give any recommendation.
- X is the number of servings of fish per week (in days) (for example, two per week).
- The figure 0.36 is the proportional reduction in deaths by coronary heart disease, with reduction in deaths assumed to be linearly related to DHA intake up to 250 mg per day.
- D is the estimated number of deaths by coronary heart disease per million people (this can be sought from the local health centre or ministry of health)

Note that DP can also be directly queried from a local health centre or professional in the field.

To estimate the economic value of DP, DP is multiplied by the five-year average gross domestic product (GDP) per capita. Thus,

Economic value of DP per year=DP×Five-year average of GDP per capita

Value transfer cost: when school-aged children and adolescents eat enough fish (see Tool 12) at school, the capital used to buy fish is reduced at the household level. This capital can be used for other purposes.

Value transfer per year=yearly average cost of fish at the local market per kg ×minimum quantity needed per year

For example, if there is no recommended or standard minimum quantity, this is set following the toolkit recommendation of 75 g per serving, with a minimum of two servings per week. Thus, the minimum quantity needed per year is equal to approximately 8 kg.

The final economic benefit can be obtained from:

Economic benefit=cost of illness per year+economic value of DP per year+value transfer per year

It is worth noting that these metrics are flexible following the local context. Users can replace, add or modify the estimation procedures. As an illustration, users can capture economic benefits using the increase in the income of local suppliers working with HGSF programmes.

BOX A1.4. *(continuous)*

3. Environmental sustainability

Contributes to sustaining fish resources by promoting the consumption of underutilized species and by-products.

Reduces the pressure on natural resources and food and nutrition waste by promoting the consumption of underutilized species and underutilized parts of fish (bones, eyes, viscera, etc.) (Zhou, Smith and Knudsen, 2015).

The negative value of the environmental cost proposed in Tool 13 can be used as a metric.

For more detailed information on the cost–benefit analysis, users can refer to WFP, 2019b and 2019a.

Sources:

De Lara, C.B. 2020. School feeding: a unique platform to address gender unequalities. In: *Weltohnehunger*. Bonn, Germany. https://www.weltohnehunger.org/full-article/school-feeding.html

Liu, J., Cui, Y., Li, L., Wu, L., Hanlon, A., Pinto-Martin, J., Raine, A. & Hibbeln, J.R. 2017. The mediating role of sleep in the fish consumption – cognitive functioning relationship: a cohort study. *Scientific Reports*, 7(1): 17961. https://doi.org/10.1038/s41598-017-17520-w

Reksten, A.M., Somasundaram, T., Kjellevold, M., Nordhagen, A., Bøkevoll, A., Pincus, L.M., Rizwan, A.A.M. *et al.* 2020. Nutrient composition of 19 fish species from Sri Lanka and potential contribution to food and nutrition security. *Journal of Food Composition and Analysis*, 91: 103508. https://doi.org/10.1016/j.jfca.2020.103508

Ritchie, S.J. & Tucker-Drob, E.M. 2018. How Much Does Education Improve Intelligence? A Meta-Analysis. *Psychological Science*, 29(8): 1358–1369. https://doi.org/10.1177/0956797618774253

Ryckman, T., Beal, T., Nordhagen, S., Chimanya, K. & Matji, J. 2021a. Affordability of nutritious foods for complementary feeding in Eastern and Southern Africa. *Nutrition Reviews*, 79(Supplement_1): 35–51. https://doi.org/10.1093/nutrit/nuaa137

Ryckman, T., Beal, T., Nordhagen, S., Murira, Z. & Torlesse, H. 2021b. Affordability of nutritious foods for complementary feeding in South Asia. *Nutrition Reviews*, 79(Supplement_1): 52–68. https://doi.org/10.1093/nutrit/nuaa139

Sigh, S., Roos, N., Chamnan, C., Laillou, A., Prak, S. & Wieringa, F. 2018. Effectiveness of a Locally Produced, Fish-Based Food Product on Weight Gain among Cambodian Children in the Treatment of Acute Malnutrition: A Randomized Controlled Trial. *Nutrients*, 10(7): 909. https://doi.org/10.3390/nu10070909

WFP. 2019a. *School Feeding in Ghana. Investment case: Cost-Benefit Analysis Report*. Rome. https://docs.wfp.org/api/documents/WFP-0000108072/download/

WFP. 2019b. *Programme d'alimentation scolaire du Bénin Analyse Coût-Bénéfice*. Rome. https://docs.wfp.org/api/documents/WFP-0000114270/download/?_ga=2.194852909.105406457.1654567055-1261000064.1651575407

Zhou, S., Smith, A.D. & Knudsen, E.E. 2015. Ending overfishing while catching more fish. *Fish and Fisheries*, 16(4): 716–722. https://doi.org/10.1111/faf.12077

TOOL 15. Tracing documents

Methodology

The tracing document is filled by:

1. Fish processors when they buy fish. To fill out the documents, they will need the support of traders or fishers and to perform a physical quality assessment of the fish.
2. Fish processors when they process fish. The documents include information on quantity, process, handling, facilities and equipment used, and quality of the fish processed and the end products (metrics can be adjusted according to expert opinions).
3. The school when purchasing, storing and preparing fish and fish products.

To be fully effective, all tracing documents must be used together, which implies a full involvement of all actors.

Goals: To serve safe and healthy fish and fish products to school-aged children and adolescents.

Period of usage:

- During the purchasing of raw materials.
- During the processing of fish.
- During procurement activities (can be part of documents to ask from potential suppliers).
- During the preparation of fish.

Participants: Local fisherfolk, school feeding programme committee, traders or fishers (optional)

TRACING DOCUMENTS FOR FRESH FISH (filled by processors who buy fish only)

Date of purchase:	**Landing site name:**
Species name :	**Capturing site name:**
Quantity bought:	**Time of catch:**
Unit price:	**Time of landing:**

STORAGE EQUIPMENT ON BOARD

☐ Unique covered container ☐ Unique uncovered container ☐ Separated covered container

☐ Separated uncovered container ☐ Use of ice ☐ Clean boxes or bag

☐ Other, specify:

FISH HANDLING ON BOARD

☐Cleaned with clean freshwater ☐ Cleaned with seawater ☐ Gutted on board

☐ Other, specify:

FISH HANDLING DURING MARKETING PHASE

☐ Elevated uncovered market stall with ice ☐ Elevated uncovered market stall without ice

☐ Elevated covered market stall with ice ☐ Elevated covered market stall without ice

☐ Directly on the ground with ice ☐ Directly on the ground without ice

☐ Other, specify:

QUALITY ASSESSMENT

Note:
1. Check the answer that applies and circle the corresponding score
2. Input the sum of the score in the dedicated spaces

SKIN		
Appearance	**Quality**	**Score**
☐ Bright and shiny	Good	3
☐ Loss of brightness	Average	2
☐ Dull	Poor	1
☐ Dull, bleaching, shrunk	Spoiled	0

SLIME		
Appearance	**Quality**	**Score**
☐ Clear	Good	3
☐ Milky	Average	2
☐ Yellow clotting	Poor	1
☐ Brown, clotted	Spoilt	0

FIRMNESS		
Appearance	**Quality**	**Score**
☐ Firm flesh	Good	3
☐ Slightly firm	Average	2
☐ Slightly soft flesh	Poor	1
☐ Soft flesh	Spoilt	0

EYES		
Appearance	**Quality**	**Score**
☐ Round, clear	Good	3
☐ Flat, little, milky	Average	2
☐ Sunken, grey, middle	Poor	1
☐ Very sunken and cloudy	Spoilt	0

SMELL		
Appearance	**Quality**	**Score**
☐ Fresh, seaweedy	Good	3
☐ No odour	Average	2
☐ Musty	Poor	1
☐ Strong musty	Spoilt	0

GILLS		
Appearance	**Quality**	**Score**
☐ Bright red	Good	3
☐ Pink	Average	2
☐ Grey	Poor	1
☐ Brown	Spoilt	0

TOTAL SCORE:

Source: FAO. 2022d. *Take care of your catch*. Rome. https://doi.org/10.4060/cb8791en

TRACING DOCUMENTS FOR PROCESSED FISH (filled by processors)

Starting date of processing:	**Species name:**
End date of processing (*to get the end products*):	**Processing methods used:**
Processing centre name:	**Processing intermediary step:** 1
Processing centre address:	2

First processing (Fill more than one processing method was used)

Starting date:	**Quantity of raw materials (fresh fish)** :
End date:	Quantity of processed fish :
Processing methods used:	

Final processing (final processing methods)

Starting date:	**Quantity of raw materials** (processed fish from the first processing method):
End date:	**Quantity of processed fish:**
Processing methods used:	

STORAGE EQUIPMENT

☐ Unique covered container ☐ Unique uncovered container ☐ Separated covered container

☐ Separated uncovered container ☐ Dry storage room ☐ None

☐ Other, specify:

PROCESSING EQUIPMENT

☐ None (i.e. on the ground) ☐ Racks ☐ Raised racks ☐ Raised covered racks

☐ Traditional kiln ☐ Improved kiln ☐ oven

☐ Other, specify:

FISH HANDLING DURING THE MARKETING PHASE

☐ Elevated market stall with ice ☐ Elevated market stall without ice

☐ Elevated covered market stall ☐ Elevated uncovered market stall with ice

☐ Directly on the ground with ice ☐ Directly on the ground without ice

☐ Other, specify:

QUALITY ASSESSMENT (intermediary products, e.g. dried/smoked)

Note:
Check the answer that applies and circle the corresponding score
Input the sum of the score in the dedicated spaces

Colour

	Appearance	Quality	Score
☐	Golden brown	Good	2
☐	Dark brown	Average	1
☐	Black	Poor	0

Taste

	Appearance	Quality	Score
☐	Tasty	Good	2
☐	Bland	Average	1
☐	Sour/bitter	Poor	0

Physical state

	Appearance	Quality	Score
☐	Whole (head/tail intact)	Good	2
☐	Head/tail dangling	Average	1

Dryness

	Appearance	Quality	Score
☐	Brittle	Good	2
☐	Slightly dry	Average	1

☐	Broken	Poor	0	☐	Soft	Poor	0

Part burn				**Skin**			
	Appearance	**Quality**	**Score**		**Appearance**	**Quality**	**Score**
☐	Intact	Good	2	☐	Intact	Good	2
☐	Head/tail dangling	Average	1	☐	Part peeling off	Average	1
☐	Whole fish burnt	Poor	0	☐	Completely peeling off	Poor	0

TOTAL SCORE:

QUALITY ASSESSMENT (End products)

Note:
Check the answer that applies and circle the corresponding score
Input the sum of the score in the dedicated spaces

Colour				**Taste**			
	Appearance	**Quality**	**Score**		**Appearance**	**Quality**	**Score**
☐	Golden brown	Good	2	☐	Tasty	Good	2
☐	Dark brown	Average	1	☐	Bland	Average	1
☐	Black	Poor	0	☐	Sour/Bitter	Poor	0

Physical state				**Dryness**			
	Appearance	**Quality**	**Score**		**Appearance**	**Quality**	**Score**
☐	Whole (head/tail intact)	Good	2	☐	Brittle	Good	2
☐	Head/tail dangling	Average	1	☐	Slightly dry	Average	1
☐	Broken	Poor	0	☐	Soft	Poor	0

Part Burn				**Skin**			
	Appearance	**Quality**	**Score**		**Appearance**	**Quality**	**Score**
☐	Intact	Good	2	☐	Intact	Good	2
☐	Head/tail dangling	Average	1	☐	Part peeling off	Average	1
☐	Whole fish burnt	Poor	0	☐	Completely peeling off	Poor	0

TOTAL SCORE:

TRACING DOCUMENTS (filled by school)

Purchasing date: **School name:**

Usage date (*to be served to students*): **Product name:**

STORAGE EQUIPMENT

☐ Unique covered container ☐ Unique uncovered container ☐Separated covered container

☐ Separated uncovered container ☐ Dry storage room ☐None

☐ Other, specify:

QUALITY ASSESSMENT (at purchasing date)

Note:
Check the answer that applies and circle the corresponding score
Input the sum of the score at the dedicated spaces

Colour

	Appearance	Quality	Score
☐	Golden brown	Good	2
☐	Dark brown	Average	1
☐	Black	Poor	0

Taste

	Appearance	Quality	Score
☐	Tasty	Good	2
☐	Bland	Average	1
☐	Sour/bitter	Poor	0

Physical state

	Appearance	Quality	Score
☐	Whole (head/tail intact)	Good	2
☐	Head/tail dangling	Average	1
☐	Broken	Poor	0

Dryness

	Appearance	Quality	Score
☐	Brittle	Good	2
☐	Slightly dry	Average	1
☐	Soft	Poor	0

Brun

	Appearance	Quality	Score
☐	Intact	Good	2
☐	Head/tail dangling	Average	1
☐	Whole fish burnt	Poor	0

Skin

	Appearance	Quality	Score
☐	Intact	Good	2
☐	Part peeling off	Average	1
☐	Completely peeling off	Poor	0

TOTAL SCORE:

QUALITY ASSESSMENT (at preparation date)

Note:
Check the answer that applies and circle the corresponding score
Input the sum of the score at the dedicated spaces

Colour

	Appearance	Quality	Score
☐	Golden brown	Good	2
☐	Dark brown	Average	1
☐	Black	Poor	0

Taste

	Appearance	Quality	Score
☐	Meaty	Good	2
☐	Bland	Average	1
☐	Sour/Bitter	Poor	0

Physical state

	Appearance	Quality	Score
☐	Whole (head/tail intact)	Good	2
☐	Head/tail dangling	Average	1
☐	Broken	Poor	0

Dryness

	Appearance	Quality	Score
☐	Brittle	Good	2
☐	Slightly dry	Average	1
☐	Soft	Poor	0

Burn

	Appearance	Quality	Score
☐	Intact	Good	2
☐	Head/tail dangling	Average	1
☐	Whole fish burnt	Poor	0

Skin

	Appearance	Quality	Score
☐	Intact	Good	2
☐	Part peeling off	Average	1
☐	Completely peeling off	Poor	0

TOTAL SCORE:

ANNEX 2. Serving culturally acceptable fish and fish products – the case of Muslim consumers

The incorporation of locally procured fish and fish products into the HGSF programme must be culturally acceptable. Thus, additional measures need to be implemented to serve fish and fish products to Muslim communities. Muslim consumers are only allowed to eat halal foods (FAO, 1997). According to Islamic law, Muslims are allowed to eat all species of fish with scales living only in water.

Tips: To help the users select adequate species, the following list provides a categorization of fish and other aquatic animals proposed by the literature (Riaz, Shaik and Chaudry, 2019):

- **Category 1:** fish with fins and removable scales, including most of the traditional species, can be consumed by all Muslims.
- **Category 2:** fish or fishlike animals that may have fins but not removable scales (shark (Selachimorpha spp.), swordfish (Xiphias gladius), sturgeon (Acipenseridae spp.), eel (Anguilla spp.), monkfish (Lophius spp.), cusk (Brosme brosme), blowfish (Tetraodontidae spp.), etc.).
- **Category 3:** molluscs or crustaceans, including clams, mussels, lobsters, shrimp, oysters, octopus and squid, are forbidden for some Muslim consumers.
- **Category 4:** fish living around water most of their life cycle (crabs, snails, turtles and frogs) are forbidden for some Muslim consumers.

Note that Categories 3 and 4 encompass some animals that are not fish but were displayed for information purposes.

To be able to serve culturally acceptable fish and fish products to school-aged children and adolescents who are Muslim, besides the steps in the main documents, users are recommended to follow these steps during the value mapping.

Step A1. Make sure that the fishing technics respect Islamic law

Islamic law considers fishing activities as halal. Thus, there are no specific requirements to capture fish for Muslims. However, the capturing method needs to be conducted in a manner such that the fish does not suffer excessively and the capturing site is free of chemical and human contamination (Riaz, Shaik and Chaudry, 2019). In short, the fishing methods should meet the fishing practice proposed by the Code of Practice for Fish and Fishery Products elaborated by the Food and Agriculture Organization of the United Nations and the World Health Organization (2020, 2022).

Tips: To verify if the fishing practices in the country meet these criteria, users can refer to the national law and regulations on the fishery. For example, regulations in the Philippines allow the capture of aquatic animals that are not poisonous, intoxicating or hazardous to human health (Macabalang, 2016). However, they forbid the consumption of fish that have died before being taken out of water or were caught by illegal fishing methods (such as dynamite or blast fishing, cyanide fishing or electrofishing). Furthermore, for inland fishing, the Philippines's laws forbid the consumption of fish captured from a site contaminated by liquid such as pus and matter discharged

from the orifices of human beings, pigs and dogs (urine, vomitus, excrement, etc.). Finally, fish must be captured according to the fisheries administrative orders on conservation and sustainable fisheries and good aquaculture practices (refer to the Philippines' Fisheries Administrative Order No. 263, Series of 2019, *Establishment of fisheries management areas (FMA) for the conservation and management of fisheries in Philippine waters*).

Step A2. Check if there are laws and regulations about supplying halal fish

Generally, laws and regulations on halal products are well defined in a country. Users can refer to these laws and use them as control points, as proposed in Step A5.

Tips: As an illustration, in the Philippines, halal fish is required to be handled, processed and manufactured following the Codex Alimentarius standards and the Code of Practices for Fish and Fishery Products, and/or the Philippine National Standards with respect to the Halal Assurance System (HAS), at all desired level/stage (Macabalang, 2016).

Step A3. Buy from local fisherfolk that provide certified and labelled halal foods

Generally, suppliers of halal products use labels to facilitate the identification of their products. Therefore, buying from local fisherfolk using labels and certification will ensure the supply of culturally acceptable fish.

Tips: The Philippines' regulations require a certification body to ensure that food is produced, prepared and handled properly to get a halal label (Macabalang, 2016). The Philippines government has well-defined regulations for halal food (Macabalang, 2016). These regulations forbid the consumption of fish from illegal fishing (fishing vessels operating in violation of Philippine laws, regulation management organization resolutions, and laws of other coastal states). The regulations also support food traceability and transparency.

If such labelling and certification are not available among local fisherfolk suppliers, toolkit users can continue to Step A4.

Step A4. Make sure that the ingredients used to process fish are not listed as Haram

Processing methods cannot use forbidden (haram) ingredients such as pig, carrion, blood and insects. Furthermore, processors are not allowed to use equipment that has been used for haram products because they are forbidden food according to Islamic law (Riaz, Shaik and Chaudry, 2019)

Step A5. Define control points to ensure that fish handling respects Islamic law

Fish from different categories should not be prepared together and equipment should always be cleaned between the preparation of products from different categories. Furthermore, it is worth noting that halal products should not be prepared on uncleaned equipment that were previously used to prepare products from lower categories. For instance, if products from Category 1 are to be processed, the equipment should be cleaned if the equipment has been used to prepare products from Category 2, 3, or 4 (Riaz, Shaik and Chaudry, 2019).

Tips: To avoid any mistakes, always clean equipment and materials before handling fish. Furthermore, make sure fish are sorted according to their categories.

When combined with other raw materials, all processing, equipment, ingredients and packaging materials must be halal. Therefore, Halal control points in the Sustainable Food Value Chain for Nutrition (SFVCN) approach are required during the:

– ***Capturing node***
  - Sort species according to the four categories provided above.
– ***Processing node***
  - Only select halal ingredients and packaging during all processes of fish handling.
  - Ensure that all equipment used is cleaned and free of any haram ingredients.
  - Do not process fish from different categories together.
– ***Transportation node***
  - Ensure that all equipment used are cleaned and free of any haram ingredients.
  - Do not transport fish from different categories together.
– ***Preparation nodes***
  - Ensure that all equipment used is cleaned and free of any haram ingredients.
  - Do not prepare or transport fish from different categories together.
– ***Storage nodes***
  - Ensure that all equipment used are cleaned and free of any haram ingredients.
  - Do not store fish from different categories together.

Tips: Users can refer to the Riaz, Shaik and Chaudry (2019) for more information on halal food and halal control points for smoked fish, fishballs, fish sausages and fish fingers.

REFERENCES

Aakre, I., Tveito Evensen, L., Kjellevold, M., Dahl, L., Henjum, S., Alexander, J., Madsen, L. & Markhus, M.W. 2020. Iodine Status and Thyroid Function in a Group of Seaweed Consumers in Norway. *Nutrients*, 12(11): 3483. https://doi.org/10.3390/nu12113483

Abbey, L., Glover-Amengor, M., Atikpo, M.O., Atter, A. & Toppe, J. 2017. Nutrient content of fish powder from low value fish and fish byproducts. *Food Science & Nutrition*, 5(3): 374–379. https://doi.org/10.1002/fsn3.402

Ahern, M., Thilsted, S.H. & Oenema, S. 2021. *The role of aquatic foods in sustainable healthy diets UN Nutrition*. UN. https://www.unnutrition.org/wp-content/uploads/FINAL-UN-Nutrition-Aquatic-foods-Paper_EN_.pdf

Ahern, M.B., Thilsted, S.H., Kjellevold, M., Overå, R., Toppe, J., Doura, M., Kalaluka, E. *et al.* 2021. Locally-Procured Fish Is Essential in School Feeding Programmes in Sub-Saharan Africa. *Foods*, 10(9): 2080. https://doi.org/10.3390/foods10092080

Atikpo, M.A.O., Abbey, L.D., Glover-Amengor, M., Lawer, L., Ayin, J. & Toppe, J. 2011. *Micronutrient Enrichment of Meals Fed to Pupils Using Highly Nutritious and Low-Cost Underutilized Fish under the School Feeding Programme in Ghana*. Victoria, MAhe, Seychelles.

Bath, S.C., Steer, C.D., Golding, J., Emmett, P. & Rayman, M.P. 2013. Effect of inadequate iodine status in UK pregnant women on cognitive outcomes in their children: results from the Avon Longitudinal Study of Parents and Children (ALSPAC). *The Lancet*, 382(9889): 331–337. https://doi.org/10.1016/S0140-6736(13)60436-5

Bizikova, L., Nkonya, E., Minah, M., Hanisch, M., Turaga, R.M.R., Speranza, C.I., Karthikeyan, M. *et al.* 2020. A scoping review of the contributions of farmers' organizations to smallholder agriculture. *Nature Food*, 1(10): 620–630. https://doi.org/10.1038/s43016-020-00164-x

Brasil. *Diário Oficial [da] República Federativa do Brasil*, 2009.

Byrd, K.A., Thilsted, S.H. & Fiorella, K.J. 2021. Fish nutrient composition: a review of global data from poorly assessed inland and marine species. *Public Health Nutrition*, 24(3): 476–486. https://doi.org/10.1017/S1368980020003857

Chidziwisano, K., Tilley, E., Malolo, R., Kumwenda, S., Musaya, J. & Morse, T. 2019. Risk factors associated with feeding children under 2 years in rural Malawi—a formative study. *International Journal of Environmental Research and Public Health*, 16(12): 1–21. https://doi.org/10.3390/ijerph16122146

Devereux, S., Sbates-Wheeler, R. & Martinez, A.P. 2010. *Home-Grown School Feeding & Social Protection*. https://www.researchgate.net/profile/Rachel-Sabates-Wheeler/publication/265220001_Home-Grown_School_Feeding_Social_Protection/links/54884ceb0cf268d28f08cfe0/Home-Grown-School-Feeding-Social-Protection.pdf

Diario de Centro America Jueves. *Ley de Alimentación Escolar [Decree 16-2017 School Meal Law]*, 2017.

FAO; Bioversity international; UFRS. 2021a. *Public food procurement for sustainable food systems and healthy diets - Volume 1*. Rome. https://www.fao.org/3/cb7960en/cb7960en.pdf

FAO; Bioversity international; UFRS. 2021b. *Public food procurement for sustainable food systems and healthy diets - Volume 2*. FAO; Bioversity International; https://doi.org/10.4060/cb7969en

FAO & DEVCO. 2018. *Strenghtening sector policies for better food security and nutrition results. Public food procurement*. Rome, FAO. https://www.fao.org/3/ca2281en/CA2281EN.pdf

FAO, WFP, IFAD, NEPAD, GCNF & PCD. 2018. *Home-Grown School Feeding Resource Framework*. Rome, FAO and WFP. https://docs.wfp.org/api/documents/WFP-0000074274/download/?_ga=2.183750245.232594339.1662121619-1261000064.1651575407

FAO & WHO. 2010. *Joint FAO/WHO expert consultation on the risks and benefits of fish consumption*. Rome.

FAO. 1997. General Guidelines for Use of the Term :Halal. In: *FAO*. https://www.fao.org/3/Y2770e/y2770e08.htm

FAO. 2014a. *The State of World Fisheries and Aquaculture*. Rome, FAO. https://www.fao.org/3/I3720E/i3720e.pdf

FAO. 2014b. *Developing sustainable food value chains - Guiding principles*. Rome, FAO. https://elearning.fao.org/pluginfile.php/550440/mod_scorm/content/3/story_content/external_files/DevelopingSustainable.pdf
FAO. 2015. *Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries*. http://www.fao.org/docrep/field/003/ab825f/AB825F00.htm#TOC
FAO. 2016. *Influencing food environments for healthy diets*. http://www.fao.org/3/i6484e/i6484e.pdf
FAO. 2018a. *Developing gender-sensitive value chains*. Rome, FAO. https://www.fao.org/3/I9212EN/i9212en.pdf
FAO. 2018b. Sustainable Food Value Chains for Nutrition. https://www.fao.org/3/i9292en/I9292EN.pdf
FAO. 2019a. *School Food and Nutrition Framework*. Rome. http://www.fao.org/3/ca4091en/ca4091en.pdf
FAO. 2019b. *FAO-Thiaroye processing technique: towards adopting improved fish smoking systems in the context of benefits, trade-offs and policy implications from selected developing countries*. Rome, FAO. https://doi.org/10.4060/CA4667EN
FAO. 2020a. Sustainable Food Value Chains for Nutrition. In: *FAO elearning Academy*. https://elearning.fao.org/course/view.php?id=566
FAO. 2020b. *Gender Transformative Approaches for food security, improved nutrition and sustainable agriculture*. FAO. https://www.fao.org/3/cb1331en/CB1331EN.pdf
FAO. 2020c. Sustainable Food Value Chains for Nutrition - International Technical Webinar. In: *FAO elearning Academy*. https://elearning.fao.org/course/view.php?id=594
FAO. 2021a. Developing gender-sensitive value chains. In: *FAO eLearnign Academy*. https://elearning.fao.org/course/view.php?id=543
FAO. 2021b. Sustainable Food Value Chains For Nutrition. In: *FAO eLearnign Academy*. https://elearning.fao.org/course/view.php?id=594
FAO. 2021c. Food Loss and Waste in Fish Value Chains. https://www.fao.org/flw-in-fish-value-chains/value-chain/processing-storage/en/
FAO. 2021d. Fishery and Aquaculture Country Profiles. In: *FAO*. https://www.fao.org/fishery/en/facp/search
FAO. 2022a. *Women and men in small-scale fisheries and aquaculture in Asia*. Bangkok, Thailand, FAO. https://www.fao.org/3/cb9527en/cb9527en.pdf
FAO. 2022b. *A methodological guide for mapping women's small-scale fishery organizations to assess their capacities and needs*. Rome, FAO. https://doi.org/10.4060/cb8235en
FAO. 2022c. *Mapping women´s small-scale fisheries organizations in Malawi*. FAO. https://doi.org/10.4060/cb8499en
FAO. 2023a. School food Global Hub. https://www.fao.org/platforms/school-food/en
FAO. 2023b. Policies by country. In: *Global database on the Implementation of Nutrition Action (GINA)*. https://extranet.who.int/nutrition/gina/en/policies/summary
FAO. 2023c. Food-based dietary guidelines. In: *Food-based dietary guidelines*. https://www.fao.org/nutrition/education/food-based-dietary-guidelines
FAO & WFP. 2018. *Home-Grown School Feeding. Ressource framework. Technical document*. Rome, FAO. https://www.fao.org/3/ca0957en/CA0957EN.pdf
FAO & WFP. 2019. *Nutrition guidelines and standards for school meals*. https://linkscommunity.org/assets/PDFs/fao_nutrition-guidelines-and-standards-for-school-meals_a-report-from-33-low-and-middle-income-countries.pdf
FAO & WHO. 2020. *Code of Practice for Fish and Fishery Products*. FAO and WHO. https://doi.org/10.4060/cb0658en
FDA. 2021. Advice about eating fish. In: *FDA*. https://www.fda.gov/media/102331/download
GNCF. 2022. *School meal programs around the world - Results from 2021 Global Survey of School Meal Programs*. http://survey.gcnf.org/2021-global-survey
Grever, M. 2021. Women in Fisheries as Agents of Change to Reduce FLW. In: *Food Loss and Waste in Fish Value Chains*. https://www.fao.org/flw-in-fish-value-chains/resources/articles/women-in-fisheries-as-agents-of-change-to-reduce-flw/en/
Hasselberg, A.E., Aakre, I., Scholtens, J., Overå, R., Kolding, J., Bank, M.S., Atter, A. & Kjellevold, M. 2020. Fish for food and nutrition security in Ghana: Challenges and opportunities. *Global Food Security*, 26: 100380. https://doi.org/10.1016/j.gfs.2020.100380

Hicks, C.C., Cohen, P.J., Graham, N.A.J., Nash, K.L., Allison, E.H., D'Lima, C., Mills, D.J. *et al.* 2019. Harnessing global fisheries to tackle micronutrient deficiencies. *Nature*, 574(7776): 95–98. https://doi.org/10.1038/s41586-019-1592-6

Honduras, L.G.R. de. *Acuerdo NO. 0989-SE-2016 - Reglamento de venta de alimentos en centros educativos gubernamentales y no gubernamentales [Regulation on the sale of foods in governmental and non-governmental schools]*, 2016.

ILO. 2022. *Working Time and Work-Life Balance Around the World*. ILO.

Kelly, S. & Swensson, L.F.J. 2017. *Leveraging institutional food procurement for linking small farmers to markets: Findings from WFP's Purchase for Progress initiative and Brazil's food procurement programmes*. FAO Agricultural Development Economics Technical Study 1, ed. Rome, Italy.

Kimani, Patrick Mang'uru; Adrien, Bernard; Ward, Ansen; Ahern, M. 2022. *Post-harvest practices for empowering women in small-scale fisheries in Africa – Successful outcomes and guidance*. Rome. http://www.fao.org/3/cb7918en/cb7918en.pdf

Kimani, P., Adrien, B., Ward, A. & Ahern, M.B. 2022. *Post-harvest practices for empowering women in small-scale fisheries in Africa*. FAO. https://doi.org/10.4060/cb7918en

Kolding, Jeppe; Zwieten, Paul A.M. van; Marttin, Felix; Funge-Smith, Simon; Poulain, F. 2020. *Freshwater small pelagic fish and their fisheries in major African lakes and reservoirs in relation to food security and nutrition*. Rome, FAO.

Konyole, S.O., Kinyuru, J.N., Owuor, B.O., Kenji, G.M., Onyango, C.A., Estambale, B.B., Friis, H., Roos, N. & Owino, V.O. 2012. Acceptability of Amaranth Grain-based Nutritious Complementary Foods with Dagaa Fish (Rastrineobola argentea) and Edible Termites (Macrotermes subhylanus) Compared to Corn Soy Blend Plus among Young Children/Mothers Dyads in Western Kenya. *Journal of Food Research*, 1(3): 111. https://doi.org/10.5539/jfr.v1n3p111

Kruijssen, F., McDougall, C.L. & van Asseldonk, I.J.M. 2018. Gender and aquaculture value chains: A review of key issues and implications for research. *Aquaculture*, 493: 328–337. https://doi.org/10.1016/j.aquaculture.2017.12.038

De la Pena, I. & Garret, J. 2018. *Nutrition-sensitive value chains - A guide for project design - Volume II*. IFAD. https://doi.org/978-92-9072-865-8

De la Pena, I., Garret, J. & Geli, A. 2018. *Nutrition-sensitive value chains from a smallholder perspective- A framework for project design*. R. Benfica, H. Gillman, A. Lesa & Izzo, eds. IFAD.

De Lara, C.B. 2020. School feeding: a uunique platform to address gender inequalities. In: *Weltohnehunger*. https://www.weltohnehunger.org/full-article/school-feeding.html

Liu, J., Cui, Y., Li, L., Wu, L., Hanlon, A., Pinto-Martin, J., Raine, A. & Hibbeln, J.R. 2017. The mediating role of sleep in the fish consumption – cognitive functioning relationship: a cohort study. *Scientific Reports*, 7(1): 17961. https://doi.org/10.1038/s41598-017-17520-w

Macabalang, S.D. 2016. *Halal Agriculture and Fisheries Products*. Phillipines. https://www.hak.gov.tr/data/5d9b248013b876a58cebe12a/f57c1747f14fe0ef1155422b95f91931.pdf

Polo Galante, A., Ahern, M. & Toppe, J. 2020. *Fish in home-grown school feeding*. Rome. https://www.fao.org/publications/card/en/c/CB3708EN

Popkin, B.M. 2014. Nutrition, agriculture and the global food system in low and middle income countries. *Food Policy*, 47: 91–96. https://doi.org/10.1016/j.foodpol.2014.05.001

Randrianantoandro, A. & Ouadi, Y.D. 2015. *How Simple Raised Racks Have Curbed Fish Losses and Changed The Landscape Along Lake Tanganyika in Burundi*. https://doi.org/https://www.fao.org/3/au751e/au751e.pdf

Randrianatoandro, A., Ward, A. & Barrazza, A.S. 2022. *Gender and food loss in sustainable food value chains in Africa*. http://www.fao.org/documents/card/en/c/I8620EN/

Reksten, A.M., Somasundaram, T., Kjellevold, M., Nordhagen, A., Bøkevoll, A., Pincus, L.M., Rizwan, A.A.M. *et al.* 2020. Nutrient composition of 19 fish species from Sri Lanka and potential contribution to food and nutrition security. *Journal of Food Composition and Analysis*, 91: 103508. https://doi.org/10.1016/j.jfca.2020.103508

Riaz, M.N., Shaik, R. & M., C.M. undated. Halal Production Requirements For Fish and Seafood. In: M. Riaz & M.M. Chaudry, eds. *Handbook of Halal Food Production*. Taylor&Fra edition, p. 401. Taylor&Francis Group.

Ritchie, S.J. & Tucker-Drob, E.M. 2018. How Much Does Education Improve Intelligence? A Meta-Analysis. *Psychological Science*, 29(8): 1358–1369. https://doi.org/10.1177/0956797618774253

Ryckman, T., Beal, T., Nordhagen, S., Chimanya, K. & Matji, J. 2021a. Affordability of nutritious foods for complementary feeding in Eastern and Southern Africa. *Nutrition Reviews*, 79(Supplement_1): 35–51. https://doi.org/10.1093/nutrit/nuaa137

Ryckman, T., Beal, T., Nordhagen, S., Murira, Z. & Torlesse, H. 2021b. Affordability of nutritious foods for complementary feeding in South Asia. *Nutrition Reviews*, 79(Supplement_1): 52–68. https://doi.org/10.1093/nutrit/nuaa139

Santana, S.A., Batista, S.A., da Costa Maynard, D., Ginani, V.C., Zandonadi, R.P. & Botelho, R.B.A. 2023. Acceptability of School Menus: A Systematic Review of Assessment Methods. *International Journal of Environmental Research and Public Health*, 20(3): 2242. https://doi.org/10.3390/ijerph20032242

Sigh, S., Roos, N., Chamnan, C., Laillou, A., Prak, S. & Wieringa, F. 2018. Effectiveness of a Locally Produced, Fish-Based Food Product on Weight Gain among Cambodian Children in the Treatment of Acute Malnutrition: A Randomized Controlled Trial. *Nutrients*, 10(7): 909. https://doi.org/10.3390/nu10070909

Signa, D. 2013. *Cooking freshwater fish: a nutrition booklet with healthy and tasty recipes to improve fish consumption. Part 1*. Rome, FAO/IOC. https://www.fao.org/fishery/en/publications/63790

Smith, H. 2022a. *Mapping women's small-scale fisheries organizations in Ghana*. Rome, FAO. https://doi.org/10.4060/cb8500en

Smith, H. 2022b. *Mapping women´s small-scale fisheries organizations in Malawi*. FAO. https://doi.org/10.4060/cb8499en

Smith, H. 2022c. *Mapping women´s small-scale fisheries organizations in Sierra Leone*. Rome, FAO. https://doi.org/10.4060/cb8497en

Smith, H. 2022d. *Mapping women´s small-scale fisheries organizations in Uganda*. Rome, FAO. https://doi.org/10.4060/cb8498en

Swensson, L. 2019. *Aligning public procurement rules and practices to support the implementation of Home-Grown School Feeding (HGSF) Initiatives: The case of Ethiopia*. Rome, Italy. www.fao.org/3/CA3614EN/ca3614en.pdf

Swensson, L.F.J. 2018. *Aligning policy and legal frameworks for supporting smallholder farming through public food procurement. The case of home-grown school feeding programmes.* 177. Rome, Italy. https://www.fao.org/3/CA2060EN/ca2060en.pdf

Swensson, L.F.J. 2020. *Aligning public procurement rules and practices to support the implementation of home-grown school feeding (HGSF) initiatives: The case of Senegal*. FAO. https://www.fao.org/3/cb1204en/cb1204en.pdf

Swensson, L.F.J. & Tartanac, F. 2020. Public food procurement for sustainable diets and food systems: The role of the regulatory framework. *Global Food Security*, 25: 100366. https://doi.org/10.1016/j.gfs.2020.100366

Toppe, J., Galante, A.P., Ahern, M.B.., Avdalov, N. & Perelra, G. 2021. Development of Strategies For the Inclusion of Fish in School Feeding in Angola, Honduras and Peru. In: *Public Food Procurment for Sustainable Food Systems and Healthy Dites - Volume*. p. 330. Rome, FAO. https://www.fao.org/publications/card/en/c/CB7969EN/

Vaitla, B., Collar, D., Smith, M.R., Myers, S.S., Rice, B.L. & Golden, C.D. 2018. Predicting nutrient content of ray-finned fishes using phylogenetic information. *Nature Communications*, 9(1): 3742. https://doi.org/10.1038/s41467-018-06199-w

VKM. 2014. *Benefit-risk assessment of fish and fish products in the Norwegian diet - an update*. Oslo, Norway. https://doi.org/https://vkm.no/download/18.2994e95b15cc54507161ea1a/1498222018046/0a646edc5e.pdf

WFP. 2016. The Cost-Benefit Analysis Methodology. In: *WFP*. https://documents.wfp.org/stellent/groups/public/documents/resources/wfp281517.pdf

WFP. 2019a. *School Feeding in Ghana. Investment case: Cost-Benefit Analysis Report*. https://docs.wfp.org/api/documents/WFP-0000108072/download/

WFP. 2019b. *Programme d'alimentation scolaire du Bénin Analyse Coût-Bénéfice*. https://docs.wfp.org/api/documents/WFP-0000114270/download/?_ga=2.194852909.105406457.1654567055-1261000064.1651575407

WFP. 2022. *The State of School Feeding Worldwide 2022*. Rome, World Food Programme. https://www.wfp.org/publications/state-school-feeding-worldwide-2022

WHO & FAO. 2019. *Sustainable healthy diets*. Rome, FAO and WHO. https://doi.org/10.4060/CA6640EN

WHO. 2020. Healthy diet. https://www.who.int/news-room/fact-sheets/detail/healthy-diet

WHO. 2022. Policies by country. In: *WHO*. Cited 6 June 2022. https://extranet.who.int/nutrition/gina/en/policies/summary

Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T. *et al.* 2019. Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *The Lancet*, 393(10170): 447–492. https://doi.org/10.1016/S0140-6736(18)31788-4

Zhou, S., Smith, A.D. & Knudsen, E.E. 2015. Ending overfishing while catching more fish. *Fish and Fisheries*, 16(4): 716–722. https://doi.org/10.1111/faf.12077

Further reading/Additional sources

FAO. 2014. *Developing sustainable food value chains - Guiding principles*. Rome. https://elearning.fao.org/pluginfile.php/550440/mod_scorm/content/3/story_content/external_files/DevelopingSustainable.pdf

FAO. 2019. *Nutrition guidelines and standards for school meals: A report from 33 low and middle-income countries*. https://linkscommunity.org/assets/PDFs/fao_nutrition-guidelines-and-standards-for-school-meals_a-report-from-33-low-and-middle-income-countries.pdf

FAO. 2023d. Sustainable public food procurement. In: *FAO*. Rome. https://www.fao.org/nutrition/markets/sustainable-public-food-procurement/en/#c858497

Hasselberg, A.E., Aakre, I., Scholtens, J., Overå, R., Kolding, J., Bank, M.S., Atter, A. & Kjellevold, M. 2020. Fish for food and nutrition security in Ghana: Challenges and opportunities. *Global Food Security*, 26: 100380. https://doi.org/10.1016/j.gfs.2020.100380

Kelly, S. & Swensson, L.F.J. 2017. *Leveraging institutional food procurement for linking small farmers to markets: Findings from WFP's Purchase for Progress initiative and Brazil's food procurement programmes*. FAO Agricultural Development Economics Technical Study 1. Rome, FAO.

Kolding, J., van Zwieten, P.A.M., Marttin, F., Funge-Smith, S. & Poulain, F. 2020. *Freshwater small pelagic fish and their fisheries in major African lakes and reservoirs in relation to food security and nutrition*. Rome, FAO.

Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T. *et al.* 2019. Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. *The Lancet*, 393(10170): 447–492. https://doi.org/10.1016/S0140-6736(18)31788-4

ISBN 978-92-5-138686-6
9 789251 386866
CD0278EN/1/06.24