



# COMMITTEE ON FISHERIES

## SUB-COMMITTEE ON FISH TRADE

### Nineteenth Session

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## THE NEXUS BETWEEN MARKETS AND AQUATIC RESOURCES UTILIZATION

### Executive Summary

This document examines the interrelationships between markets and the utilization of aquatic resources, highlighting the critical role of market access for food security, nutrition, and livelihoods. Aquatic foods, including by-products, offer highly accessible and affordable sources of animal proteins and micronutrients. However, without adequate market access, market information, infrastructure and related services, safe and high-quality aquatic food products will not reach consumers, which could lead to significant food loss and waste (FLW).

### Suggested action by the Sub-Committee

- Review the analysis on the importance of the market in combating malnutrition and reducing FLW.
- Share national experiences in improving aquatic food value chains, highlighting potential opportunities and challenges in reaching new markets for value-added by-products such as fish powder.
- Provide guidance on how to assist Members in FLW reduction by employing a multidimensional solution approach, including strengthening markets.
- Bring testimonies and suggestions on fostering the implementation of the Voluntary Code of Conduct for Food Loss and Waste Reduction (CoC).

- Advise on how to assist Members in raising awareness and disseminating information about FLW reduction and fish waste valorisation through knowledge hubs.

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## INTRODUCTION

1. Aquatic food systems are gaining attention due to their potential to provide more of the world's dietary needs, being good sources of proteins and micronutrients and possibly playing a vital role in food security and nutrition, particularly in vulnerable coastal populations.
2. A sustainable agrifood system provides food security and nutrition for all in a manner that does not compromise future generations' economic, social and environmental bases. Various pressures, such as rapid population growth, urbanisation, increasing purchasing power in different regions of the world, and significant changes in consumption patterns, are preventing food systems from providing nutritious food and enhancing livelihood opportunities in an environmentally sustainable manner.
3. In this regard, FAO Blue Transformation also seeks to ensure that aquatic food systems can support the provision of sufficient food in an environmentally, socially and economically sustainable manner, ensuring the availability and accessibility of safe and nutritious aquatic foods for all, particularly vulnerable populations, and promoting the reduction of FLW.<sup>1</sup>

## INTERCONNECTION BETWEEN MARKETS AND AQUATIC RESOURCES UTILIZATION

### *Markets for small pelagics*

4. Small pelagic fish species typically reach consumers through industrial, local and traditional market systems.<sup>2</sup> Industrial market systems are predominantly large-scale, with formalised outlets and national and international commercial transactions. Industrial market systems for small pelagic fish typically serve supermarkets, industrial processing facilities and fishmeal and fish oil factories. Domestic markets are usually dominated by large-scale actors such as supermarkets, whereas international markets are primarily concerned with exported processed small fish.<sup>3, 4, 5</sup>
5. In low- and middle-income countries, territorial and traditional markets serve as the primary distribution system and are crucial to the availability of small pelagic fish. However, numerous quality concerns regarding fish sanitation and food safety standards exist. In addition, small-scale fish marketers and merchants operating in territorial and traditional markets may be excluded from markets because of a number of factors, undermining their effectiveness and jeopardising low-income consumers' access to inexpensive, nutrient-rich aquatic food. A recurring detrimental factor is the absence of the necessary infrastructure and technologies, such as cold storage.
6. For example, many African countries rely on imported small frozen pelagics captured by European fleets to supplement local landings and meet domestic demand.<sup>6</sup> Imports of frozen pelagics

<sup>1</sup> <https://doi.org/10.4060/cc0459en>

<sup>2</sup> Forthcoming FAO Technical Paper on small, low-cost fish for food and nutrition security.

<sup>3</sup> <https://doi.org/10.1371/journal.pone.0102057>

<sup>4</sup> <https://www.gob.pe/institucion/pnipa/informes-publicaciones/3745003-estudio-de-prospectiva-la-cadena-de-valor-de-la-anchoveta-para-consumo-humano-directo>

<sup>5</sup> <http://ejournal-balitbang.kkp.go.id/index.php/ifri/article/view/9292/7256>

<sup>6</sup> <http://dx.doi.org/10.4172/2332-2608.1000122>

from European fleets have increased recently, mainly after new harbour facilities were developed to facilitate landings. These imports are then distributed through a network of privately owned cold storage facilities in the main cities of West Africa, made available in frozen or smoked form in city and village markets.<sup>7</sup>

7. Women are crucial in territorial and traditional markets, as they are frequently more involved in the aquatic product value chain processing, marketing and trading nodes. However, they are especially susceptible to disruptions caused by social, cultural and political factors that impact their work. Furthermore, they were more negatively affected by COVID-19.<sup>8</sup>

8. Both industrial and territorial and traditional market systems exist for Peruvian anchoveta (*Engraulis ringens*), but only 2 percent of production goes to direct local human consumption, which is offered in more expensive forms, such as canned (1.2 percent) or frozen (0.2 percent).<sup>9</sup> The main reason for the existing consumption pattern is the seasonality of catches, the large volumes landed and the lack of an adequate cold chain for fresh products. Considering that the costs of landing anchoveta for human consumption are higher, there are few low-cost opportunities to promote them for direct consumption. Furthermore, because it has been mainly produced for fishmeal and fish oil, consumers frequently regard it as feed rather than food, leaving an untapped resource for alleviating malnutrition by promoting the direct intake of this nutritious fish. However, there has recently been a growth in demand for salted, canned, and frozen anchoveta for human consumption in countries such as France, Italy, Japan, Spain and the United States of America.<sup>10</sup>

#### *Markets for fish powder*

9. Fish powder from small pelagic fish plays an essential role in local culinary traditions and the fortification of diets. Locally produced fish powder can be utilised to fortify and flavour foods for infants, children, and the entire family. For example, fish powder is a ubiquitous product on the Ghanaian market, where it is used to season a hot pepper sauce called shito, as well as other local dishes. Although fish powders are widely used in some markets, further work is needed to improve the food safety aspects of production in existing fish powder value chains and to address consumer perceptions.

#### *The market of value-added products converted from by-products*

10. Approximately 70 percent of all processed fish ends up as by-products, such as heads, guts, skin, bones, and trimmings, among others.<sup>11</sup> Due to the high demand for feed ingredients, more of these by-products are being processed into fishmeal and fish oil. By 2031, about 29 percent of fishmeal and 47 percent of fish oil are expected to be produced from fish by-products.<sup>12</sup> In addition, there is a growing demand for foods based on fish by-products, producing nutritious and low-cost products derived from specific fish parts. Numerous products use recovered flesh from frames and trimmings as raw material, and modern technology converts bones and skins into foods, including powders.

11. For example, INFOFISH, a unit of the Fish Info Network, advised Norwegian salmon producers to consider exporting fish heads to Asia years ago.<sup>13</sup> Previously, shipped salmon was gutted and headed. Following an INFOFISH market analysis, salmon heads were marketed throughout Southeast Asia, becoming a success story of exporting and valuing a by-product. In another example, a Norwegian salmon company informed a Malaysian palm oil company about fish waste availability. The company started analyzing fish waste for fish oil. After the investigation, the Malaysian business invested considerably in a Norwegian company that separates and processes fish waste from various processing plants to manufacture cosmetics and food, replacing some palm oil inputs initially used. Other regions in the world also demand fish maws or dried swim bladders. By utilising waste from processing in the

<sup>7</sup> [https://horizon.documentation.ird.fr/exl-doc/pleins\\_textes/pleins\\_textes\\_6/colloques2/42104.pdf](https://horizon.documentation.ird.fr/exl-doc/pleins_textes/pleins_textes_6/colloques2/42104.pdf)

<sup>8</sup> Forthcoming FAO Technical Paper on small, low-cost fish for food and nutrition security.

<sup>9</sup> <https://doi.org/10.1007/s11367-014-0716-3>

<sup>10</sup> <https://doi.org/10.1371/journal.pone.0102057>

<sup>11</sup> <https://doi.org/10.4060/cc0461en>

<sup>12</sup> <https://doi.org/10.1787/flb0b29c-en>

<sup>13</sup> <http://infofish.org/v4/>

production of fishmeal and fish oil, which are then used in the production of fish feed, the waste is converted into products for human consumption and contributes to food security.

12. Moreover, additional products exist. Fish leather, pearl essence derived from fish scales and isinglass derived from fish maws are examples of non-food products. Nutraceuticals are supplementary products derived from by-products, such as long-chained omega-3 fatty acids, calcium supplements from fish bones and cartilage supplements. Gelatine derived from fish collagen is another item whose demand is growing.

#### *The market as a solution to reduce FLW*

13. The market's importance is frequently neglected because attention is focused on technology, cold chain improvements, value addition, by-product utilisation, quality difficulties, and standards that lead to the prevention or decrease of FLW.

14. However, the market is the primary source of knowledge about consumer tastes and food cultures around the world. An intimate understanding of the markets and the driving forces in distinct markets is required to find market opportunities. The Fish Info Network (GLOBEFISH, INFOFISH, EUROFISH, INFOPECA, INFOSAMAK, INFOPÊCHE and INFOYU)<sup>14</sup> play a role in gathering and disseminating information regarding the market potential for fisheries and aquaculture products, as well as customer preferences and behaviour.<sup>15</sup> Regarding FLW, markets can be seen as a significant incentive for improvements, and having standards in value chains can positively influence fish handling and the hygiene of facilities. Supermarkets frequently require suppliers to meet specific hygienic conditions, product specifications and standards. Best management practices (BMP) and certification processes are commonly utilised to increase market access and reduce FLW.

15. The underlying causes of FLW in developing countries are interconnected and complex, but limited market access, which leads to product deterioration before the sale, is a significant factor. In contrast, access to markets in developed countries can increase standards and quality and facilitate adopting practices that result in loss reduction and enhanced value. Regional market access can be increased by improving roads and services, streamlining certification processes, and making cross-border trade simple and cost-effective.

16. Increasing consumer awareness of quality and safety could create demand for better quality products, requiring better practices and standards further upstream in the supply chain. Retailers, for instance, can play a crucial role in advising consumers on reducing food waste.

17. One of the problems in many countries is the lack of market and consumer knowledge that can be used to inform interventions. The demand for by-products as value-added products varies significantly by geographical region and culture. Understanding the varied market cultures and preferences is critical to find chances for better utilisation. Considering its broad capillarity, the Fish Info Network is familiar with the various cultures and business potential. New product utilization and market opportunities can be effectively identified and explored in different regions by coordinating information through the network. As a result, market assessments or research are frequently necessary to be developed in connection with FLW interventions.

## **FAO ACTIVITIES**

18. In FAO, the Fisheries and Aquaculture Division, in collaboration with the Food and Nutrition Division, is developing a toolkit to assist countries in determining the viability of incorporating fish into school feeding programs that source foods from local producers or those that use school-grown produced foods. FAO recently concluded testing the toolkit in Ghana and Malawi. FAO assists women's small-scale fisheries organizations create value-added products, such as fish powders that schools can procure. The toolkit will be finalised in 2023 and serve as a guide for other countries.

<sup>14</sup> <https://www.fao.org/in-action/globefish/background/fishinfonetwork/en>

<sup>15</sup> <https://www.fao.org/3/nb253en/nb253en.pdf>

19. At the 32nd Session of the Committee on Fisheries (COFI) in July 2016, the importance of reducing FLW, particularly in fish value chains, was emphasised. The 32nd Session of COFI supported the creation of FAO technical guidelines addressing the causes and remedies of FLW. The Norwegian Ministry of Trade, Industry and Fisheries funded the development of the Food Loss and Waste in Fish Value Chains website compiling essential information on FLW.<sup>16</sup>

20. The CoC, developed through an inclusive process under the overall supervision and guidance of the FAO Committee on Agriculture (COAG) Bureau, was endorsed during the 42nd Session of the FAO Conference in 2021.<sup>17</sup> Members should implement the CoC and promote awareness raising, education and incentives to support resilient and sustainable production.

21. FAO employs a multidimensional solutions strategy to reduce FLW in aquatic food value chains under the Norwegian Agency for Development Cooperation (NORAD)-funded global project, including expanding market connections and creating and disseminating evidence-based FLW knowledge products.<sup>18</sup>

## WAY FORWARD

22. In many food- and nutrition-insecure regions, the cost of aquatic food products and their capacity to be transported and stored pose obstacles. Small pelagic fish and fish by-products can be low-cost, nutrient-rich alternatives. Due to their size, small pelagic fish are ideal for drying and smoking, allowing for extended storage periods. Fish by-products are typically derived from bigger fish and require processing before being incorporated into aquatic food recipes. By drying and converting these products into powder, they can be included in various local dishes, improving their flavour and nutritional composition.

23. On average, processed fish generates 50 percent of by-products. Although these by-products are typically not considered for humans, it is possible to convert most of them into products for human consumption. The remaining by-products could be converted into other valuable products, such as feed or fertilisers and products where nutrients are not the primary focus, such as fish leather, biochemical extracts, or isinglass.

24. The increased emphasis on sustainability and circular economies has provided new impetus and opportunities for successfully improving fish by-product utilisation. This food potential represents a significant opportunity to offer healthier food without increasing production. To realise this potential, it is necessary to have well-informed and prepared markets in order to foster a natural demand. In this regard, institutional markets such as school meal programmes are being evaluated as entry points.

25. With the support of the Fish Info Network, FAO could coordinate investigation on the types of FLW that occur in various regions and identify opportunities for developing new products and markets for these aquatic products.

26. Markets and consumer behaviour drive the adoption of enhanced practices, technologies and standards that decrease FLW. Linking FLW initiatives to market opportunities is essential for sustainable supply chain improvements. The market plays a crucial role in influencing consumer behaviour and reducing waste. Therefore, it is critical to understand the role that markets can play in addressing FLW, and a lack of market information can exacerbate the existing challenges. Thus, market studies and consumer research should be considered top priorities, and study design and implementation guidelines should be available. Providing market information to producers is also essential, especially for balancing the problems caused by demand and supply fluctuations. Furthermore, increasing consumer awareness of quality issues and ways of reducing waste must always be considered.

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<sup>16</sup> <https://www.fao.org/flw-in-fish-value-chains/en/>

<sup>17</sup> <https://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/1635033/>

<sup>18</sup> <https://www.fao.org/flw-in-fish-value-chains/projects/en/>