Addressing food loss and waste in fish value chain using a web-based information, Repository

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Abstract. Food loss and waste (FLW) in fisheries is a major concern and occur in most fish distribution chains throughout the world. FLW across the fish value chain is estimated to be 35 percent. These losses constitute lost income to fishers, processors and traders and other value chain actors and contribute to food and nutrition insecurity. Thus, it is globally recognized as a challenge that needs to be addressed. There has been much work done to address and prevent losses in fisheries value chains. However, a key issue is related to the availability and quality of information. Information needed to guide policy development and management of the resources is of poor quality and often not produced or distributed in a timely manner. The 32nd Session of the Committee on Fisheries (COFI), July 2016 reiterated the topical importance of reducing fish losses and made a plea for the development by Food and Agriculture Organization of the United Nations (FAO) for a guidance for reduction of fish losses. FAO, through the Products, Trade and Marketing Branch (FIAM), supported by the Norwegian government had developed an information repository that can provide solutions for reducing or eliminating food losses for common loss scenarios in fish value chains. It provides access to fish loss and waste related information for informed policy in the fisheries and aquaculture from the post-harvest to consumption stages. It aims to provide guidance to policy-makers, development practitioners, non-governmental organizations (NGOs) and value chain actors ability to facilitate the development of solutions to food loss scenarios on the ground at the targeted points of the supply chain, as well as at policy level. The development of the repository was guided by an internal FAO specialist group covering food loss, policy, fisheries and ICT and an expert group of specialists coming from the public sector, civil society and research institutions with representation of a range of geographical regions. A series of internal and external consultations were done before the webpage was launched on May 2019.

Keywords: fish loss and waste; fish value chain; global food loss and waste reduction; policy guidance.

1. Introduction

In 2016, the global fish production reached about 171 million tonnes, with estimated value at USD 362 billion, of which USD 232 billion was from aquaculture production. With capture fishery production relatively static since the late 1980s, aquaculture has been responsible for the continuing impressive growth in the supply of fish for human consumption. Fish provided about 3.2 billion people with almost 20 percent of their average per capita intake of animal protein with fish accounted for about 17 percent of animal protein consumed by global population in 2015 [1].

Food losses refer to the decrease in edible food mass throughout the part of the supply chain that specifically leads to edible food for human consumption. Food losses take place at production,
postharvest and processing stages in the food supply chain. Food losses occurring at the end of the food chain (retail and final consumption) are rather called “food waste”, which relates to retailers and consumers’ behaviour [2].

The 2011 FAO estimates that almost one-third of food produced for human consumption (approximately 1.3 billion tonnes per year) is either lost or wasted globally. The losses and waste in the whole fisheries sector is estimated to amount to 35 percent. The per capita food loss in subSaharan and South/SouthEast Asia was at 120 to 170kg/year with the total per capita production of edible parts of food for human consumption at 460 kg/year. While 6-11 kg/year was wasted by the same regions [2].

In recent years, the topic of food loss and waste (FLW) has been gaining importance, both in the public and private sectors of the global food systems. Reducing losses is an important development goal in the fisheries sector, and is globally recognized as a challenge that needs to be addressed. However, it is not a straightforward process owing to the multiplicity of species, fishing gear and methods, as well as numerous dispersed and inaccessible landing sites especially in small-scale fisheries.

One of the main issues to be addressed in regional and international contexts is related to the availability and quality of information. Poor quality of information leads to substandard guidelines, which creates a general sense of distrust on fishery information among intended users specifically policy-makers and fisheries managers, thus, resulting in very limited use or no use of this information. On the country and regional levels, fisheries agencies and organizations are often poor in resources and exchange of information.

The 32nd Session of the Committee on Fisheries (COFI) July 2016 highlighted the importance of reducing FLW and made a plea for the development by FAO of a guidance for the reduction of FLW. With the seed project funded by the Norwegian Ministry of Trade, Industry and Fisheries, FAO had developed a supply chain orientated document/repository structure that will provide information on common fish loss scenarios, loss reduction and policy guidance to support the prevention and reduction of food losses for common fish loss and waste scenarios.

This paper focuses on the development of the FLW in fish value chain information repository in relation to addressing FLW that can be very useful mainly in small-scale African fisheries and aquaculture value chains. The overall objective of the project is improved access to fish loss and waste related information for informed policy in the fisheries and aquaculture from the pre-harvest to consumption stages. Thus, it can result to increased transparency and quality of food losses-related information is supported.

2. Methodology

The paper provides description and review of relevant information related to food loss and waste. The method used was designed to get an overview of the development of the FLW in fish value chain information repository. It will briefly describe its key features and provide updates on its users after it was launched in May 2019.

3. Result and Discussion

3.1. Food loss and waste in fish value chain

Globally, the reduction of FLW is supported and can be found in several key macro level policy instruments:

- United Nations Sustainable Development Goal 12 – Responsible consumption and production. This SDG focus on promoting resource and energy efficiency, sustainable infrastructure, and providing access to basic services, green and decent jobs and a better quality of life for all. It aims to educate consumers on sustainable consumption and lifestyles, provide adequate information through standards and labels and engage in sustainable public procurement, among others. Under SDG Target 12.3 : By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses [3].
- High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. This report analyses food losses and waste in a triple perspective: a systemic perspective, a sustainability perspective, including the environmental, social and economic dimensions of sustainability, and a food security and nutrition perspective, looking at how food losses and waste relate to the various dimensions of food security and nutrition [4].

- Code of Conduct for Responsible Fisheries (CCRF) - general guidance to policy makers and industry on responsible fish production and utilization (FAO 1998). The Code provides principles and standards applicable to the conservation, management and development of all fisheries. Furthermore, it covers the capture, processing and trade of fish and fishery products, fishing operations, aquaculture, fisheries research and the integration of fisheries into coastal area management. In Article 11 - Post-harvest practices and trade, it advise the states to encourage those involved in fish processing, distribution and marketing to reduce post-harvest losses and waste [5].

- The Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (the SSF Guidelines). This was developed as a complement to CCRF with respect to small-scale fisheries in support of the overall principles and provisions of the Code. Guideline 7.5 advise that all parties to avoid post-harvest losses and waste and seek ways to create value addition, building also on existing traditional and local cost-efficient technologies, local innovations and culturally appropriate technology transfers [6].

- Codex Alimentarius Code of practice for fish and fishery products handling, hygiene and processing and underpins standards and legislation. This Code is intended for all actors engaged in the handling, production, storage, distribution, export, import and sale of fish and fishery products. It provide guidance on practices to attain safe and wholesome products that can be sold on national or international markets and meet the requirements of the Codex Standards [7].

Food loss and waste in fisheries occur in most fish distribution chains throughout the world. It can be observed at all stages of the value chain, from net to plate. Some key causes of FLW are summarised in Figure 1.

**Figure 1.** Fish losses along the value chain: stages and causes [8-12].
3.2. FLW in fish value chain information repository

In developing the repository, an internal FAO specialist group covering food loss, policy, fisheries and ICT guided the development of the repository. An electronic expert group was formed to guide and actively contribute to the process. This expert group developed the structure of the document/repository through electronic communications, with physical meetings taking place on an as-needs basis. An Expert Consultation on the Development of a Global Fish Loss and Waste Repository to Inform Policy held at FAO Headquarters, Rome in early November 2017 was attended by a cross section of fisheries, agri-food development, technical, socio-economics and ICT specialists from the public sector, civil society and research institutions with representation of a range of geographical regions.

The Phase II of the project involved finalizing the development of the validated web-based tool and enabling access to it by end-users. The project beneficiaries and stakeholders may be found on several levels as the information produced by the project can be used by a wide range of users, located in all regions, ultimately from government officials and policy-makers, and as well traders, industries, researchers, academia and international organizations.

○ 02 November 2017: Expert Consultation on the Development of a Global Fish Loss and Waste Repository to Inform Policy
  - Natural Resources Institute (Value Chains)
  - World Resources Institute (Food Loss & Waste)
  - WorldFish (Gender/losses)
  - UNIDO (Fish Marketing/Indonesia)
  - Tanzania Govt – (Africa/losses)
  - SEAFDEC/S.E. Asia/losses
  - Sustainable Food Chains at Wageningen University & Research (Loss & Waste)
  - Vestergaard (Food Storage)
  - Mindfully Wired (Web Information Resource)

○ 26 May 2017: FAO Advisory Group’s Inception Meeting

Figure 2. Repository development stages and activities.

Key features of the repository are as follows:
- Description and technical information of the fish value chain
- Description of the of key loss scenarios encountered at supply chain stages
- Format and design is consistent for the various loss scenarios for ease of reference.
- Multidisciplinary solutions focused on enabling policy environment, technology, skills and knowledge, infrastructure and services, regulatory environment, social and gender dynamics, and markets
- Reference materials relevant to FLW in fish value chains

This repository utilized a supply chain approach to simplify identifying the part of the chain where you might be looking for a loss reduction solution. It features different loss scenarios along the supply chain, covering standard elements namely description of the loss scenario, type of loss, level of investment needed to reduce/eliminate the loss, local variations, type of input need to address the loss, etc. It also provides a section on the solutions on reducing FLW. These solutions rely on a combination of the right policy, application of appropriate technology, skills and knowledge, services and infrastructure, regulatory environment, social and gender equity, good linkages to and knowledge of markets.
The repository was launched on 06 May 2019 and can be accessed at http://www.fao.org/fish-value-chains/en/. The aim is that the repository will be a living document and further options can be provided as and when they are developed. Users who are interested in food losses in fisheries and aquaculture can contribute to this document, with due recognition given.

Since the repository was launched on 06 May, data until 06 September 2019 showed that the website reached 3000 visitors and 3400 sessions since and has been viewed by users in 138 countries. Around 9.10 percent of traffic came from ‘Organic Search’, which was up from 8.33 percent in July 2019, and with an average session duration of three minutes and 39 seconds. About 7.8 percent of visitors have returned to the site, viewing an average of five pages and spending five minutes on the site. For geographical distribution of the visitors, the top ten countries with the most website visits (in percent) are: Spain (59.66), Ukraine (3.66), United States (2.87), United Kingdom (1.62), India (1.58), Italy (1.42), China (1.19), Mexico (1.19), Norway (1.19), United Arab Emirates (1.12).

![Figure 3. Overview of visitor location from 06 May to 06 September 2019.](image)

4. Conclusions
Food loss and waste happen all throughout the fish supply chain. The reduction of food loss and waste is globally recognized as a challenge that needs to be addressed. Several case studies and projects are conducted that lead to valuable information. However, the availability of a single repository containing quality information is lacking. This valuable information will be helpful to the stakeholders if made available and accessible to them. The development of an information repository is timely and relevant in addressing the lack of access to quality information. This web-based source of information can provide guidance to policy-makers, development practitioners, non-governmental organizations (NGOs) and value chain actors’ ability to facilitate the development of solutions to food loss scenarios on the ground at the targeted points of the supply chain, as well as at policy level. After it’s launched on 06 May 2019, the information repository have attracted potential users from around the world aiming to increase transparency and quality of food losses-related information.

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