

POSTHARVEST LOSSES IN THE MULTIDAY FISHERIES SECTOR OF SRI LANKA: INSIGHTS FROM A RECENT FISH LOSS ASSESSMENT

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This article presents a summary of a comprehensive study conducted in Sri Lanka to assess postharvest losses from harvesting to unloading at fishery harbours in the multiday fisheries sector. Multidimensional solutions are proposed, including implementing supportive policies and regulations, investments in fleet development and infrastructure, capacity-building programs, improved market linkages and value addition activities. These solutions offer a pathway towards improving fish quality, minimising losses, and promoting sustainable fisheries, thereby enhancing food security and supporting the country's economic and social development.



Conducting the assessment at the fishery harbour in Mirissa, Sri Lanka

Sri Lanka, an island situated in the Indian Ocean, highly relies on its fisheries sector due to its significant contributions to employment, food security, and foreign exchange generation. This sector plays an indispensable role in the country's economy, accounting for approximately 1.1% of the Gross Domestic Production. Fish products hold great importance as they provide around 60% of the country's animal protein intake.

More than 40% of marine fish production in Sri Lanka is derived from multiday deepsea fishing, which primarily employs longline fishing, gillnet fishing, and ring net fishing techniques to catch species such as tuna (*Katsuwonus pelamis*), and tuna-like fish species (*Auxis thazard*, *Euthynnus affinis*, and *Rastrelliger kanagaruta*), as well as Indian scads (*Decapterus russelli*), in the deep waters off the Sri Lankan coast. Marine fisheries production reached 331 675 tonnes in 2021, consisting of coastal water and offshore/deepsea

water catches of 178 260 tonnes and 153 415 tonnes, respectively. The multiday fishing fleet consisted of 5 364 boats in the year 2021 where about 1 194 boats were operating on the high seas.

Food loss and waste (FLW) are significant issues in Sri Lanka's fishing industry. A significant portion of the fish caught is not of the best quality due to various factors such as poor handling

and storage practices, lack of processing and preservation technology, and inadequate infrastructure. These losses occur at various stages of the value chain, starting from the time of harvesting and continuing through subsequent stages such as processing, transportation, distribution, storage and marketing, until consumption. The FLW in fish value chains not only reduces overall yield but also has negative economic consequences and impact on the livelihoods of fishing communities, contributing to food and nutrition insecurity.

Paucity of data hinders effective interventions

In Sri Lanka, the lack of data on fish losses makes it difficult to develop effective fisheries management policies and solutions. Many studies have not been systematic in measuring losses at all stages of the value chain, hindering efforts to identify potential areas for intervention. However, such assessments are costly and time-consuming, which has limited the number of full-chain assessments conducted thus far. To bridge this

knowledge gap, it is necessary to conduct a comprehensive FLW assessment at the stage in the fish value chain where the most significant loss occurs. Understanding the extent of FLW in Sri Lanka's fishing industry and implementing interventions to reduce it are crucial steps towards improving the industry's sustainability. This can benefit both industry and the country's overall economic and social development.

In this context, the NORAD-funded GCP/GLO/352/NOR project on responsible use of fisheries and aquaculture resources for sustainable development has been implemented to tackle these challenges by conducting a comprehensive FLW assessment. This project is a critical milestone in identifying effective interventions to reduce losses and waste in multiday fisheries, thereby promoting more sustainable and efficient use of the resource.

A preliminary study aimed to assess the magnitude and characteristics of fish losses at various stages or nodes in the fish value chain. The results indicated that multiday fisheries experienced the highest losses compared to other stages. Consequently, a subsequent survey focused specifically on the stages encompassing fish capture at sea and the unloading process at fishery harbours in multiday fisheries within Sri Lanka. In the context of Sri Lanka, multiday fisheries play a crucial role due to several factors: the presence of significant quality losses, a substantial volume of fish caught, their contribution to exports, the employment of a large number of individuals in fishing and post-harvest activities, their impact on food security, and the Government's prioritisation of this sector.

Assessment methodology

The assessment employed a systematic approach, combining interviews, field observations, data collection and analysis to capture a comprehensive understanding of post-harvest losses in the multiday fisheries. It encompassed the various aspects of multiday fishing operations, starting from the capture of fish to the final unloading process at fishery harbours. The data was collected using the Exploratory Fish Loss Assessment Method (EFLAM) and Questionnaire Loss Assessment Method (QLAM).

The assessment covered eight fishery harbours which were selected based on the large number of multiday boats operated and geographically-dispersed locations in Sri Lanka. It was conducted during the period from November 2022 to January 2023. Data was collected using a pre-tested online questionnaire (Google form), administered to the multiday boat skippers. Fish loss percentages were calculated using the SDG 12.3 Food Loss Index method.



Distribution of assessed multiday boats across selected harbours in Sri Lanka

Credit @ NARA

Results of the assessment

The data collected during the survey pertained to 1 502 fishing trips carried out in multiday fisheries, and the results are based on this sample size. Based on the sample survey, species such as skipjack tuna (*Katsuwonus pelamis*), Indian scad (*Decapterus russelli*), and yellowfin tuna (*Thunnus albacares*) collectively constituted 75% of the total catch. Among the total catch, skipjack tuna accounted for 35%, making it the largest contributor; following closely was Indian scad, which contributed 27% to the total catch. Yellowfin tuna constituted 13% of the total catch. In Sri Lanka, the three primary fishing gears employed in the multiday fisheries are longline fishing, gillnet fishing, and ring net fishing. Based on the data it can be observed that the catch obtained from various types of fishing gear was not uniform. Ring net was found to be the most frequently used fishing gear followed by gillnet, while longline showed the least usage among the three main gears considered in this study. The catch obtained from gear combinations was minimal.

Highest losses from ring net fishing

The postharvest quality loss of fish catch was evaluated, and it was found that the quality loss percentage or the portion of the catch below Grade 1 averaged 60.3%. In the case of ring net fishing, 68% of the total catch was below Grade 1, indicating a high level of quality loss. In fact, among the eight

fishery harbours assessed, the highest percentage of quality loss was observed at sites where ring nets were used as the primary fishing gear. Similarly, 61% of the total catch from gillnet fishing was below Grade 1, which also resulted in a considerable quality loss. Conversely, the longline method yielded the smallest catch quantity of low-grade (28%) fish in the sample. Longline fishing has been found to yield the highest percentage of Grade 1 fish (72%), whereas the lowest percentage of Grade 4 and 5 (<1%) fish has been observed in the same type of fishing. This indicates that longline fishing may result in a lower quality loss compared to ring net fishing.

The outcomes of the study indicate that the approaches utilised in ring net fishing and the subsequent storage procedures may require reassessment and refinement to mitigate the extent of quality deterioration. Therefore, it is essential to handle and store fish appropriately to ensure that the highest possible proportion of fish is maintained in the Grade 1 category. This approach will help to minimise quality loss and increase the overall value of the catch.

When considering the overall quality loss across the three main gear types, the quality loss value percentage was found to be 15% in the sample. This highlights a significant economic loss resulting from fish quality deterioration in multiday fisheries in Sri Lanka, from the time of catch to unloading. In terms of quantity, the results of the assessment indicated that the total loss for the sample was 1.78%, and the primary cause of this loss was identified as predatory attacks during the harvesting process by multiday fishing vessels. These losses not only affect the economic viability of fisherfolk and traders but also have implications for food security, considering the importance of fish as a source of protein and essential nutrients for the Sri Lankan population.

Factors that contribute towards losses in fisheries

Multiple factors contribute to post-harvest losses in the fisheries sector of Sri Lanka, as highlighted by the survey. Despite the substantial quantity of ice brought on board in these Sri Lankan multiday fishing vessels, the study found that fish quality loss is still prevalent. This could be attributed to poor on-board handling techniques and inadequate insulation in fish holds, leading to the melting of ice. Additionally, extended fishing trips and high rates of ice melting can exacerbate the problem. These factors likely contribute to the inability to maintain the recommended 1:1 ice to fish ratio, and subsequently impact the quality of the fish caught.

Other key factors contributing to fish quality loss include extended soaking time in nets, prolonged fishing trip duration, inadequate fish handling equipment and facilities at fishery harbours and landing sites, inadequate infrastructure, including insufficient cold storage facilities,

subpar preservation and processing facilities, limited knowledge on fish quality preservation, inadequate guidance for fishers, limited use of modern technologies in capture fisheries (such as low performance fishing gears), utilisation of low-quality inputs like contaminated water and ice, exceeding recommended fish storage levels, insufficient cold chain management during transportation, and inadequate enforcement of regulations. Additionally, the lack of appropriate transportation systems and poor market linkages were identified as other challenges leading to quality losses.



Fish auction center, Negombo fishery harbour, Sri Lanka

The fishing industry is a significant contributor to the Sri Lankan economy, employing over 500 000 people and generating approximately USD 250 million in foreign exchange earnings annually. Fish losses can significantly impact the industry's productivity, resulting in decreased revenue, job losses, and reduced foreign exchange earnings. It can also have several negative impacts on the fishing industry, the environment, public health, market price, and cause financial losses. Reduced customer satisfaction is another consequence of low-quality fish. Additionally, the industry's decline can have broader economic implications, such as food insecurity for the nation.

A multidimensional approach is needed

Addressing postharvest quality losses in the fisheries sector is crucial for promoting sustainable fisheries and ensuring food security in Sri Lanka. By reducing losses, the country can enhance the income and livelihoods of fisherfolk, reduce resource waste, and support the sustainable management of fish stocks. Furthermore, preserving fish quality and minimising spoilage contributes to the availability of nutritious seafood for local consumption and reduces the reliance on fish imports.

Therefore, it is crucial to take measures to reduce the loss of fish quality to avoid these consequences and ensure the sustainability of the fishing industry. After analysing the assessment findings, it became evident that a multi-stakeholder approach is necessary to address the identified challenges, and therefore a Multidimensional Solutions (MDS) strategy within the country is recommended. This

approach should combine suitable policies and regulations, the application of appropriate technologies, the enhancement of skills and knowledge, the development of infrastructure and services, the promotion of social and gender equity, and the creation of effective markets and linkages.


Based on the assessment findings, several recommendations are proposed to mitigate postharvest losses in the multiday fisheries sector. Investments in multiday fishing fleet development and infrastructure development, including the establishment of adequate cold storage facilities and improvement of transportation systems, are essential to maintain fish freshness and prevent spoilage. Implementing robust capacity-building programs targeted at fisherfolk, traders, and other relevant stakeholders is also crucial in mitigating quality losses. By equipping them with comprehensive knowledge and skills pertaining to proper handling, processing, and storage practices, significant advancements can be made in reducing losses throughout the supply chain. These capacity-building initiatives will empower individuals involved in the industry to adopt best practices and effectively preserve the quality and freshness of their products, thereby minimising waste and maximising economic returns.

In addition, facilitating market linkages and encouraging value-addition activities play a vital role in enhancing market access and minimising postharvest losses. By establishing strong connections between producers, traders, and consumers, market linkages enable smoother and more efficient distribution of products, reducing the chances of spoilage or waste. Furthermore, promoting value-addition activities such as processing, packaging, and branding, adds value to the products and expands their market potential. These activities not only enhance the marketability of the goods but also increase their shelf life, ensuring longer periods for

selling and consumption. Thus, by actively fostering market linkages and promoting value addition, the overall resilience and profitability of the sector can be significantly improved while curbing postharvest quality losses.

In conclusion, by implementing recommended measures such as infrastructure development, capacity-building initiatives and market linkages, supported by enabling policies and regulatory environment, Sri Lanka can foster sustainable fisheries and maximise the efficient utilisation of its fish resources, benefiting both the economy and the well-being of its population. Given the significant challenges faced by the fishing industry in the country regarding fish quality loss, it is essential to address these issues through a collaborative approach involving all relevant stakeholders. This includes active participation and involvement from the government, fishers, processors, and the private sector. By collectively working towards improving fish quality and reducing quality loss, the industry and the economy as a whole can reap the benefits. Moreover, such efforts will have a positive impact on food security and contribute to the well-being of the Sri Lankan population.

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