SPECIAL REPORT

Cold Chain Management for Seafood Project

by SEAFDEC/MFRD

Fish and seafood are important sources of protein for the people in the Southeast Asian region. Traded in high volumes in the region, and even exported across continents to the European and North American markets, fish and seafood products are highly perishable commodities and sensitive to temperature changes. Deterioration occurs almost immediately following catch or harvest, thus adopting good cold chain practices ensures high quality and minimizes food safety risks of fish and seafood products.

The Codex Alimentarius Commission (2008) defines cold chain as "*a term embracing the continuity of successively employed means to maintain the temperatures of foods, and appropriate, from receiving through processing, transport, storage, and retailing.*" Cold chain management is an essential tool in maintaining and ensuring the quality and safety of fish and seafood products, as well as its economic value from catch or harvest, to consumption. Cold chain management help to minimize deterioration, which can occur through microbiological metabolism, oxidative reactions, and enzymatic activity, and accelerated through poor temperature control.

Throughout the supply chain, the fisheries industry heavily relies on proper cold chain management practices to ensure the quality, safety, and commercial viability of its products. From aquaculture production or wild catch, post-harvest handling, receiving, processing, packing, transport, to retail, it is essential to ensure that there is no breakage in the cold chain to maintain high quality and safety of the seafood products. Practices such as the application of ice, use of refrigerated seawater, storage in refrigerated facilities, and chilling or freezing, are used to ensure that the fish and seafood is kept under cold chain throughout the supply chain. However, these low temperature conditions must also be supported by good and hygienic handling practices, to effectively delay spoilage of the fish and seafood products.

However, the fisheries industries in the Southeast Asian region face many challenges in the implementation of a cold chain system. Firstly, many players in the fisheries industry are from small to medium enterprises, with limited access to technologies and appropriate facilities, and lack the knowledge on cold chain management practices. Furthermore, many fisheries supply chain systems in this region involve individual players who operate as single entities. Thus, even if businesses are able to procure facilities and technologies to apply cold chain management in the handling of fish and seafood products, problems arise in maintaining the system throughout the supply chain. Finally, cold chain management practices are still largely voluntary in many ASEAN Member States (AMSs), and are not enforced as a requirement.

The project entitled "Cold Chain Management for Fish and Seafood" of SEAFDEC Marine Fisheries Research Department (MFRD) was carried out in view of these challenges, and based on the Resolution 20, Plan of Action D58, and Plan of Action D63, as endorsed at the ASEAN-SEAFDEC Conference in 2011.

The Project is in line with these Resolution and Plan of Action (ASEAN-SEAFDEC Conference of 2011):

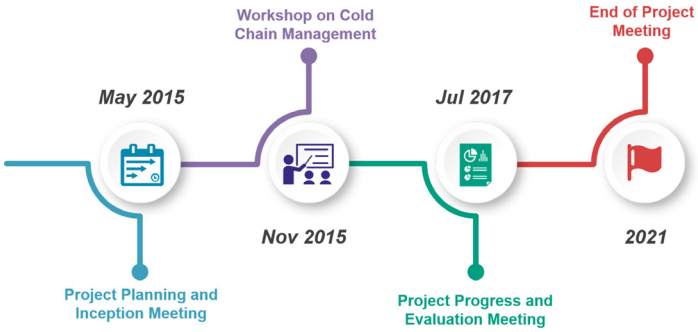
Resolution 20: Optimise catch utilisation from water to market by reducing post-harvest loss and waste. Thus increasing fish supply and improving economic returns through promoting appropriate technologies and facilities along the supply chain

Plan of Action D58: Introduce and support the development and application of technologies that optimise catch utilisation. Thus reducing post-harvest loss and waste in commercial/small-scale fisheries, and processing operations through improved processing, facilities and infrastructure development, on-board and on-shore handling, storage, distribution, and marketing of fish and fishery products.

Plan of Action D63: Promote and conduct training programs and develop training materials to upgrade the technical skills and competencies of personnel in the public and private sectors on fisheries post-harvest technology and food safety management system.

The objectives of the project were: 1) to assist in upgrading the regional seafood industry in cold chain management and technologies; and 2) to develop generic guidelines on cold chain management for the seafood industry in the region.

The project commenced in May 2015, with a project inception and planning meeting which was held in Singapore. The two-day meeting provided the AMSs with an overview of the project, an opportunity to report the current cold chain management practices and resources available in their respective country, as well as discuss the requirements and



key deliverables for each project activity. The countries were also requested to invite a participant from the private sector to provide a well-rounded view of the state of cold chain management in their respective countries.

A three-day Regional Workshop on Cold Chain Management for Seafood was held in November 2015 in Singapore. Two experts from Australia – *Dr. Janet Howieson,* Post-doctoral Scientist from Curtin University, and *Mr. Mark Boulter,* Quality Analyst Manager from Sydney Fish Market, were engaged as resource persons to impart the knowledge and skills needed to implement and monitor seafood cold chain management in the AMSs. This included methodology to measure quality parameters and developing quality indices for these key commodities, *e.g.* white shrimps, tiger shrimps, seabass, tilapia, pompano, blue swimmer crab, and squid. A field trip was also organized, to view the advanced cold chain facilities at Song Fish Pte Ltd. After the Workshop, the participants were tasked to carry out a trial to evaluate the status of cold chain management of key seafood commodities, and to identify key gaps and challenges of seafood cold chain management in their countries.

Table experts, Mr. Mark Boulter *and* Dr. Janet Howieson *during Cold Chain Management Workshop*

In July 2017, the AMSs were invited again in Singapore for the 3-day Project Progress and Evaluation Meeting. The participants reported the findings from the trials, and drafted the Regional Guidelines for Cold Chain Management of Fish and Fishery Products. The draft guidelines were disseminated to each country for national consultation with their respective implementing agencies.

Participants analysing fish quality

At the end-of-project meeting in April 2018, feedback from the national consultations on the regional guidelines were collated and discussed by the participants. The finalized regional guidelines will be submitted to the SEAFDEC Council in 2018 for endorsement for publication in 2019.

The goal of the program was to provide a platform for AMSs to share knowledge, experiences, and cost effective technologies on cold chain management of seafood, as well as develop a set of guidelines to serve as a benchmark for AMSs when developing national guidelines and standards. The successful completion of this project sees the achievement of both goals, along with addressing the gaps and limitations in cold chain management in the region.

Participants at the End of Project Meeting in Singapore, 2018