'Our Tuna, Our Wealth, Our Future: Lessons from the Pacific

The following article is a part of FIFP webinars conducted on 31st October 2020 on the topic of Value addition in fishery industry' (Part1)

Note from the Chief Editor:

Main theme of the second in the series of FIFP webinars was Value addition in fishery industry' (Part1) conducted on 31st October 2020. In all, three presentations were made covering an overview of export of tuna from India; Our Tuna, Our Wealth, Our Future: Lessons from the Pacific; and Glimpses of the Maldivian Tuna industry. Soni Maria shares her experience working with the Pacific Islands nations where Tuna is an integral part of the people's culture and livelihood and how the people of the Pacific manage and utilize their most valuable resource. The Slogan "Our Tuna, Our Future, Our Wealth" is in the minds and hearts of all. The article covers tuna fisheries of the Oceania, Major commercial species, Management of tuna fisheries in the region, organizations instrumental in developing management measures and value addition in tuna.

Introduction

Tuna plays a significant role in ocean ecosystems. They are one of the most important top predators in the food chain feeding on fishes, squid, shellfish and a variety of planktonic organisms. They play a crucial role in maintaining the marine ecosystem, and their depletion can have cascading effects on lower trophic levels. Tunas migrate long distances over all the world's oceans and occupy tropical, temperate, and even some cooler waters. Additionally, they are also an essential and affordable source of nutritious and high-quality protein- high in protein, low in fat, and essential nutrients like Omega-3. This has resulted in high demand in global markets. The canning industry is the leading destination for most of the world's tuna catches. In 2018, commercial fishing vessels landed about 5.2 million metric tons of Tuna, with an estimated dock value (the amount paid to fishers) of $11.7 billion. Their primary markets are the United States of America and the European Union for canned Tuna, while Japan is the world's largest importer of fresh and frozen Tuna in whole or loin form. Major imported-tuna processing and re-export industries are located in China, Ecuador, Philippines, Spain and Thailand. Tuna Bonito and bill fishes together contributed 9% in fish trade in terms of value.

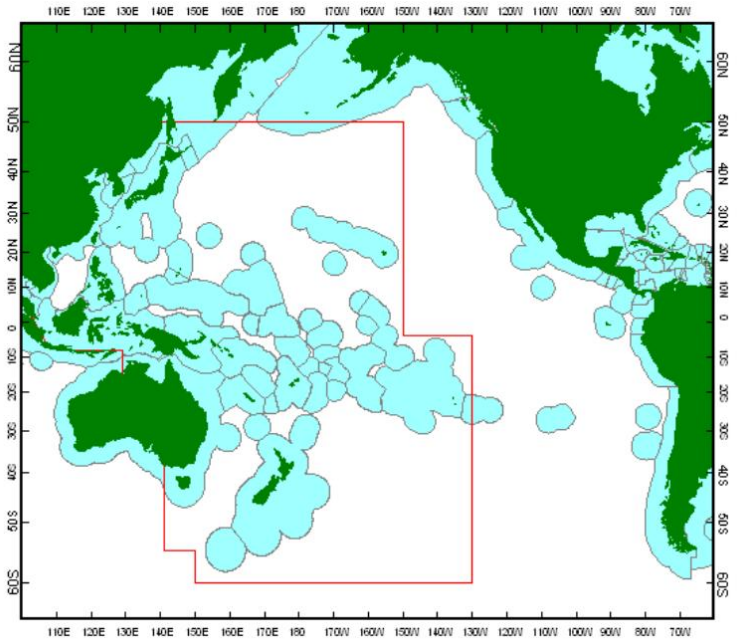
The raw material is sourced from long-distance tuna fleets fishing regional tuna stocks managed by regional fisheries management organisations (RFMOs). A Tuna regional fisheries management organization (RFMO), is an international organization that is dedicated to the sustainable management of Tuna resources in a particular region of international waters. The five tuna RFMOs namely the InterAmerican Tropical Tuna Commission (IATTC), the International Commission for the Conservation of Atlantic Tunas (ICCAT), the Indian Ocean Tuna Commission (IOTC), the Western and Central Pacific Fisheries Commission (WCPFC), and the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) are constituted of the regions' coastal states and representatives of the distant water fishing nations who are most active, and often capture much of the benefit, in the

regions. Scientists from the RFMOs use the most recent and best available data and information to evaluate the stocks and provide advice for management.

In area 71, the Western Central Pacific, Tuna and tuna-like species accounted for most of the increase in catches, with skipjack tuna increasing from 1.0 million tonnes to over 1.8 million tonnes in the last 20 years. Tunas are sourced from both offshore artisanal and long-distance fleets fishing regional tuna stocks managed by the RFMOs. The catch comprises multiple species in the tropical and subtropical latitudes of the Atlantic, Pacific and Indian Oceans. Bluefin and bigeye tuna are typically used for sashimi and sushi, while skipjack, albacore and yellowfin are used in canned and other prepared and preserved products.

Tuna fisheries of the Oceania

Fishing for Tuna has been important in Pacific Island countries for centuries. Tuna fishing has a rich history in the Oceania region of the Pacific Ocean. It forms a significant part of the cultural heritage of the region. It is enormously important for the food security and livelihood of the people in this region, is an affordable source of protein and a major resource for potential economic development. The highest per capita fish consumption, over 50 kg, is found in several small island developing States (SIDS), particularly in Oceania. Oceania covers the western and central parts of the southern Pacific Ocean. There are 16 independent states, two of which are developed (Australia and New Zealand) while the remaining states, together with a number of dependent territories of France, the U.K. and the U.S.A., are SIDS. Fish has a unique and substantial role in livelihoods, nutrition, food security and wealth generation in Pacific Island countries. In 2014, about 1.8 million tonnes of Tuna were caught in the EEZs of the 14 independent Pacific Island countries. Nearly 70% of the world's annual tuna harvest, currently 3.2 million tonnes, comes from the Pacific Ocean. Skipjack tuna (*Katsuwonus pelamis*) dominate the catch.



The Pacific Ocean, showing the boundaries of the WCPFC-CA used for the compilation of catch estimates (Source: SPC,2010)

Four species are of major commercial importance in the Pacific Islands: skipjack, yellowfin, bigeye, and albacore. These four species of Tuna are quite distinct with respect to many properties such as how they are captured, the amount presently captured, the size of the populations, and the end use of the product.

Major commercial species of Tuna

Skipjack

Skipjack tuna (*Katsuwonus pelamis*) is a smaller, warmer bodied species than other tunas like Albacore (*Thunnus alalunga*) and Yellowfin (*Thunnus albacares*). Skipjack is known as a highly migratory fish and is distributed from tropical to subtropical waters. Skipjack are a surface–schooling tuna which are easily distinguished from other species of Tuna due to their small size, small dark pectoral fins and three to six distinct dark longitudinal lines (stripes). Skipjack tuna are mainly caught by using purse seine and pole and line fishing methods. They are sold as fresh, frozen, canned, dried, salted and smoked.

Yellowfin

Yellowfin is the second Tuna species in terms of volume and popularity. Yellowfin reach intermediate sizes, between albacore and bigeye. They form both free and associated schools, with adults generally forming schools of similarly sized individuals. The free-swimming schools tend to contain large individuals and are mono-specific. They are mainly caught by purse-seine and pole and line fishing on the surface of the waters for juvenile fish, by purse seine for mature fish and longlining for mature fish in deeper waters. Juveniles are sold fresh, frozen, canned, dried, salted and smoked. Mature Tuna are of high value in the Japanese sashimi market.

Bigeye

Bigeye tuna occur in the tropical waters of the Pacific, Atlantic and Indian Oceans. They are highly migratory and travel long distances. They are pelagic species that can be found up to depths of 250 meters. Schools may also occur in association with floating objects. Juvenile bigeye will form schools with juvenile yellowfin and skipjack tunas.

Albacore Tuna

Albacore tuna are highly migratory and travel long distances. They are a pelagic species that can be found up to depths of 200 meters. Albacore tuna tend to school by size, as well as with other tuna species. Schools may also occur in association with floating objects.

Fishing methods

Tunas have been caught for centuries in the Pacific Islands. This was usually from canoes and often using handlines, troll gear, or pearl shell lures. Large scale tuna fishing gear was introduced into the region in the early 1900s. Four types of gear: purse seine, longline, pole-and-line and troll land the vast majority of tuna catch in the Pacific Islands region.

Management of Tuna fisheries in the region

As tuna are considered highly migratory, management interventions are more effective at the regional scale. But they are discussed and implemented at three different levels within the WCPO.

At the regional level, the annual Commission meeting of the WCPFC develops 'Conservation and Management Measures' (CMMs) for fisheries and stocks on the basis of advice from its Committees, including the Scientific Committee advice on stock status. These CMMs are often specific to fishing gear types, primarily because different gear types target different species. For example, recent CMMs aiming to limit fishing impacts on tropical tuna, in particular bigeye, focus on reducing longline catches and limiting fishing effort by purse seiners on FADs, because these fishing approaches have a strong negative impact on that stock.

At the subregional level, two key organizations develop management measures.

FFA – Forum Fisheries Agency

The Pacific Islands Forum Fisheries Agency (FFA) is an organization composed of 17 members with a common fisheries interest in the Pacific Ocean region. FFA strengthens national capacity through technical assistance and other support to its members.

PNA – Parties of Nauru Agreement

Eight tropical countries comprise the PNA, a subset of the FFA membership: The Federated States of Micronesia, Kiribati, the Marshall Islands, Nauru, Palau, Papua New Guinea, Solomon Islands and Tuvalu. Around 75% of the WCPO skipjack is caught in the waters of these countries. The free school purse seine fishery for skipjack is the world's largest certified tuna fishery globally and the PNA countries are leaders in the Pacific Ocean with regard to fisheries management. They were the first to implement management measures that placed temporary closures on fish aggregating devices (FADs) fisheries, closures of high sea purse seine fishing, 100% observer coverage on purse seine vessels, banning sets on whale sharks and other management measures.

As a group, the PNA aims to sustainably manage the purse seine fishery, primarily using the VDS (vessel day scheme). The fishery is managed by a 'vessel day scheme' which is an input control on the number of days that purse seine vessels can fish in the PNA waters. The number of days fished is set to maintain the sustainability of the tuna stocks according to the best scientific research on the region.

Other subregional organizations involved in the tuna fisheries and their management

SPC – Pacific Community

SPC provides technical assistance, training and scientific support to the SPC's main activities on oceanic fisheries such as training, support for oceanic fishery monitoring (observers and port samplers), fisheries catch and effort data management, scientific information on biology and ecology of tuna and large pelagic fish, ecosystem modelling, information on impacts of climate change, stock

assessments of tuna, billfish and key shark species, and the provision of scientific advice to informed-management decisions.

MSG – Melanesian Spearhead Group

Established in 2007, is a group of four independent countries — Papua New Guinea, Solomon Islands, Vanuatu and Fiji — and the Kanak socialist national liberation front (FLNKS) advocating for political independence in New Caledonia. The MSG's goal is to facilitate cooperation, promote stability and implement policies to achieve sustained improvements in livelihoods in Melanesian countries.

Representatives of these national, subregional and regional organizations meet throughout the year, and annually during the Commission meeting of the WCPFC.

Conservation and management measures taken in the region

Some of the important conservation measures taken in the region over the years include

- Imposing seasonal FAD closures — which have resulted in reducing the purse seine catch of bigeye tuna, the species that has been threatened by overexploitation
- Introducing area closures such as the prohibition of fishing on pockets of the high seas, which reduces the area over which purse seine vessels fish, thus minimizing the pressure on bigeye tuna
- Introducing mesh size regulations which ensures that smaller-sized fish are not caught, allowing them to grow older and bigger
- Prohibitions against targeting whale sharks, shark action plans, and other conservation measures to protect the marine ecosystem.
- Requiring 100% observers on all purse seiners to collect data and also to ensure that purse seine vessels do not set on FADs during the closure and do not fish on the high seas

Tuna Value Chain

A food value chain (FVC) consists of all the stakeholders who participate in the coordinated production and value-adding activities that are needed to make food products. A sustainable food value chain is a food value chain that is profitable throughout all of its stages.

The processing of canned tuna involves several steps starting from catching Tuna using fishing methods like pole and line, hand line, long lines and big purse seines to freezing onboard, unloading to processing facilities and tuna canneries, cold storage, thawing, butchering, precooking, cooling, skinning, loining, packing, freezing if intended for export for canning in other countries, seaming-retorting-cooling if directly canned, labelling, palletising, container loading, shipment and finally taking a place on the shelves of huge super markets.

Value Addition in Tuna

Fresh/Frozen Tuna

Immediately after catching, without any change in its form, tuna is frozen to -9° C in brine which is intended for canned tuna processing industry. Main species are Skipjack, Yellowfin and Bigeye. For restaurants especially for the sushi restaurants (sushi bars), tuna caught are immediately blast frozen from to -40 to -60° C. In its fresh form whole tuna is kept chilled in ice at 0° C. Main species are yellowfin and Bigeye.

Fresh /Frozen gilled gutted head off

In order to maintain the highest quality, prevent spoilage and reduce space and weight, the head or just the gills of the tuna can be removed. Also, fish can be handled with the head still on, but just the gills and the guts removed. This process takes place onboard the vessel just prior to chilling or freezing. Tuna is chilled at zero, or frozen at -18°, -40° or -60° C.

Fresh and frozen raw loins/raw tuna cuts

Raw tuna meat boneless and skinless, which has been cut by whole loins, been either cleaned in fresh or frozen state, then packed in foil and distributed in fresh or frozen form to the restaurant sector. It can be cut in various forms, such as thin sliced, steaks, saku blocks for distribution to the restaurant sector and distributed either in fresh or frozen form.

CO treated Tuna

Carbon Monoxide is used to retain or enhance the red color of the tuna meat prior to vacuum packaging.

Frozen Precooked Tuna Loins

Tuna loins are cooked, cleaned – with all skin, bones and black meat removed, creating individual fillets per loin which are then frozen at -18° C with a blast or contact freezer. It is produced especially as main component for tuna canneries which have outsourced the cleaning of tuna to other facilities.

Canned Tuna

Canned tuna is made from fresh tuna that is cooked and preserved in a suitable medium like brine or oil. The best brands manage to retain the original taste, freshness and nutrients in this fish. However, the taste may differ based on the variety of tuna, how fresh the catch is, and the storage medium. After first being cooked and having skin, bones, black meat and blood veins removed, the tuna meat is inserted in a metal or aluminum can. Water, oil or sauce is usually added. It is then thermally processed in retorts to attain commercial sterility. Shelf life of the product depends on the medium that is used, so normally for a can packed in oil it would be 5 years and brine-packed cans last up to 3 years.

Infusions

Recently introduced in the market are Tuna infusion products which come in various flavors and are in a convenient resealable pack. They are shelf-stable and have almost no water to drain thus adding further convenience.

Pouch Tuna

Tuna in pouches is another convenient packaging where Tuna is packed in pouch with minimum amount of water and oil.

Conclusion

Tuna industry is growing, meeting customer demands and enhancing the livelihood of millions of people depending on this resource. With the success of the Pacific nations in managing their resources, it is evident that when people are empowered to take ownership of what is theirs, it can be ensured that resources are available for future generations. The road to sustainability comes with consideration of the ecosystem, accelerating growth and innovation by generating ideas and inspiration throughout the Tuna value chain, creating self-reliance, championing the fishers doing the right thing and managing ocean and its resources. As it is rightly quoted by the United Nations, *"The world's oceans – their temperature, chemistry, currents and life- drive global systems that make the Earth habitable for humankind."*

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