Indonesian Tuna Supply Chain Analysis

Sustainable Fisheries Partnership
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Background

Indonesia is the biggest tuna producing countries, contributing to 12.45% of total commercial tuna production in 2007, followed by Philippines (11.36%), Japan (10.23%), Taiwan (8.3%), and Korea (6.1%). Indonesia also holds important position for highly commercial species, such as yellowfin tuna, bigeye, albacore, southern bluefin tuna and skipjack. Indonesia is the second important countries to produce yellowfin tuna, after Philippines, contributing to 7.5% of total global yellowfin tuna catches. Indonesia is the third biggest producing country for bigeye, albacore and Southern bluefin tuna in the world, contributing to 9.5%, 8% and 9% of their global catches respectively [FISHSTAT-FAO].

According to data from MMAF and JICA (2009), yellowfin tuna catches has showed downward trend, in 2000, total catch of yellowfin tuna reached 163,241 tonnes, but since then it tend to decrease and dropped to 94,406 tonnes in 2006, though in 2007 it started to recover again with 103,655 tonnes catch. Indian Ocean (Indian Ocean, Western Timor Sea, Bali Strait and Sawu Sea) used to be the main catching areas for yellowfin tuna. Almost 54% of total yellowfin tuna in Indonesia was caught from this area. In the eastern part, Sulawesi Sea and Pacific Ocean was the important catching areas for yellowfin tuna, covering 33.7% of total yellowfin tuna landings, followed by Flores and Makassar Strait (18.2%) and Moluccas Sea, Tomini Bay, and Seram Sea (12.4%) – Figure 1.

Figure 1. Yellowfin Tuna Landing Distribution per Fishery Management Areas (WPP) in 2004
Since tuna resources are abundant and scattered around Indonesian water, fishing grounds and landing areas of tuna in Indonesia are dispersed. A significant volume of tuna is unloaded in Muara Baru (Jakarta) and Benoa (Bali); three other fishing ports that also carry tuna and skipjack are Bitung, Ambon, and Sorong.

At regional level, Indonesia’s tuna fisheries fall into two RFMOs, namely Indian Ocean (western part of Indonesia’s waters) and Western Central Pacific Ocean (eastern part of Indonesia’s waters). FAO (undated) suggested that most of tuna in Western Central Pacific Ocean was caught within EEZs, but only 20% of tuna in Eastern Indian Ocean was caught within EEZ. FAO (2005) believes that there has been an unknown portion of the longline catch originates from locations outside of Indonesia.

Information provided by industry during the past years also suggests that as catches of the primary target species (yellowfin and bigeye tunas) on the ‘traditional’ grounds in Eastern Indian Ocean have declined, some vessels are fishing in other areas further from their home ports. Correspondingly these vessels are spending much longer periods at sea – up to 4 to 5 months, compared to 1 – 2 months for closer fishing grounds. There has been a corresponding increase in use of carrier vessels and fishing vessels acting as carrier vessels, landing their own catch but also catch transhipped at sea from ‘sister vessels’ of their company. Such activities have been necessary to overcome the absence of freezer facilities on the majority of the longline vessels (IOTC 2005b).

**Fishery Profile**

The Indonesian tuna fisheries can be divided into industrial fisheries and artisanal fisheries. The former are mostly longline and pole-and-line fisheries, while the artisanal fisheries use trolling gear, small purse seines, gillnets, and Danish seine. Longline normally catches big fish, such as yellowfin, bigeye, albacore and bluefin. Purse-seine normally catches small size yellowfin and skipjack.

Major fishing companies are state-owned, joint venture of the state and private company or operated by fishermen' cooperatives. Most of the fishing companies are involved with catching tuna, processing and export.

Most of industrial tuna fishing in western part of Indonesia (Indian Ocean) use longliners, usually with GT below 200 tons, with available super-cold storage facilities. This type of fishing gear can undertake long voyages and operate over large areas of the region. More than 1,000 longliners were estimated to operate in Indian Ocean in 1999 and 2000, all under the Indonesian flag, as the consequence of regulations put forward by the Indonesian government to prevent fishing by foreign vessels in the Indonesian Economic Exclusive Zone (EEZ). Many fresh tuna longliners currently operating under the Indonesian flag were before operating under Taiwanese (and Chinese) flags.

As an IOTC full member, Indonesia has opportunities in taking advantage the fish resources in the high seas with the obligation to do an effective control of the Indonesian fishing vessels that conduct activities on the high seas. Various Indonesia fishing fleet that registered in the IOTC up to 2008 are 874 ships, consists of 871 longline ships and 3 purse seine ships in Indian Ocean. Meanwhile, the number of catch from Indonesia ship that registered in IOTC in 2007 reached 252,227 tons, or 24.1% of Indonesian tuna catches.
Meanwhile, industrial tuna fishing in eastern part of Indonesia (Western Central Pacific Ocean) is mainly purse seineing, and pole-and-line (huhate) fishing from vessels greater than 15 GT. Compared to pole and line, purse seine was considerably a new tuna fishing method in Indonesia, targeting small size skipjack and yellowfin tuna. So far, purse seiners are only confined to the EEZ (Widodo et al., 2001). Simorangkir (2002) indicated that there were 39 licensed purse-seine vessels in Indonesia’s Western Central Pacific Ocean at area, mostly of about 300 GT in size, and three 900- to 1000-GT seiners based in Biak (FAO 2005). Purse seiners have fished in North Sulawesi since the late 1990s, some in Indonesia–Philippines joint ventures, catching tuna associated with rumpons (FADs), most of which is landed directly into General Santos City and other southern Philippine ports. The offshore fishery lands more than 50,000 tonnes per year from waters around North Sulawesi and Northern Papua (Naamin, et al 1995).

Pole and line (huhate) was developed by state enterprises located in Sorong, Bitung and Ambon in the 1970s. Most vessels range in size from under 10 GT to up to 30 GT. Small pole and line vessels using sail, with small engines, are called ‘funai’ and ‘rorehe’ in North Sulawesi and Ambon respectively. In addition to that, since 1992, many longliners less than 50 GT that were based in Benoa and that fished in the Indian Ocean have moved to Bitung to fish in the Banda Sea and the Sulawesi Sea (Naamin 1995).

Report from Oceanic Development (2006) noted that in 2005 Indonesian fleet comprised the followings: 2013 longliners with available super-cold storage facilities which target yellowfin tuna and bigeye tuna principally for Japanese sashimi market, about 3872 tuna pole and line vessels which target skipjack tuna, in particular for processing into fushi (dried and smoked skipjack tuna) but also for canning (Indonesia Captures Fisheries Statistics - MMAF 2007); and 1474 purse seiners.

**Tuna Supply Chain**

Tuna in Indonesia is processed into: frozen tuna, fresh chilled tuna and canned tuna. For the Japan and USA market there are 4 basic grade distinctions.

**Table 1. Tuna Quality Grades**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Quality</th>
<th>Used in</th>
<th>Products</th>
<th>Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tuna that has bright red muscle tissue, is firm in texture, has translucent flesh (clarity) and little or not fat</td>
<td>The higher end sashimi markets (high end Japanese markets)</td>
<td>Sashimi</td>
<td>Japan</td>
</tr>
<tr>
<td>2</td>
<td>Tuna with red muscle tissue, are firm in texture, some translucency and no fat</td>
<td>The lower end sashimi markets (e.g. Japan, Hawaii) or in better restaurants where tuna is prepared in semi cooked form</td>
<td>Seafrozen A</td>
<td>Japan, EU, US</td>
</tr>
<tr>
<td>3</td>
<td>Tuna with some red and some brown muscle tissue, is firm in texture, no translucency (opaque) and</td>
<td>The lower end restaurants (e.g. USA mid west)</td>
<td>Seafrozen B</td>
<td>EU, US</td>
</tr>
<tr>
<td>4</td>
<td>Tuna with brown and gray muscle tissue, soft in texture and no translucency</td>
<td>Either canned or frozen or used in fresh markets in which fresh tuna is very price sensitive and consumption is a rather new phenomena. When frozen they are called landfrozen (contrary to Seafrozen products).</td>
<td>Steak</td>
<td>EU, US</td>
</tr>
</tbody>
</table>

Note: The color of the lower qualities like #4 and even lower qualities ‘chocolates’ can be colour upgraded by the use of Carbon monoxide (CO). The use of CO is strictly forbidden in the EU, as it is an additive.

Source: [http://www.ledafish.com/tuna.htm](http://www.ledafish.com/tuna.htm)

Supply chain for tuna in Indonesia is presented in the Figure 2 below. It is a relatively common practice in the tuna industry to undertake all the processing stages up to tuna loining as close as possible to the landing areas and to export the semi-processed product (tuna loins) to canneries in other countries.

**Figure 2. Tuna Supply Chain**
**Fresh Chilled Tuna**

Species caught for fresh tuna products are bluefin, bigeye and yellowfin. These species are caught by both long-liners and pole-and-line methods and these methods of catch provide raw materials of a higher quality. Fresh chilled tuna is stored in icebox or dampened in chilled water in the vessel until it is unloaded. The fresh tuna is generally transported by air as bullets or as loins. Transporting fresh tuna as loins is the cheaper option as they are lighter and less bulky than bullets, which although gutted still include bones, skin and the cavity. The highest grade of tuna will be transported as bullets destined for the Japanese market or the very highest quality markets in other tuna consuming nations.

The speed is required from the catch to the final consumption. The fishing ground should not be too far from the unloading port. Although neither modernized vessel equipments nor landing facilities is necessary, periodical and frequent flight is necessary from the nearest airport since cargo space on passenger plane is the most economical way of air transportation. Singapore is one of major exporters of yellowfin to Japan. It is not because tuna is caught by vessels of these country and region, rather, the landing area of these country and region are used for the convenience of flight availability. There is a large price range, however, by individual species of tuna. In order for an exporter to successfully export fresh tuna to Japan, one must be knowledgeable about the quality of the fish and handling operation. Tuna is essentially distributed in the form of GG (Gilled and Gutted), i.e. a round tuna where the gut and gills are eliminated. It is more efficient to process tuna to fillet or steak before it is exported since an exporter otherwise cannot tell the quality of the meat and only 55% of the original weight is finally consumed as Sashimi (Yamashita 2000).

**Frozen Tuna**

In the case of frozen tuna distribution, tuna is frozen immediately after the catch as cold as -60 centigrade, and the temperature is kept until it reaches retailer's storage for sale. The speed of delivery is not important. Instead, modernized super-cold storage should be furnished in the catch vessel, carrier vessel, and port area in case it is transshipped (Yamashita 2000).

**Canned Tuna**

Tuna for canneries does not question the way it is caught, and the size or variety of tuna. Fresh and frozen tuna caught by purse-seiner, hook-and-line and long liners are delivered to canneries. Canned tuna is not only made from yellowfin but also from albacore, bigeye tuna and skipjack. In terms of volume, skipjack is the dominant species. The prices of yellowfin are higher than those of skipjack because yellowfin are often considered to be of better quality and also, because they are larger, produce less waste than do skipjack during processing. Canned yellowfin and skipjack are usually labeled as light-meat tuna, except in Japan, where skipjack cannot be legally labeled as tuna. Albacore is marketed as white-meat tuna, which has a higher value than light-meat tuna (Catarci 2003).

In 2001, MMAF estimated the presence of 25 tuna processing factories, 16 of which were canneries with 9 factories processing into fushi (dried and smoked products). Approximately 30,000 t (though the production capacity is 70,000 t) of canned tuna is produced per annum, whereas the production of fushi products is 7,000 t per annum. Its production is mainly skipjack for the international market (Japan, U.S., Middle East and Northern Europe).

Although Indonesia is one of the biggest tuna fishing nations, in terms of canned processing, Indonesia only contribute about 2.7% of total canned processing in the world in 2006 with total
production of 44.6 thousands t, about 6.2 thousands t less than 2005 production when it reached its peak (Globefish 2008).

**Indonesian Tuna Export**

Total Indonesian exports of fishery products in 2007 were valued at USD 2.26 billion, US$ 155 million more than in 2006. Tuna products are the second biggest Indonesian fishery product exports, contributing 13.5% of total export value or about USD 304.3 million in 2007. Shrimp has been the biggest commodity export from Indonesia, contributing 45.6% of total export value or USD 1.03 billion in 2007. Total export volume of tuna in 2007 reached 121,316 tonnes (MMAF and JICA 2009). In 2008, MMAF claimed that tuna export from Indonesia reached increased and reached 125,933 tonnes, valued at US$ 337.89 million.

Indonesian tuna export started to grow rapidly from 1980s to early 1990s. Indonesia tuna export in 1991 amounted to 103.4 thousands t, compared to 14.4 thousands t in 1981, with an average growth rate of 17 percent per annum. Uktolseja (1995) suggested that the rapid development of the Indonesian tuna industry in this period was due to the support by the government of such as: encouraging the export of non-fuel and natural gas commodities such as shrimp and tuna, providing loans to the fishermen, establishment of physical infrastructure, such as fishing ports, piers, market halls, dockyards, and slipways, creation of production, processing, and marketing facilities, such as fishing boats, fishing gears, engines, cold storage, and deployed rumpon (FADs) and subsidizing air cargo for the export of fresh tuna.

**Figure 3. Indonesia Tuna Export (1999-2007)**

In terms of the products, in the beginning fresh and frozen tuna dominated total export, covering more than 80% of total export until early 1990. Export of canned tuna started to grow rapidly in 1991, contributing to 40% of total export compared to 26% in previous year.

Data from 2002-2004 shows that exported tuna products were dominated by canned tuna (44%) with the average price of US$ 2.48 per kilo, followed by frozen tuna (29%) with the average price
of US$ 1 per kilo and fresh tuna or high quality tuna (27%) for sashimi with the average price of US$ 3.8 per kilo (MMAF 2007).

Indonesia Tuna Market

Historically, Japan has been the biggest market for Indonesian tuna export. In terms of export value, during period 2001-2006, 44% of total Indonesian tuna export went to Japan, followed by U.S. (27%), Saudi Arabia (4%), Germany (4%), and Singapore (3%). In 2007, Japan is still the biggest market for Indonesian tuna, taking up 25.8% of total tuna export volume from Indonesia or amounted at 31,330 tonnes, followed by United States (17.6%), Thailand (15.5%), Germany (6.9%) and Hong Kong (3.3%).

In terms of value, Japan contribute the biggest portion, contributing to 37% of total tuna export value in 2007, valued at US$ 112.67 million, followed by United States (24.6%), valued at US$ 73.56 million. Thailand contributed to 6.9% of total export value, with US$ 21 million. European countries (Belgium and Luxemburg and Netherlands) also contributed significant amount of export value, with 5.5% and 1%.

Data from Globefish (2006) shows that from 45 thousands t of Indonesia fresh and frozen tuna export, about 15 thousands t was exported to Thailand, 15 thousands t (using 2004 data) to Japan, 2.7 thousands t was exported to U.S. So it means that both Thailand and Japan have already contributed to more than 60% of total Indonesian fresh and frozen tuna export. Data from Globefish (2006) shows that from 47 thousands t Indonesian canned export, about 17.5 thousands t (or 37%) was exported to U.S. and 7.8 thousands t (or 17%) to European Union countries. It means that U.S. and European Union has been the most important market destination for Indonesian canned tuna products.

Indonesia is the biggest frozen tuna supplier to the U.S. contributing about 43% of total U.S. frozen tuna import in 2009, or totaled 11,560 tonnes (valued US$ 99 million), followed by Philippines (16%), Canada (6%), Thailand (6%) and Vietnam (6%). In terms of fresh tuna, Indonesia only contribute 4% of total US fresh tuna import in 2009, totaled 853 tonnes. The biggest supplying countries for fresh tuna in US market were Vietnam (12.3%), Trinidad and Tobago (9.3%), Ecuador (9.2%), Philippines (7.4%), Fiji (7%), Panama (5.2%) and Mexico (5%). Indonesia was the third biggest supplying countries for canned tuna in US market, contributing 5% of total US canned tuna import or 13,725 tonnes, following Thailand (48%) and Philippines (12.4%).

U.S. has been the biggest market for Indonesian fishery exports, contributing to more than 30% of total Indonesian fishery exports. Total value of U.S. fishery products import from Indonesia reached USD 918 million in 2009, decreased significantly from 2008, which was US$ 1.1 billion. In terms of value, tuna is the second biggest U.S. edible fishery import from Indonesia, after shrimp, contributing to 17% of total import value in 2009, or totaled US$ 154 million. Shrimp and crab contributed to 54% and 14.1% of total import value of edible fishery products from Indonesia to US market respectively.

In terms of species, tuna imported to US market from Indonesia consists of albacore (21%), yellowfin tuna (8%), bigeye tuna (1.5%), bluefin tuna (0.2%) and not specified (69%). In terms of products, more than 50% of tuna imported to US from Indonesia is in the form of ATC (Air Tight Container), about 45% is in frozen and less than 5% is in fresh [NMFS].
The EU nations of UK, France, Germany, Italy and Spain are all amongst the largest importers of prepared and preserved tuna products. Indonesia contributed to about 2% or totaled 10,600 tonnes of total canned tuna import to EU market in 2007. Main markets of canned tuna from Indonesia in EU were Germany, UK and Netherlands.

In 2007, some 60% of EU imports of whole round frozen tuna were yellowfin. According to some sources, ambient tuna production in Europe “is now mostly aimed at yellowfin”. Ambient products using yellowfin put pressure on the materials available for fresh yellowfin tuna products. There is a trend for outsourcing the primary stages of ambient tuna production i.e. growth in imports of tuna loins rather than whole fish, particularly into Italy and France and more recently Spain (Seafish 2008).

The market for tuna products is global and as such is subject to international trade rules. Trade tariffs and barriers affect trade flows of tuna as they can affect the price and availability of tuna in specific regions or nations.

At least there are more than 80 tuna Indonesian exporters to U.S. market. There is no single exporter that dominating tuna export from Indonesia. But the leading Indonesian tuna exporters in the last five years are Super Saku Bali, Intimas Surya, Juifa Intl Foods, Hatindo Makmur and Avila Prima Intra Makmur.

Indonesia Tuna Association was established on November 8, 1997 with main purposes:

1) To ensure tuna business activities covering catching, culture, processing and marketing.
2) Acting as liaison between tuna entrepreneur in Indonesia and government, and other related organizations national and international as well.
3) To strengthen the endurance of business taking into account the sustainability of the resources, etc.

Members of ASTUIN are companies which vessels have the following specifications: steel longliner, beyond 130 GRT, equipped with super deep frozen facilities; (139 companies).

Meanwhile, Indonesia Tuna Longline Association (ATLI) currently has 53 companies listed as members as ATLI up to January 2010.

**Key Issues**

**Infrastructure**

Indonesia Tuna Association stated that one of the ways to increase the quality of tuna is by strengthening the infrastructure of national capture vessel. For example additional vessel completed with 60 C degree of storage in it, to maintain the quality of the tuna (http://www.dkp.go.id/dkp5en/index.php/ind/news/1637/quality-enhancement-of-tuna-entrepreneurs)

**Lack of materials for canning industry**

In the last few years, especially after the increase of fuel price, many of national canning industries lack of raw materials. Association of Fishery in Indonesia (HNSI) noted that each cannery need at least 80 tonnes of tuna in a da or about 28,000 tonnes per year. It means that the tuna production should be able to supply the 17 canneries in Indonesia. However, according to them, about 50% of these 17 industries cannot produce due to lack of raw materials
Illegal Unregulated and Unreported Fishing

Herrera (2002b) indicated that many small longliners (< 200 GT) operating in Indian Ocean have almost never reported their activities since early seventies. It is believed that the numbers of these fleets have constantly increasing, exceeding the 1,000 vessels in early 2000. This fleet is almost fully made up by Taiwanese and Indonesian owned longliners although some Chinese longliners are also operating since 1995. These vessels target yellowfin and the bigeye tuna, which are generally kept in crushed ice (seldom in refrigerated sea water) to be unloaded to processing plants in different ports of the Indian Ocean, where they are graded and, if complying with the ‘sashimi’ quality standards, air-freighted to Japan. These vessels have been using different ports of landing in the Eastern Indian Ocean, mainly in Indonesia, Malaysia, Thailand and Sri Lanka. Small numbers of these longliners also use Seychelles and Maldives as their ports.

In the Northern portion of Indonesia, tuna fishing situation has been complicated by legal, semi-legal (authorized vessels making unauthorized landings outside Indonesia), and illegal fishing by Philippine tuna fishing vessels. Most of the fish catches caught by Philippine purse seiners are not recorded. It is estimated that approximately 70 to 80 per cent of all tuna catches by Philippines vessels in the Indonesian EEZ are landed in the Philippines without being reported to designated Indonesian ports. In addition to that, most of the FADs deployed in this area are not regulated in practice because it is often not clear which country has jurisdiction over them (Sodik 2007). Report by Sea Fare Group (2008) also reported that most tuna landed by Philippines pump boats is caught in Indonesian water (80% by most estimates). These pump boats operators do not have fishing agreements with Indonesia.