

Skipjack (*Katsuwonus pelamis*) tuna pole-and-line marketing supply chains in Indonesia: case study in Pulau Bacan

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Abstract. The skipjack tuna fisheries in the Eastern Indonesia has the potential for sustainable fisheries in terms of tuna size and species caught. One of the reasons is the sustainable fishing gear which is known in the local name as hutate or internationally popular as pole-and-line. This study examines the supply chains of skipjack tuna fishery in eastern Indonesia by conducting a case study at Pulau Bacan, North Maluku. The research activity was conducted in 2015. Data was collected through interviews and surveys directly at the research sites, in this case is the landing base. Moreover, the researcher also observed how the skipjack has being captured and handled by participating in fishing trip activities. The marketing chains can be identified through interviews with fishermen, stakeholders, policy makers and marketing actors. The result showed that skipjack supply chains in Pulau Bacan have traditionally been dependent on middlemen because they manage the local market, control the prices, and provide financial support for fishing operations. The skipjack supply line in Pulau Bacan starts from the fishers at the landing site, then the fish is being transported to a middleman who is traditionally known as a *dibodibo*, and subsequently onto the local and inter-island markets agent. But no traceability system was found on the supply lines in Pulau Bacan because the market was monopolised by traditional local middlemen instead of the national or international players.

Key Words: *katsuwonus pelamis*, pole-and-line, marketing, supply chain, eastern Indonesia, sustainable fisheries.

Introduction. Skipjack (*Katsuwonus pelamis*) is one of the capture fisheries commodities in Indonesia that has good development potential (van Duijn et al 2012). The global tuna market is supplied with a range of products, including canned tuna, fresh and frozen sashimi, other fresh and frozen value-added products and *katsuobushi* (Hamilton et al 2011). The Indonesian Ministry of Marine Affairs and Fisheries (MMAF) reported that total Indonesian exports of tuna, including skipjack and eastern little tuna (*Euthynnus affinis*), increased from 122,450 tonnes in 2010 to 206,553 tonnes in 2014 (MMAF 2015). In early 1980s, Indonesia was known as the seventh largest tuna producer globally, then by the early 1990s moved to the third largest tuna producer. By 2004, Indonesia had become the highest producer of tuna worldwide (Sunoko & Huang 2014). The tuna and skipjack fisheries are important export commodities in Indonesia (Naamin & Gafa 1998) as the frozen products, fresh and other processing commodities (Saputra et al 2014). Fishing gears that usually operated to catch skipjack tuna are commonly purse seine and handline (Saputra et al 2014) also pole-and-line (Monintja & Mathews 2000). According to Karman et al (2016) skipjack tuna fishery in Pulau Bacan, North Maluku are

using *huhate* fishing gear or also internationally known as pole-and-line. The fishermen also use the fish aggregating devices (FAD) also known as *rumpon*. In general, skipjack resources are economical commodities in the most eastern Indonesia territory which is generally carried out by small scale fishermen (Monintja & Mathews 2000; Khan et al 2018). However, small-scale pole-and-line tuna fisheries in Indonesia are at risk from several threats to their sustainability business. One threat is overfishing by the illegal, unreported, and unregulated (IUU) fisheries (Arias & Pressey 2016), mostly from foreign fishing fleets, which derive substantial tuna catches from within Indonesia's exclusive economic zones (EEZs) (Leroy et al 2016; Khan et al 2018).

The certification scheme which is required by many developed countries could also influence the market price of tuna, where it can be started from the fishing port dockside level in the developing countries (Stemle et al 2016; Stratoudakis et al 2016; Adolf et al 2016). Furthermore, traceability plays a key role in promoting pole-and-line fisheries since they create very little discarding non target fish or by-catch, and have a negligible impact on the benthic system. This study aims to understand the tuna pole-and-line marketing supply chains in Pulau Bacan, North Maluku.

Material and Method

Study sites. The research was carried out in North Maluku waters with the case study at Pulau Bacan fish landing area. The study was conducted from July to September 2015. The location was chosen because Pulau Bacan fishing port is one of the landing bases for skipjack tuna fisheries in the North Maluku. The location had data availability related to their skipjack pole-and-line supply lines, marketing chains and recorded landings data.

Data sources. Data collected includes marketing chain data, production data that taken both through questionnaires and secondary data collection from relevant agencies. In addition, a field survey by taking a fishing trip with fishermen was also carried out in order to get good quality of data collection process.

Questionnaire data was collected from various sources. The primary interviewed were the key informants (KIs) who conducted the interview in depth. The KIs were chosen for their expert knowledge and working experience of skipjack pole-and-line fisheries at the research sites. Part of the KI questionnaire focused on the KIs' perceptions of their market supply lines and the traceability of their products. Initial contact was conducted with several potential KIs with interactions and introductions activity by official fishery staff, landing site staff, fishers' group leaders, captains, community leaders, scientists, and policy makers from local and national levels. The answer from KIs to the interviewer generated mainly qualitative data. Additionally, further contacts were established by using the 'snowball sampling' method, whereby participants suggested other possible participants (Gubrium & Koro-Ljungberg 2005), or by visiting other stakeholders at the research sites as suggested by Turner (2010). Second, 560 fishers were questioned in a field survey by the researcher with additional support from two local field assistants who received training related to the conduct and aims of the research (Lavides 2009). This survey questionnaire (SQ) contained closed questions and generated quantitative data.

Data analysis. The information obtained from the KI questionnaires on respondents' perceptions of the supply lines and market chains was collected, interpreted, and analysed descriptively. Descriptive analysis was used to obtain relevant information regarding the current conditions of the tuna pole-and-line supply lines and marketing system to describe the existing supply lines and market chain situations. From the SQ questions, the associations between types of stakeholders and their perceptions of the supply chains and the traceability were compared and differences were determined using Chi-square tests.

Results. Pulau Bacan fishing base is one of the ports of fisheries in the North Maluku region with skipjack tuna as the main production. The production of skipjack fisheries in Pulau Bacan can be illustrated in Figure 1. The data illustrates the production fluctuations dated from 2006 to 2015 which generally increased in trend. Skipjack tuna production is in the range from 556 thousand tons to 4,363 thousand tons annually.

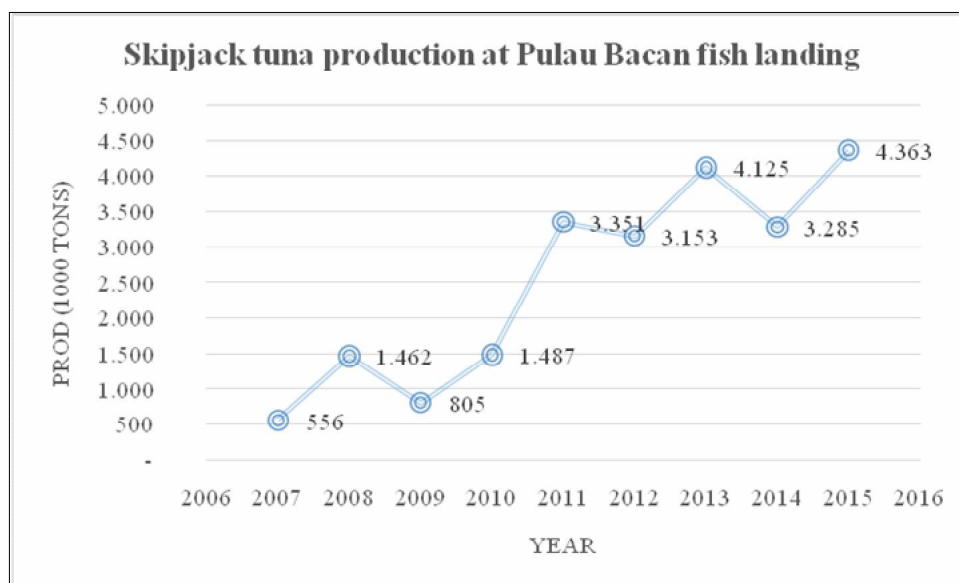


Figure 1. Skipjack production data (Source: Pulau Bacan Fishing Base Annual Report 2016).

There was no processing company, either for canning or frozen processing plant at the landing site in Pulau Bacan. The fishers were landing their catches at the government-operated landing port in Pulau Bacan where contracted and non-contracted middlemen (known as *dibo-dobo*) were waiting for the landings. The whole fresh tuna was then distributed to another location either within or outside Pulau Bacan by the middlemen, who were supplying the frozen and canning companies. The closest canning company is located in Bitung (North Sulawesi), while the closest frozen-fish company is in Ternate (North Maluku). From the canning and frozen companies, the tuna subsequently enters national and international markets. The tuna distribution market lines in Pulau Bacan have traditionally been dependent on middlemen because they manage the local market in Pulau Bacan, control the tuna prices, and provide financial support for fishing operations. KI-09 stated that: *"the tuna supply line in Pulau Bacan starts from the fishers at the landing site, is transported to a middleman who is traditionally known as a dibodibo, and subsequently onto the local and inter-island markets"*.

No traceability system was found on the supply lines in Pulau Bacan because the market was monopolised by traditional local middlemen rather than by national or international players (Figure 2).

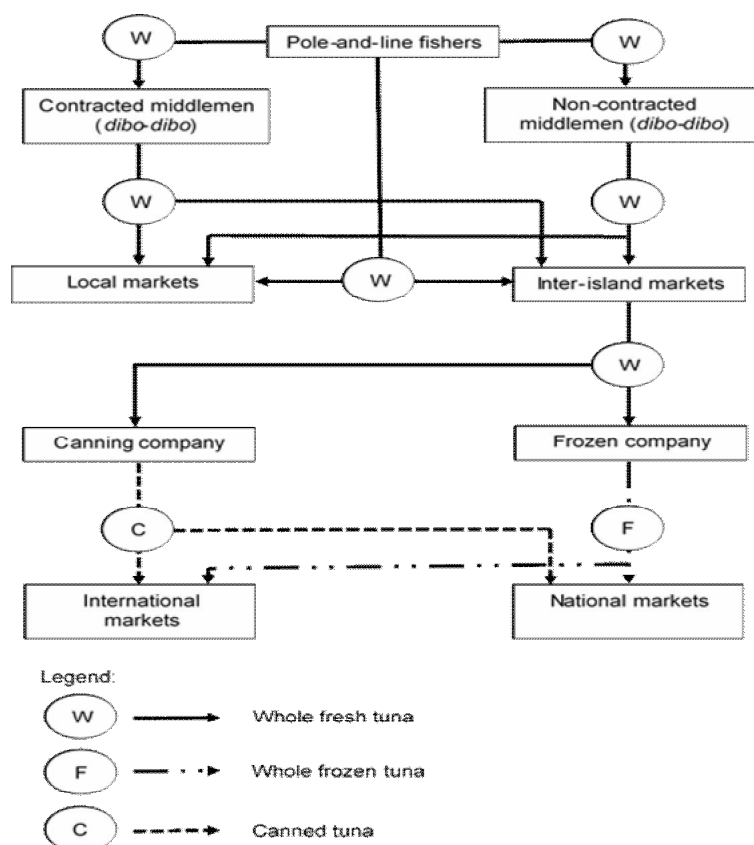


Figure 2. Pole-and-line tuna distribution supply lines in Pulau Bacan. The arrows reveal the market flow with regards to the tuna.

Discussion. The traditional tuna supply activities can still be found in several places in developing countries, including Indonesia. As Alimina et al (2015) notes, the small-scale tuna pole-and-line supply line in Southeast Sulawesi, eastern Indonesia consists mainly of fishers to middleman or to retailers and subsequently into some form of processing or cold storage. Finally it is sold on to consumers locally. This study finds that the range of marketing strategies options is constrained by either or both contractual or traditional arrangements. Traditional arrangements restrict marketing opportunities in Pulau Bacan also because non-contracted or contracted middlemen control the landing process, manage the local market, control tuna prices, and provide financial support for fishing operations. It is clear that, the fishers in Pulau Bacan are locked into a marketing system which is completely monopolised by middlemen. This fact is contrary to study undertaken by Watson et al (2017) which has revealed that open market access between developed and developing countries may lead to poverty reduction, greater food security and strengthened small-scale fisheries resilience. For example, open market access for tuna products from Regional Fisheries Management Organisations (RFMOs) members such as Indonesia to markets in Europe, USA, Japan and other developed countries led to more fairness in setting tuna prices (Jeon et al 2008; Huang & Leung 2011; Fernández-Polanco 2016).

The profits from tuna fishing go mostly to middlemen rather than fishers. The fishers have very limited direct communication with retailers and therefore, the fishermen are price-takers rather than price-makers. In Pulau Bacan, most catches are taken by the "dibo-dibo" (traditional middlemen), who provide logistical support for fishing operations and thereby form an association with fishers with an implied obligation for fishers to hand over their catches. However, some fishers who have direct access to local and inter-island markets could increase their income seeing as no middleman is involved in the supply line. This finding is consistent with research carried out on fishers' incomes in Kenya, Ghana, Namibia, Sri Lanka, Thailand, the Philippines, Nicaragua, Brazil, Chile, Senegal and Fiji by Bene (2006), which suggested that where the fishers were actively involved in the selling of export-orientated products, their activity tended to increase

their incomes. However, this benefit could be eroded by government policies that increase the cost of business activities (Barclay & Cartwright 2007). Furthermore, many governments consider eco-labelling certification schemes as a helpful additional tool for fisheries management (Gulbrandsen 2014).

Conclusions. The skipjack supply chains in Pulau Bacan have traditionally been dependent on middlemen because they manage the local market, control the prices, and provide financial support for fishing operations. The skipjack supply line in Pulau Bacan starts from the fishers at the landing site, is transported to a middleman who is traditionally known as a *dibo-dibo*, and subsequently onto the local and inter-island markets. No traceability system was found on the supply lines in Pulau Bacan because the market was monopolised by traditional local middlemen rather than by national or international players.

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