

# Indonesia tuna fisheries development and future strategy



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## ABSTRACT

Tuna has made a significant contribution to Indonesian and world fisheries. Indonesian tuna fisheries were introduced from Japan, Taiwan and Korea. Longline fishing was introduced in 1962, and purse seine gear was first used in 1974. Many foreign vessels have reflagged to the Indonesian flag. The Indonesian government developed its own tuna fisheries and closed the chartering program in 2006. Through these efforts, Indonesia became the number one tuna production country in 2004 and has further targeted an increase in marine capture fisheries catch of 0.5%/year from 2010 to 2014. Tuna resources remain under pressure globally. The tuna regional fisheries management organizations attempt to manage tuna fisheries by strengthening conservation of stocks. To enhance international cooperation, Indonesia ratified the 1982 Convention on the Law of the Sea in 1985 and the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks in 2005 and became a member of Indian Ocean Tuna Commission and Commission for the Conservation of Southern Bluefin Tuna and a cooperating non-member of Western and Central Pacific Fisheries Commission in the 2000s. Consequently, Indonesia adopted domestic regulations to comply with management measures. For future sustainable development, Indonesia needs to build its capacity, improve its compliance with the tuna RFMOs' conservation and management measures, strengthen data collection, develop its products to increase their quality and diversification, and enhance its international cooperation.

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## 1. Introduction

Situated between the Indian and Pacific Oceans, Indonesia is an archipelago consisting of 13,427 islands [1], with the fourth longest coastline in the world at 95,181 km [2,3]. Indonesian fisheries production reached 9 million tonnes [4] and became third in marine capture fisheries, seventh in inland capture fisheries and fourth in aquaculture among all countries in 2008 [5]. The marine capture fisheries contribute significantly to national fisheries. The potential value of Indonesian fisheries is estimated to be US\$ 82 billion annually, including US \$ 15.1 billion from marine capture fisheries [1]. With respect to composition, tuna (in this paper, "tuna" refers to all tuna species, including skipjack and eastern little tuna/tongkol) accounts for the largest proportion of the catch, with 19.65% of production, including bigeye, yellowfin, albacore, bluefin (4.22%), skipjack (7.27%) and tongkol (8.09%) [6], and tuna export has reached 128,715 t at US\$ 345 million [7]. Indonesia had the sixth or seventh highest tuna production

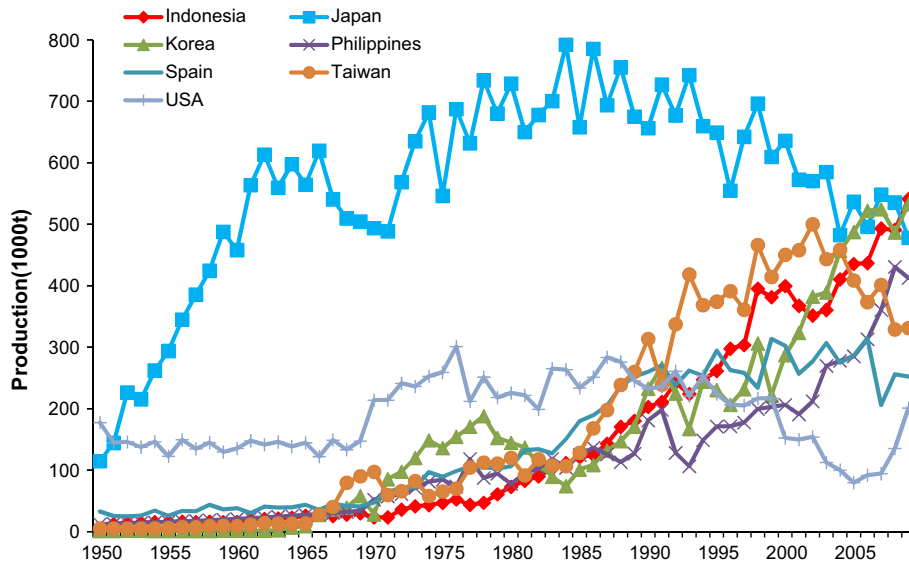
before the 1990s. After Indonesian tuna production increased rapidly in the 1990s while US production simultaneously declined, Indonesia became third in the 1990s. The decreasing catch of Japan and Taiwan in the 2000s enabled Indonesia to become the number one tuna-producing country after 2004 [8,9] (Fig. 1). The Ministry of Marine Affairs and Fisheries (MMAF) Strategic Plan 2010–2014 outlines a goal for marine capture fisheries production to increase by 0.5% per year. The plan would increase production from 5.38 million tonnes in 2010 to 5.5 million tonnes in 2014 [1].

However, global marine fisheries resources are decreasing; in particular, an estimated 32% of commercial fish stocks were classified as overexploited, depleted or recovering in 2008 [5]. Tuna is a highly migratory species (HMS), and approximately 40% of world's production is from the high seas [10]. Tuna industry development faces global issues such as illegal, unreported and unregulated (IUU) fishing; environmental degradation; climate change; competition with other tuna producer countries; and barriers on trading, among others. Among the 23 tuna stocks, up to 60% were fully exploited and up to 35% were overexploited or depleted, with few reported to be underexploited (primarily skipjack tuna) [11]. The 1982 Convention on the Law of the Sea (UNCLOS 1982) requests coastal states and distant water fishing nations (DWFNs) to cooperate to ensure the conservation and

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**Fig. 1.** Tuna Production of Major Tuna Fishing Countries from 1950 to 2009. Resource: [9], Indonesia's data after 1977 was from [51–55].

optimum utilization of HMS through existing regional fisheries management organizations (RFMOs), including by creating a new RFMO that all can join [12–14]. The five tuna RFMOs, including the Inter-American Tropical Tuna Commission (IATTC), International Commission for the Conservation of Atlantic Tunas (ICCAT), Commission for the Conservation of Southern Bluefin Tuna (CCSBT), Indian Ocean Tuna Commission (IOTC), and Western and Central Pacific Fisheries Commission (WCPFC), aim to manage tuna fisheries to ensure that those stocks are maintained at or above levels that are capable of supporting maximum sustainable yield [15]. Under the IUU vessels list schemes of the RFMOs, 355 Indonesian fishing vessels were identified as IUU vessels by CCSBT trade information, and 75 Indonesian large-scale longline vessels were identified as IUU vessels by ICCAT. Indonesian IUU fishing vessels have been detected in the Southern Ocean and within the North Pacific Anadromous Fish Commission Convention area. These IUU fisheries have resources, economic and political impacts on Indonesia [16].

Given these circumstances, how can Indonesia develop its tuna fisheries? The literature systematically analyzing the status of Indonesia's tuna fisheries with respect to management and especially participation in international societies is limited. The present research aims to provide a comprehensive overview of the development of Indonesia's tuna industry in the past and analyzes current Indonesian efforts to comply with the conservation and management measures (CMMs) adopted by tuna RFMOs. The results are expected to provide a reference for those interested in learning about Indonesian tuna fisheries management and to provide recommendations for government policymaking of other developing island countries.

## 2. Indonesian tuna fisheries status

### 2.1. Fisheries resources

Indonesia has 5.8 million km<sup>2</sup> of marine waters, consisting of 3.1 million km<sup>2</sup> of territorial waters and 2.7 million km<sup>2</sup> of Exclusive Economic Zone [1]. Indonesian waters contain large marine ecosystems with high biodiversity [17], including economically important marine species such as 44 groups of fish, 7 groups of crustaceans, 7 groups of mollusks, 3 groups of other marine

animals and 2 groups of seaweeds [18]. Indonesian waters are divided into eleven fisheries management areas designed for fishing monitoring, stock assessment of fish resources, and total allowable catch and for fishing licensing consideration.

According to the Minister of Marine Affairs and Fisheries Decree No. KEP.45/MEN/2011 on the Estimation of Fish Resources Potential in Indonesia's Fisheries Management Areas, the potential biomass of tuna and tuna-like species was approximately 1,145.4 thousand tonnes/year, while the Minister of Agriculture Decree No.995/KPTS/IK.210/9/99 separated 851.3 thousand tonnes/year in territory waters and 332.9 thousand tonnes/year in the IEEZ. The total allowable catch (TAC) for tuna (bigeye, yellowfin, albacore, and bluefin) was 274 thousand tonnes/year. The TAC for skipjack was 437 thousand tonnes/year, and the TAC for tongkol was 235.7 thousand tonnes/year (Table 1).

However, the tuna resources in Indonesian waters are under pressure. Most species have been fully exploited or over-exploited. Only the skipjack maintained a moderate level. Southern Bluefin Tuna has been over-exploited, and bigeye tuna is classified as over-exploited except in the Makassar Strait waters, Bone Bay, Flores Sea and Bali Sea. Yellowfin tuna has been fully exploited except in the Makassar Strait waters, Bone Bay, Flores Sea, Bali Sea, Aru Sea, Arafura Sea and Eastern Timor Sea.

### 2.2. Tuna fishing fleets

Indonesian vessels primarily capture tuna by angling, trolling lines, pole and line, longlines and purse seines. Skipjack are taken by pole and line, troll line, purse seine and angling. Tongkol are taken with troll lines, drift nets, purse seines, seine nets and angling [19,20]. There were 18 tuna longline, 513 pole and line, 1706 purse seine and 32,538 troll line fishing vessels in 1979. After three decades, the numbers increased to 10,345 tuna longlines, 12,727 pole and line, 18,423 purse seiners and 84,953 troll lines in 2009 (Fig. 2). Approximately 90% of the vessels are smaller than 5 GRT; these vessels are artisanal and operating in coastal areas. With respect to capture method, more than 90% of the fishing vessels used troll lines in 1979, but the percentage decreased to 67% in 2009. In contrast, the percentages of longline and pole and line vessels increased from 0% and 1% in 1977 to 8% and 10% in 2009.

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