INDONESIAN TUNA FISHERIES: GETTING TO KNOW OUR NEIGHBOURS

Peter Williams
Fisheries Database Supervisor
SPC Oceanic Fisheries Programme
(PeterW@spc.int)

Introduction

Indonesia is the world's largest archipelago, comprising over 17,500 islands with a combined coastline of about 81,000 km. The enormous number of highly varied ecosystems that exist in Indonesia's archipelagic waters has resulted in high biodiversity and productivity.

Indonesia's EEZ is adjacent to several Pacific Island countries (e.g. Palau, Papua New Guinea and the Federated States of Micronesia) and, therefore, shares the valuable highly migratory fish resources of the western and central Pacific Ocean. It is important that Pacific Island countries have an understanding of what is happening with tuna fisheries in Indonesia, with a view for enhanced future cooperation under the umbrella of our regional fisheries management agencies.

Indonesia's tuna fisheries in the Pacific Ocean

According to official FAO statistics (http://www.fao.org/fishery/statistics/tuna-catches/en), Indonesia catches a significant portion of the world's tuna. Indonesian fisheries comprise a complex mix of industrial and artisanal fisheries spread out over a wide area with unloadings undertaken in many ports. Artisanal fishing craft in Indonesia number in the hundreds of thousands over the past decade — a daunting statistic for any fisheries monitoring staff. The number of non-motorised fishing vessels in Indonesia is estimated to range from 220,000–250,000, while the number of vessels with outboard and inboard motors ranges from 160,000–180,000 and 80,000–90,000, respectively. Indonesia's fisheries are mainly traditional or small-scale (artisanal), consisting of gill nets (30%), traps (11%), trolling (7%), seine nets (6%), lift nets (5%) and other minor gear types. Commercial purse-seine and longline fisheries account for only 2% and 1%, respectively, of the total number of inboard fishing vessels.

The main gear types used to target pelagic tuna species in Indonesia are the industrial and small-scale purse seine (*pukat cincin/jaring pajeko*), pole-and-line (*huhate/pancing funae*), troll line (*pancing tonda*), handline (*pancing ulur tuna*) and longline (*rawai* tuna). Most tuna fishing involves fish aggregation devices (*rumpons*), which have been used traditionally in Indonesia for centuries. Indonesia is now one of the few places where pole-and-line fisheries persist on a large scale; live bait for these vessels is often supplied by a separate lift net fishery, with fixed or mobile platforms (*bagans*) deployed to catch and supply bait. The diverse fisheries within Indonesia and the way in which fish catches are disposed of, requires a detailed exposé, which will be covered in a future SPC *Fisheries Newsletter* article.

Indonesian fishing vessels targeting tuna operate mainly within the Food and Agriculture Organization (FAO) statistical areas #57 (eastern Indian Ocean) and #71 (western-central Pacific Ocean) (Fig. 1). Tuna fisheries in these broad ocean areas are managed by several regional fisheries management organisations

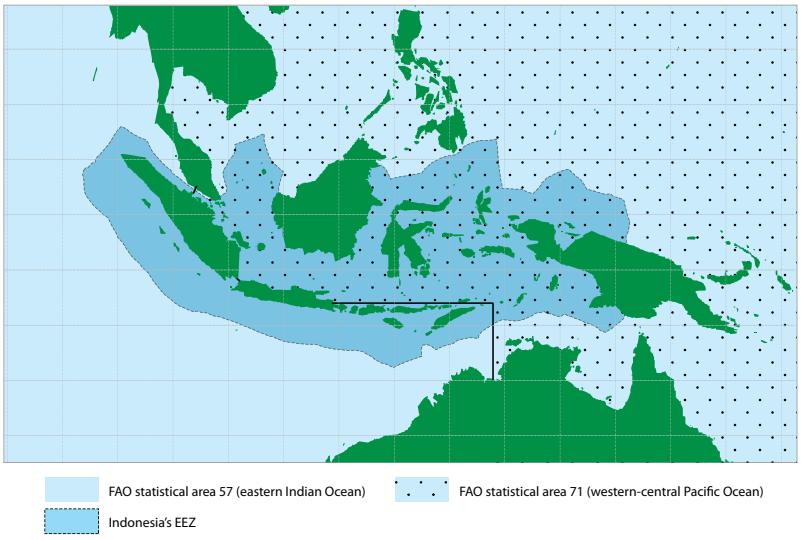


Figure 1. The Indonesian archipelago, showing the approximate 200-mile boundaries (darker blue) and the area covered by the WCPFC Convention Area (blue shading with dots, which is also FAO Area 71). Indonesian waters that do not overlap with the WCPFC Convention Area, and are included in the Indian Ocean Tuna Commission Convention Area (also FAO Area #57, light blue shading on this map)

(RFMOs): the Western and Central Pacific Fisheries Commission (WCPFC), Indian Ocean Tuna Commission (IOTC), and the Commission for Conservation of Southern Bluefin Tuna (CCSBT). Indonesia is a member of IOTC and CCSBT and was granted cooperating non-member status of WCPFC in December 2008, with a view to becoming a fully-fledged member in the next few years. WCPFC is responsible for regional tuna fisheries management that includes the part of Indonesia's EEZ on the Pacific Ocean side.[1] For national management purposes, Indonesia has divided its EEZ into 11 fisheries management areas, which were established through Ministerial Regulation 01/2009.

The main area of oceanic tuna fisheries in eastern Indonesia are the Sulawesi Sea, Maluku Sea, Halmahera Sea, Ceram Sea, Flores Sea and Banda Sea, and excludes the large continental shelf areas in the Java and Arafura Seas, and the southern part of the South China Sea where oceanic tunas do not occur.

Historically, the tuna fisheries of Indonesia's less densely populated eastern portion were subsistence, with only very minor commercial activities. However, by the 1970s and 1980s, the higher price of fish commodities abroad compared with those in the local market, along with an increased international demand for tuna resulted in a boom in fisheries exports from many coastal states, including Indonesia, which soon led to the development of pole-and-line, longline and purse-seine fisheries in Indonesia. These commercial fisheries were initially established through foreign involvement, but progressively moved to become fully domesticated, particularly over the past 10–15 years.

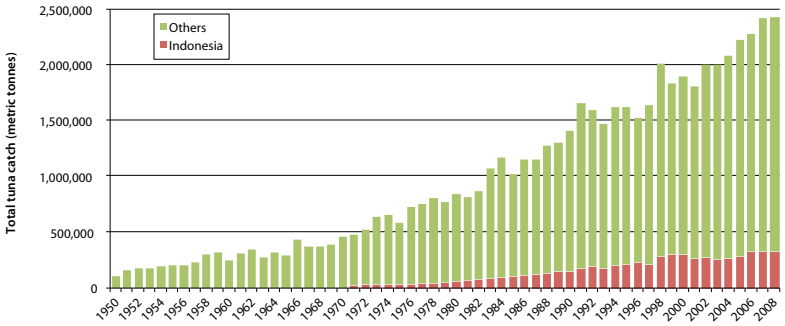


Figure 2. Comparison of Indonesia's annual total tuna catch to the annual WCPFC Convention Area tuna catch, 1950–2008

Indonesian catches of oceanic tuna (skipjack, yellowfin, bigeye, albacore and southern bluefin) and billfish species (swordfish, marlin and sailfish) represent a significant proportion of the total catches recorded in the Indian and Pacific Oceans by respective RFMOs. Eastern Indonesian catches account for around 15% of the total WCPFC Convention Area tuna catch and, therefore, represent an important component of the WCPFC tuna fisheries (see Fig. 2).

Monitoring eastern Indonesia's tuna fisheries

The complexity of Indonesia's tuna fisheries (comprising mostly artisanal craft that landing their catches at many ports) has made the task of monitoring the catch and effort extremely challenging. In the 1970s and 1980s, the Indo-Pacific Tuna Programme (IPTP, forerunner to the IOTC) was involved in establishing port sampling *inter alia* in several ports throughout eastern Indonesia. The IPTP eventually ceased involvement in Indonesia, but monitoring through port sampling and the work of scientists from Indonesia's Research Centre for Capture Fisheries (RCCF[2]) continued into the 1990s; however, data collection activities were sporadic and depended on the availability of funds. Coverage was generally very poor, which hindered the work of scientists and statisticians tasked with determining reliable catch estimates, and the provision of any data that could be used in stock assessments.

The Scientific Committee (SC) of the WCPFC noted as recently as August 2009 that there is a paucity of data on Indonesian tuna fisheries for conducting regional assessments of Pacific Ocean tuna stocks. Major problems include: i) the complete lack of operational and aggregated catch and effort data, and the paucity of size composition data; and ii) annual catch estimates provided by Indonesia have not been stratified by gear type, and bigeye tuna (with other large tuna and billfish species) were included in the catch estimate for "yellowfin" for years prior to 2004.

In recent years, the Indonesia's Directorate General for Capture Fisheries (DGCF) and RCCF have implemented a range of measures intended to strengthen the collection and processing of fisheries statistics in Indonesia, albeit with work that started earlier in the Indian Ocean than in the Pacific Ocean. Implementing some of those measures has come in response to recommendations from RFMOs, highlighting the need for Indonesia to satisfy its obligation to provide scientific data

as a member country of each RFMO. IOTC, with assistance from several member country agencies (e.g. the Australian Commonwealth Scientific Industrial Research Organisation [CSIRO], the Australian Centre for International Agricultural Research [ACIAR], and Japan's Overseas Fishery Cooperation Foundation [OFCF]), have successfully established monitoring at several key ports, servicing longline vessels fishing in the Indian Ocean over the past 10 years. These ports include Benoa (Bali), Muara Baru (north Jakarta), and Cilacap (south coast of central Java). Since the early 1990s, Benoa has been a focal point for sampling and, more recently, as a base for observer activities, largely as the result of this port being the primary landing place for Indonesia's catch of southern bluefin tuna. Recent improvements in Indonesia's fisheries statistical system have led to marked improvements in the estimation of total catches by species for Indonesia's longline vessels operating in the Indian Ocean, and in the estimation of catches by species and gear types for Indonesia's artisanal fisheries, also operating in the Indian Ocean.

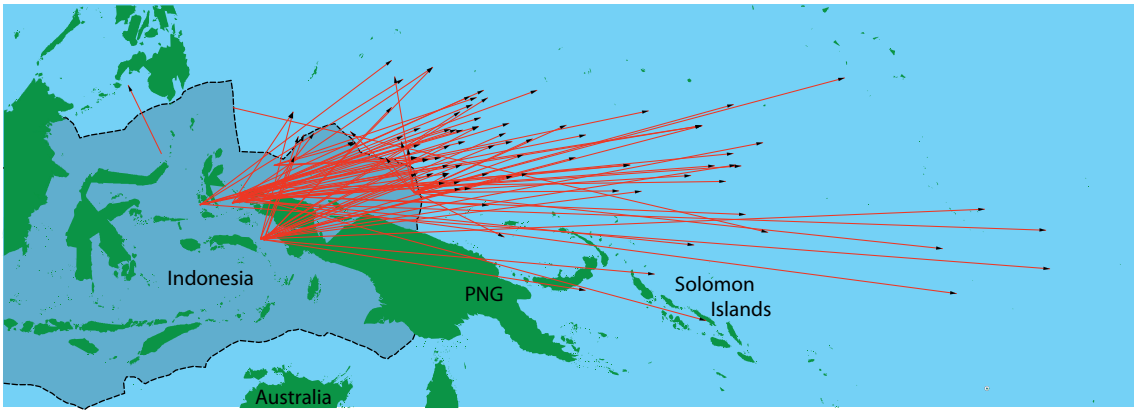
The success in establishing monitoring systems for the Indian Ocean fisheries came after considerable effort by the Indonesian government fisheries departments and industry, with significant assistance from IOTC, OFCF, ACIAR, CSIRO and other agencies. This success provides optimism for establishing similar projects for the eastern Indonesian tuna fisheries. Since 2007, WCPFC has taken the lead in providing assistance to RCCF and the DGCF in establishing tuna fishery monitoring systems in eastern Indonesia (with funding assistance provided by the United Nations Development Program/Global Environment Facility [UNDP/GEF] and several WCPFC member countries) through several workshops conducted under the "Indonesia Philippines Tuna Fisheries Data Collection Project" (IPDCP), and more recently the UNDP/GEF West Pacific East Asia Oceanic Fisheries Management Project (WPEAOFM, established in mid-2009[3]). The Oceanic Fisheries Programme (OFP) of the Secretariat of the Pacific Community (SPC) is the science and data service provider to WCPFC, and has been primarily involved from the outset in providing technical advice to this important process.

There are major gaps in the available information on tuna fisheries in the waters of eastern Indonesia (despite recent comprehensive work done by the World Wildlife Fund 2008 and Proctor et al. 2003), but there are encouraging signs that this situation will change in the coming years with the establishment of several new fisheries monitoring initiatives. The importance of robust data collection systems that provide appropriate data cannot be underestimated, and the initiatives (briefly described below) will ultimately fill in some important gaps in regional fisheries data, which will be fundamental in providing more informed output from the regional assessments of Pacific Ocean tuna stocks.

Port sampling

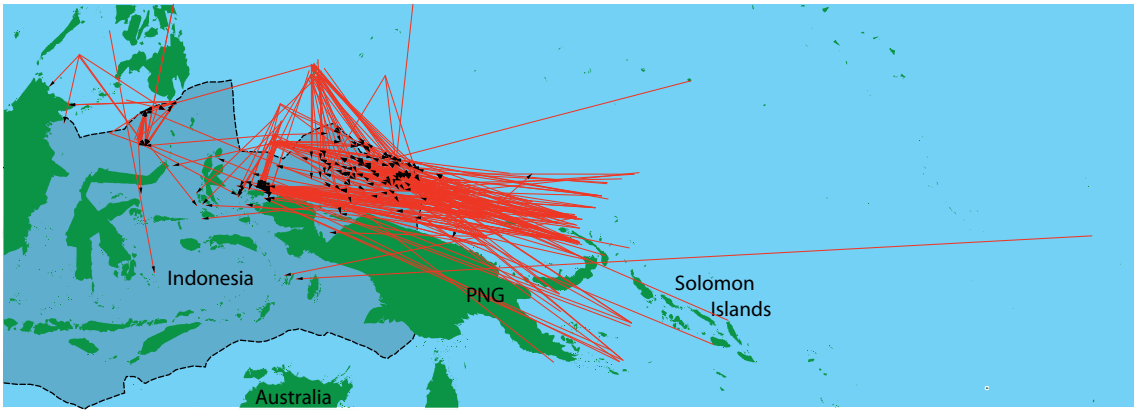
Workshops funded through the WCPFC-administered IPDCP have been conducted on an annual basis since 2007 for the purpose of designing, planning and implementing port sampling data collection in key tuna fishery ports in eastern Indonesia. OFP's involvement has ensured that the data collection protocols and forms closely resemble those used by Pacific Island countries and, thereby, satisfy WCPFC's data requirements. At this stage, pilot sampling sites have been successfully established in Bitung (north Sulawesi) (Fig. 3) and Kendari (south Sulawesi) where landings and port sampling are conducted on all fishing

Figure 3. Enumerators (port samplers) measuring and recording the catch from a mini-purse seine vessel (*pajeko*), at the Bitung Port Fish market, North Sulawesi, Indonesia, which is adjacent to the Tuna Fisheries Monitoring Station (see insert) — note the important association with the WCPFC (Photos courtesy of Craig Proctor, CSIRO)



Indonesia's EEZ

Figure 4. Long-distance movements of tunas tagged in Indonesian waters and recovered outside of Indonesian waters (Source: Regional Tuna Tagging project conducted by OFP, 1989–1992).



Indonesia's EEZ

Figure 5. Long-distance movements of tuna tagged outside of Indonesian waters that were recovered in Indonesian waters (Source: Regional Tuna Tagging project conducted by OFP, 1989–1992).

gear types that target pelagic tuna species. Establishing the WPEAOFM project will result in considerable expansion of port sampling activities to several other key ports in the next three years.

Tuna tagging

Indonesia has a long history of tuna tagging initiatives, including the IPTP in the 1980s, the SPC Regional Tuna Tagging Project in 1991 (see Figs 4 and 5) and the World Bank North Sulawesi Tagging project in 1996–1997. As a part of the region-wide Pacific Tuna Tagging Project (PTTP) managed by OFP,[4] a tagging cruise was conducted in Indonesian waters in late 2008, which resulted in 25,197 tag releases (19,576 skipjack, 5,267 yellowfin and 354 bigeye tuna). At the time of writing this article, a second tagging trip was well underway and expected to be completed in mid-September 2009. There have already been 4,250 tag recoveries (16.8%) from the 2008 Indonesian tagging trip, and the information collected will provide invaluable input to stock assessments, in particular, the determination of natural mortality, growth and movement parameters of pelagic tuna species.

Logbook programme

Logbooks (or logsheets) provide the only means of obtaining information at the fishing operation level other than observer programmes, which, due to their expense and complexity, are usually not designed to provide 100% coverage of fishing activities. Until now, logbooks were only used on a sporadic basis in Indonesia's tuna fisheries, without any national legislation enforcing their collection, or where present (e.g. the longline fleet operating from Benoa), have failed to produce quality catch and catch per unit of effort

information. Some of the large industrial fleets use logbooks for their own purposes and only in rare instances are these provided to government research agencies (e.g. RCCF). In 2008, the DGCF embarked on a project to implement a logbook system for Indonesia's fisheries, and requested help from the tuna RFMOs to provide assistance in designing and implementing a logbook system that would satisfy the requirements for both Indonesia and RFMOs. A workshop was convened in May 2009 by IOTC and DGCF, and was attended by all Indonesian stakeholders (e.g. government fisheries agencies, fishing industry and associations) and RFMOs (IOTC, WCPFC). The workshop resulted in general acceptance of logbook forms for the longline, purse-seine and pole-and-line and handline fisheries and the planned implementation next year will be a significant achievement towards better monitoring of thee fisheries and will provide invaluable information to both national and regional fisheries science and management. OFP played a key role in designing the logbooks, and their similarity to the regional standard logsheets used by Pacific Island countries will ensure that the data available for regional stock assessments are in a standardised format.

Observer programmes

Participants at the national Tuna Fisheries Monitoring Workshop held in Jakarta in May 2008 agreed on the need for national coordination of future observer activities. World Wildlife Foundation and CSIRO, working with DGCF and RCCF have been involved in several observer initiatives on longline vessels in the Indian and Pacific oceans in recent years, and their experience will be fundamental to establishing national observer programme coordination, which will extend to eastern Indonesian tuna fisheries at some stage in the future. The data collection forms used by observers associated with the CSIRO project in Indonesia were based on the regional observer data collection forms used in the Pacific Island observer programmes, so data standardisation has already been achieved. It is envisaged that WCPFC, through the WPEAOFM project and assistance from OFP, will be strongly involved in establishing observer activities in eastern Indonesia's tuna fisheries in the future.

Other cooperative initiatives

OFP has been intermittently involved with Indonesian scientists for more than 20 years, through jointly conducted tagging cruises in the early 1990s, and again more recently (see the Tuna tagging section above) by engaging Indonesian scientists in the annual meetings of the Standing Committee on Tuna and Billfish (SCTB). However, OFP has also extended its technical support to capacity building, sourcing funds to ensure Indonesia participates in the annual Tuna Data Workshops and Stock Assessment Workshops conducted by OFP.[5]

The Pacific Islands Forum Fisheries Agency (FFA) also recognises the important role that Indonesia can play in Pacific Ocean tuna fisheries management, and recently held a formal consultation with senior fisheries officials from Indonesia.[6] Agreement was reached on a broad area of cooperation in fisheries management and science; the mechanisms for cooperation will cover areas including i) Indonesia's participation in FFA meetings and workshops; ii) FFA's participation in Indonesia's relevant meetings and workshops; and iii) meetings, on an opportunistic basis, in the margins of meetings of WCPFC's subsidiary bodies (e.g. the Scientific Committee, Technical and Compliance Committee), joint tuna RFMOs and FAO's Committee on Fisheries.

References

Proctor C.H., Gede Merta I., Fedi Sondita M., Wahu R., Davis T., Gunn J. and Andamari R. 2003. A review of Indonesia's Indian Ocean Tuna Fisheries. CSIRO. Marine Research.

WWF. 2008. Getting off the hook: Reforming the tuna fisheries of Indonesia and considerations for Ecosystems-based management (EBM). WWF contact Dr Jose Ingles, Strategy Leader, Tuna Strategy, WWF Coral Triangle Initiative.

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1. For convenience, we refer to the fisheries that target tuna in the part of the Indonesian EEZ that falls within the WCPFC Convention Area as the "East Indonesian Tuna Fisheries".
2. Also, the predecessors of RCCF — Central Research Institute for Fisheries (CRIFI) and Indonesian Research Institute of Marine Fisheries (RIMF).
3. WPEAOFM will also fund activities in the Philippines and Vietnam. See http://www.wcpfc.int/west-pacific-east-asia-oceanic-fisheries-management-project
4. See http://www.spc.int/oceanfish/Html/TAG/index.htm
5. See http://www.spc.int/oceanfish/Html/Meetings/TDW3/index.htm
6. "The Preliminary Consultation on Future Cooperation between the Ministry of Marine Affairs and Fisheries and The Pacific Islands Forum Fisheries Agency, March 2009.