CCSBT-ESC/2108/Info 03
(ESC Agenda item 4.1)

SCIENTIFIC OBSERVER – **Indonesia**

INDONESIA SCIENTIFIC OBSERVER PROGRAM ACTIVITIES IN THE INDIAN OCEAN FROM 2015-2020

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Prepared for the 26th Meeting of the Extended Scientific Committee Meeting (ESC26) of the Commission for the Conservation of Southern Bluefin Tuna (CCSBT)
23 – 31 August 2021 (Online)

Research Institute for Tuna Fisheries
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Summary

This paper presents a progress summary of the Indonesian scientific observer program on the tuna fishing vessels operating in the Indian Ocean. The observer data is the most detailed information associated with catch, effort, fishing practices, gear configuration, and environmental conditions. Only low fleet coverages were available from this data set. Hence this could be expanded to get robust abundance indices from the fishery.

Indonesian observer program in the Indian Ocean

There are two kinds of observer programs currently operated by Indonesia in the Indian Ocean, namely the national observer program and the scientific observer program. The Ministry of Marine Affairs and Fisheries (MMAF) has formally legalized the national observer program since 2013 through Ministerial Decree No. 1/2013. Catch and effort data have been collected through the national observer program. However, recurring problems on data entry, validity, and verification process before analysis remain. Therefore, an improvement in the capacity of the observers and related officers is continuously required (Fahmi et al., 2020).

The scientific observer program was initiated in mid-2005 through a research collaboration between RCCF-MMAF (Indonesia) and CSIRO (Australia), funded by ACIAR (Sadiyah et al., 2012). The program is formerly known as the trial observer program. After the collaboration finished, it was transferred, continued, and funded by the Indonesian Government through the RCCF (2009-2011) and Research Institute for Tuna Fisheries (RITF) (2012-present). RITF was established in 2011 to conduct researches on tuna fisheries in the Indian Ocean, including continuing the scientific observer program. The trial observer program (2005-2008) has been reported in the 13th Meeting of the Extended Scientific Committee in 2008, while the scientific observer data have been reported within the Indonesian National Report Scientific Meetings of the IOTC and CCSBT since 2010. This information paper updates the Indonesian scientific observer program activities in the Indian Ocean during 2015-2020.

Design of the scientific observer program

There are currently six trained scientific observers at the RITF. They were not only deployed in the longline vessels based in Benoa but also Palabuhanratu (West Java), Muara Baru (Jakarta), and Cilacap (Central Java). A total of two scientific observers were deployed in 2020, involved in 2 trips, lasted for 108 days at sea (54 days/trip on average) with 86,845 hooks observed. The number of observed efforts (hooks or trips) was substantially lower than in previous years due to

restrictions during the Covid-19 outbreak (Table 1). Geographically, the capacity of scientific observers covered the fishing ground of statistical areas 1 and 2.

Table 1. Observer activities in authorized Fishing Vessels in 2020 (source: Indonesian National Report for the CCSBT SC meeting)

No.	Trip ID	Day at sea	No of Setting	No of Hooks	No of SBT	HR(x10^3)	CCSBT Statistical Area
1	Trip 1	26	15	20220	5	0.249	1
2	Trip 2	104	35	45695	1	0.031	1
3	Trip 2	104	15	20930	2	0.085	2

Spatial distribution of the observed sets and tuna catch composition

The observed tuna longline sets covered the area between 5º-35º S and 90º-115º E. Most of the observed sets were conducted in area 1, and the other was either inside EEZ or inside area 2. Darker colour indicates a higher number of hooks observed (Figure 1). Southern bluefin tunas were caught mostly within CCSBT statistical area 2 (Figure 2)

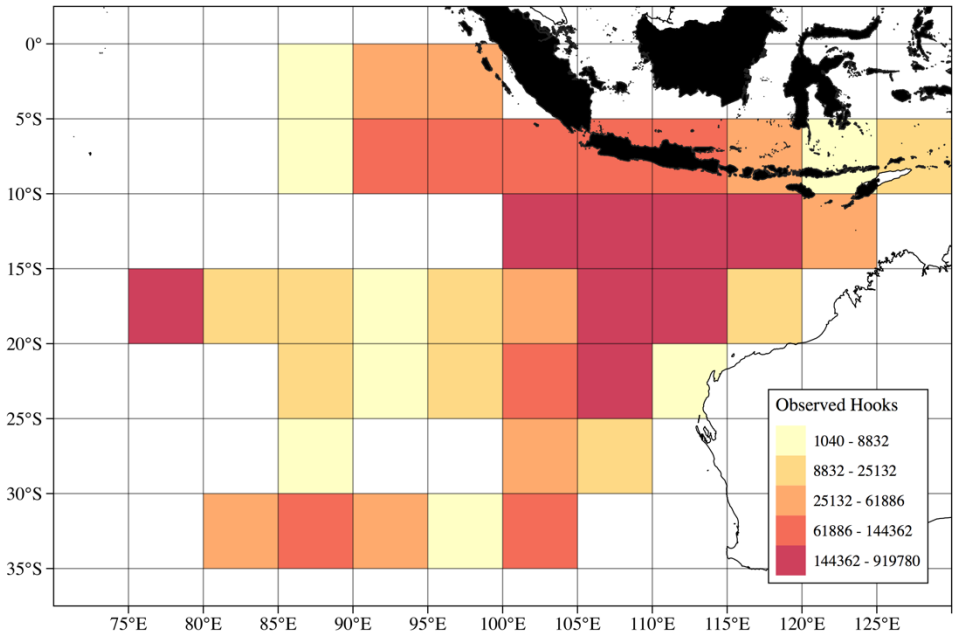

Figure 1. Effort distribution from Indonesian tuna longline vessels year 2020 (Source: Scientific observer data).

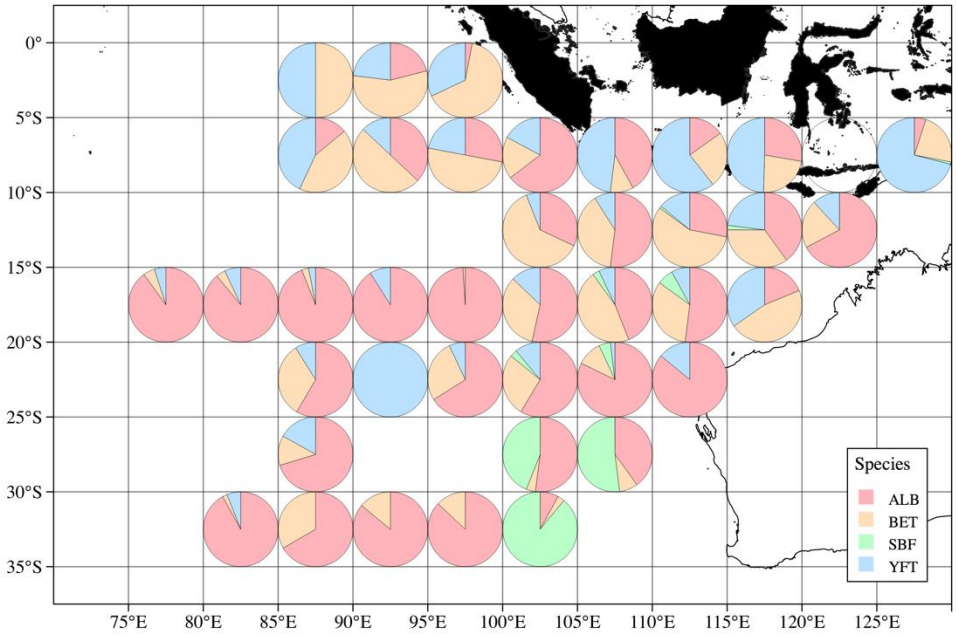

Figure 2. Spatial distribution of tuna catch composition in 2019 (Source: Scientific observer data).

Trends of catch and effort recorded by the observers

Over the last five years, the effort observed by scientific observers is declining. Mainly because of technical issues related to some implementation on onboard observer's regulations recently. In 2020, only two trips were deployed (Table 2). Observed catch and effort from scientific observer data showed that most tuna species' hook rates declined in the last five years (Figure 3). Indonesia is currently improving the quality and quantity of logbook data to get robust catch and effort data.

Table 2. Estimated hook rates of SBT on authorized fishing vessels

SBT					
TRIP	n	HR	Length (cm FL)		
			Min	Max	Mean
1	5	0.25	158	185	171
2	3	0.05	159	197	184

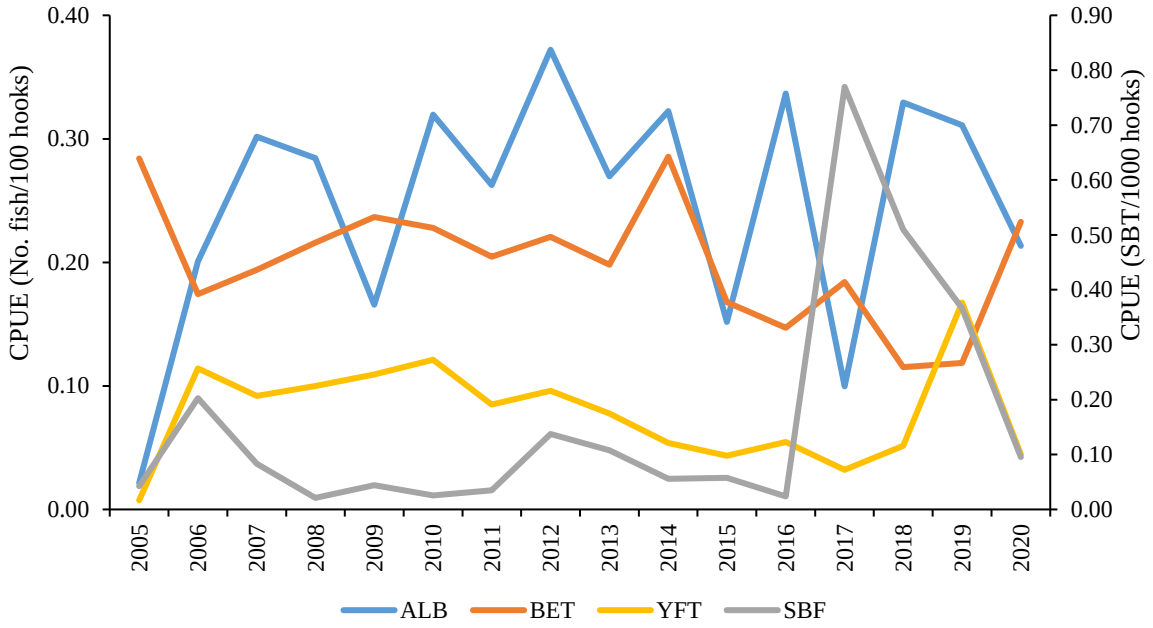

Figure 3. Nominal CPUE of longline catch from 2005-2020 based on scientific observer data

Challenges

The main challenge in terms of improving the use of the scientific observer data is related to the following issues: low spatial and temporal coverages (region), low fleet coverage (gear types), and no replication for each observed vessel.

References

Fahmi, Z., Hikmayani, Y., Yunanda, T., Yudiarso, P., Wudianto, W., & Setyadji, B. (2020). *Indonesia national report to the Scientific Committee of the Indian Ocean Tuna Commission 2020* (National Report IOTC-2020-SC23-NR07). Indian Ocean Tuna Commission (IOTC).

Sadiyah, L., Dowling, N., & Prisantoso, B. I. (2012). Developing recommendations for undertaking CPUE standardization using observer program data. *Indonesian Fisheries Research Journal*, *18*(1), 19–33. https://doi.org/10.15578/ifrj.18.1.2012.19-33

Appendix 1. Annual activities of scientific observer from 2005 to 2020

Year	No. Of Obs	No. Of Trips	No. Of Company	Number of Hooks	Total Day at Sea (DAS)	Range DAS	Mean DAS
2005	6	6	1	140,406	251	19-22	20
2006	6	19	5	667,479	758	7-99	39
2007	6	14	5	396,952	648	21-108	34
2008	5	15	7	523,627	481	23-66	30
2009	5	14	8	321,591	535	15-59	38
2010	5	8	4	220,302	240	40-50	50
2011	5	6	3	131,644	210	30-50	40
2012	6	7	5	282,147	496	11-93	83
2013	5	3	3	251,774	170	52-60	57
2014	8	6	4	216,641	371	29-90	62
2015	4	5	5	172,463	241	31-61	48
2016	3	3	3	175,868	170	32-86	57
2017	5	5	5	192,188	241	31-61	48
2018	6	6	6	262,856	321	26-83	53
2019	5	9	4	216,836	328	15-104	36
2020	2	2	2	86,845	108	26-81	54

Appendix 2. Observed catch and effort data of ecologically related species (ERS) from the scientific observer program in 2020.

Trip No.	Total Hooks	ALX	BSH	BTH	CCL	DOL	FAL	GES	LAG	LEC	LKV	LMA	LOP
1	20,220	73	2	0	1	0	0	45	1	50	0	0	0
2	66,625	617	105	13	0	4	0	65	56	203	0	0	1
Trip No.	Total Hooks	MOX	OCS	OIL	PLS	PSK	PTH	PTZ	SMA	TIG	TST	TUG	WAH
1	20,220	0	0	0	16	5	0	0	0	0	11	0	9
2	66,625	1	2	5	53	4	0	0	2	0	7	0	14

Appendix 3. List of ecologically related species incidentally caught by Indonesia tuna longliners in the last six years (2015-2020)

Code	Species	2015	2016	2017	2018	2019	2020
ALX	Long snouted lancetfish	739	693	796	1773	657	690
ALZ	Albatrosses nei	7	0	0	0	0	0
BAR	Barracudas nei	5	6	0	0	0	0
BRZ	Pomfrets, ocean breams nei	121	0	0	0	0	0
BSH	Blue shark	137	105	184	314	223	107
BTH	Bigeye thresher	0	0	3	15	4	13
BTS	Hound needlefish	0	1	0	0	0	0
CCB	Spinner shark	1	3	0	0	0	0
CCE	Bull shark	0	0	1	0	0	0
CCL	Blacktip shark	1	0	0	0	3	1
CCP	Sandbar shark	0	0	0	0	0	0
DKK	Leatherback turtle	0	0	0	0	0	0
DOL	Common dolphinfish	7	13	33	12	33	4
EBS	Brilliant pomfret	0	0	1	0	0	0
FAL	Silky shark	26	0	2	12	10	0
GES	Snake mackerel	0	0	26	65	110	110
HAR	Longnose chimaeras	14	46	0	0	0	0
ISB	Cookie-cutter shark	0	0	39	9	0	0
LAG	Opah	30	60	13	60	42	57
LEC	Escolar	490	353	240	617	669	253
LHX	Seagulls nei	0	0	0	0	0	0
LKV	Olive ridley turtle	1	15	5	12	2	0
LMA	Longfin mako	0	0	0	5	3	0
MOX	Ocean sunfish	2	1	0	3	2	1
MSK	Mackerel sharks, porbeagles nei	0	0	0	0	0	0
OCS	Oceanic whitetip shark	4	4	4	10	6	2
OIL	Oilfish	16	8	24	19	20	5
PDM	Great-winged petrel	0	0	0	1	0	0
PFC	Flesh-footed shearwater	0	0	0	8	0	2
PHU	Sooty albatross	0	0	1	0	0	0
PLS	Pelagic stingray	206	272	157	230	239	69
PSK	Crocodile shark	108	174	84	151	122	9
PTH	Pelagic thresher	0	0	2	2	3	0
RME	Longhorned mobula	1	0	0	0	0	0
RMJ	Spinetail mobula	0	0	0	0	0	0
SMA	Shortfin mako	1	5	35	13	6	2
SPL	Scalloped hammerhead	1	0	0	1	0	0
SPY	Hammerhead sharks, etc. nei	0	0	0	0	0	0
SSH	Scarlet shrimp	0	0	0	0	0	0
TCR	Keeltail pomfret	45	62	42	0	0	5
TIG	Tiger shark	0	0	0	3	4	0
TPA	Dealfish	0	0	7	0	0	0
TSK	Flapnose houndshark	6	1	6	0	0	0
TST	Sickle pomfret	29	117	105	131	25	18

Code	Species	2015	2016	2017	2018	2019	2020
TTH	Hawksbill turtle	0	0	0	0	0	0
TTX	Marine turtles nei	0	0	0	0	0	0
TUG	Green turtle	0	0	0	0	1	0
WAH	Wahoo	63	61	30	74	80	23