

CATCH ANALYSIS OF TREVALLY (*Carangoides* spp. RUPPELL, 1830) AT KANDANGSEMANGKON SMALL LANDING SITE, LAMONGAN, EAST JAVA

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ABSTRACT

Fisheries data statistics play an important role in fisheries management. The data collection might be provided at landing sites. However, not all landing sites can provide fisheries data. Kandangsemangkong small landing site is an unreported landing site that lands various economically important species; one of species is The trevally fishery. The purposes of this study were to identify the species landed, determine the categorization of species supporting the landed trevally fishery, and determine the trevally fishing area and the volume of trevally production that was not recorded or reported at Kandangsemangkong Small Landing Site. The data collection method of this study is the descriptive survey method, which involves taking primary and secondary data. The primary data collection was carried out by interviewing fishermen regarding the species of the catch landed and the trevally fishing area and observing the research location. The secondary data used was the production data of Trevally landed at Brondong Fishing Port. The results of this study show that there were three types of target species, secondary species, primary species, and no endangered, threatened, or protected species were found. The trevally fishing grounds are generally in WPPNRI 712 and 713. The volume of unrecorded and unreported production was 46.70% and did not contribute to the fisheries statistics of Lamongan, East Java.

Keywords: *Small landing site, catch analysis, trevally production, participatory mapping*

1. INTRODUCTION

In general, the results of fisheries statistical data are obtained from the data collection of capture fisheries results. Enumerators collected data by record the catches that are landed, then the data will be

processed by the Port Operations Section to be used as monthly and annual reports (Khairani et al., 2022). The reports that have been processed into monthly or annual reports are then forwarded to the Local Fisheries and Marine Affairs Office to be published into Fisheries Statistical Data. This step is a regulation of data recording in general, and become an objective basis for decision-making and policy for sustainable fisheries.

This general regulation of data recording is assumed to be a problem which there are still fishermen who do not report or record their catch data because of avoiding taxes (Rais et al., 2019). Fishermen who do not report or record their catch data, landed their catches in small landing site. Small landing site is a location that has facilities that can serve fisheries activities, such as filling supplies, landing catches to marketing catches (Singa et al., 2018).

The existence of small landing site existence is government main focus, because of its various impacts primarily on state revenues from the fisheries sector. Another impact from Small Landing Site is the gap in the main function of Fishing Port. This is because the operational of small landing site is generally almost the same as docks located at fishing port. On the other hand, the existence of small landing Site has a positive impact, which can help the growth rate of local fishermen's economic sector, due to the existence of fisheries sector activities (Situmeang et., 2019)

One of small landing site in Lamongan is Kandangsemangkong Small Landing Site, which is in Kandangsemangkong Village, Lamongan, East Java. The fish resources that are landed at Kandangsemangkong small

landing site is Trevally (*Carangoides* spp.) which is assumed as a bycatch.

2. RESEARCH METHODS

The research was conducted in Kandangsemangkon, Lamongan during March – May 2023. The tools and materials used to support the implementation of this study are stationery, handphone, laptop, survey forms, maps, meters, trays, as well as trevally production data at Brondong Fishing Port, fishing coordinate and catch production data at Kandangsemangkon Small Landing Site.

The research method used is descriptive survey method, there are primary and secondary data collection. Primary data that has been taken are catch production and coordinates of trevally fishing ground at Kandangsemangkon small landing site. Supporting secondary data used is Brondong Fishing Port production data.

The analysis used was identifying landed species, categorizing the trevally fishery support species, participatory mapping and catch production volume.

1. Species Identification

This method was carried out by taking documentation of landed species. Identification was carried out by referring to Carpenter and Niem (2001)'s book & fishbase website. Then species is identified whether it is an Endangered, Threatened and Protected (ETP) species or not, by looking at the CITES or IUCN Redlist website.

2. Support Species Categorization

This method was conducted to determine the categories of primary and secondary species of trevally fishery supporting species, that landed at Kandangsemangkon small landing site. The following are the steps in performing species categorization (Figure 1).

In the species categorization analysis method, the catch were analyzed as the target and supporting species. Furthermore, an analysis is carried out by referring to the IUCN Redlist website regarding the existence of the species, whether the species is included in the ETP species or not. If the species is not assumed as the ETP species, then another analysis is carried out whether it is included in the 'outside the scope of the ETP' or 'not outside

the scope of the ETP', if it is included in the 'outside the scope of the ETP' then the species is categorized as a primary secondary species. If the species is 'not outside the scope of the ETP', we analyzed whether the species is managed or not with reference to supporting literature, if managed then it is a primary species, if not managed then a secondary species.

Furthermore, the species were analyzed whether they are less resilient or not by referring to fishbase website. If the species is less resilient then the unit off assessment value used is $>2\%$, otherwise $>5\%$ is applied. If the Unit of Assessment (UoA) catch result is less than 2% or 5%, the species is considered a minor primary species. If the UoA Catch result is more than 2% or 5% then the species is considered as a main primary species.

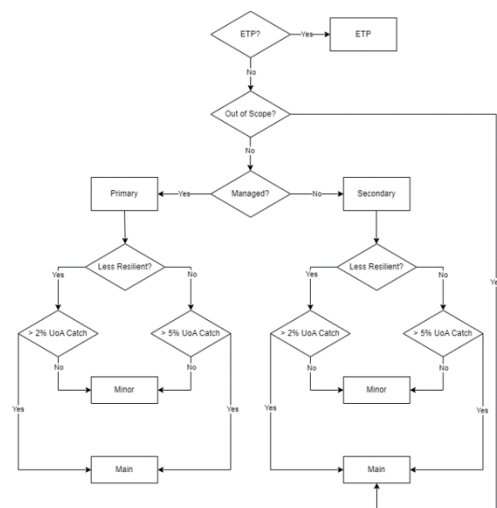


Figure 1. Support Species Categorization Step (Southall et al., 2016)

3. Participatory Mapping

Participatory mapping is a mapping conducted by a group of people or individuals about an area, where they live or carry out activities, with the help of visualization using geospatial features (Hapsari & Cahyono, 2014). This method is carried out by collecting the coordinates of the fishing grounds, through interviews with fishermen, through maps provided. Coordinate points will be tabulated and then processed using ArcMap application to produce a distribution map of fishing grounds.

4. Catch Production Volume

Production data that has been collected, then analyze the catch production volume using the following formula :

$$\frac{\text{Production Volume (kg)}}{\text{Small Landing Site Catch Production*}} \times 100\% = \text{All Catch Production**} \quad (1)$$

*Kandangsemangkon Small Landing Site catch production.

**Brondong Fishing Port + Kandangsemangkon Small Landing Site catch production.

In this study we compared the production value from two fishing port, the official fishing port and the Kandangsemangkon small landing site in order to know the magnitude of the production value difference between two landing sites. As both landing sites dominantly landed trevally species.

3. RESULTS AND DISCUSSION

3.1 Trevally Fisheries Profile

The amount of trevally production in Brondong Fishing Port from 2019 – 2023 has increased and decreased, the highest amount of production was in 2020 and the lowest in 2023 (Figure 2).

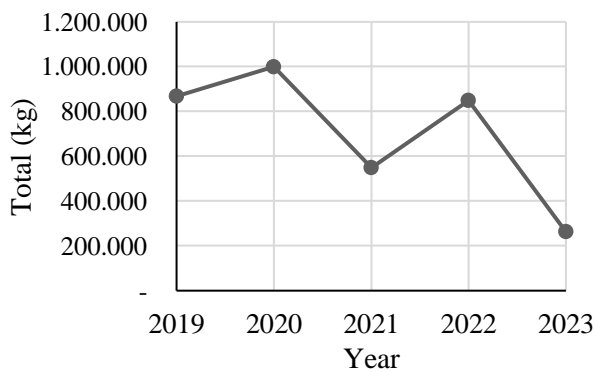


Figure 2. Trevally Production in Brondong Fishing Port (2019 – 2023)

Trevally production in Kandangsemangkon Small Landing Site has a lower amount compared to Brondong Fishing Port, during the study period in March – May 2023 (Figure 3).

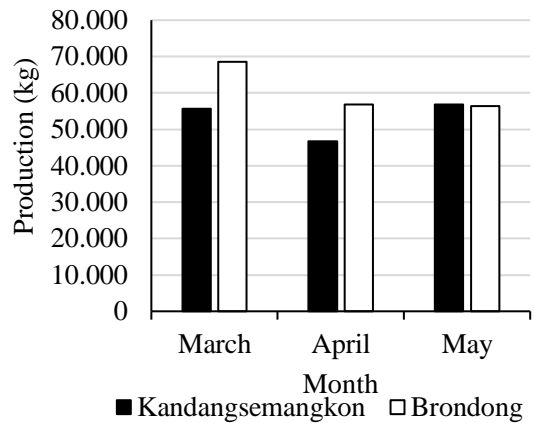


Figure 3. Trevally Production in

Kandangsemangkon Small Landing Site and Brondong Fishing Port (March – May 2023)

3.2 Trevally Production in Kandangsemangkon Small Landing Site

There are 4 types of Trevally that landed in Kandangsemangkon Small Landing Site, which are *Caranx tille*, *Carangoides malabaricus*, *Carangoides coeruleopinnatus* and *Carangoides plagiotaenia*. Local fishermen call them as coarse trevally, wide trevally, super trevally and waxy trevally. Trevally production in Kandangsemangkon Small Landing Site during the study period, it was found that super trevally had the highest production and the lowest production is coarse trevally (Figure 4).

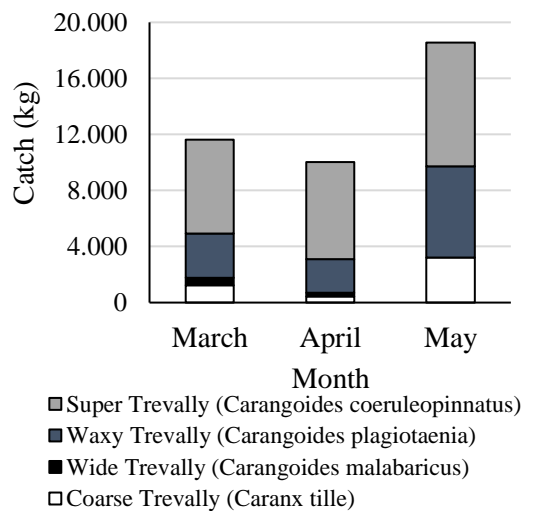


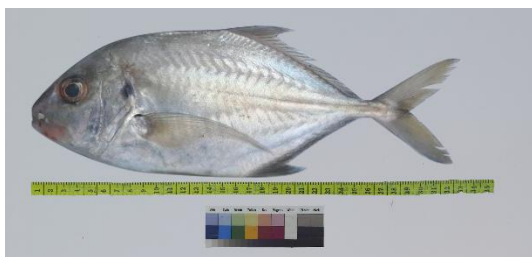
Figure 4. Trevally Production in Kandangsemangkon Small Landing Site (March – May 2023)

3.3 Identification of Trevally in Kandangsemangkon Small Landing Site

The following are 4 types of Trevally found in Kandangsemangkon Small Landing Site :

1. Super Trevally (*Carangoides coeruleopinnatus*)

Called as super trevally because it has the highest selling value compared to other trevally. Super trevally has the characteristics of no scales on the body and there is a sharp fin at the base of the tail. Super trevally body color is silvery and on the head is darker, the body



shape is slightly rounded and short (Figure 5).

Figure 5. Super Trevally (*Carangoides coeruleopinnatus*)

2. Wide Trevally (*Carangoides malabaricus*)

Wide trevally has morphological characteristics there are no scales on its body, and at the base of the tail there are thick scales. The body shape is wide and the head is rounder. The body color is silvery with golden head (Figure 6).

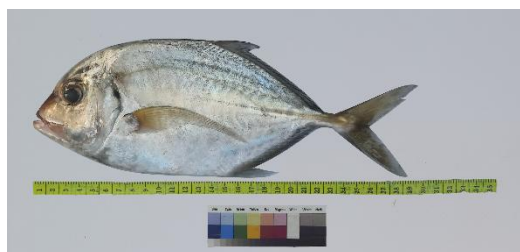


Figure 6. Wide Trevally (*Carangoides malabaricus*)

3. Waxy Trevally (*Carangoides plagiotaenia*)

Waxy trevally has morphological characteristics there are scales on its body and there are hard scales at the base of tail. The body shape is elongated like candle, and the

body color is silvery with yellowish lines on the body. The color of its back is blackish (Figure 7).

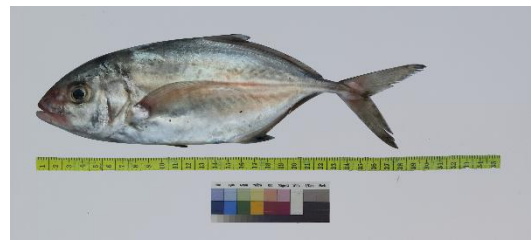


Figure 7. Waxy Trevally (*Carangoides plagiotaenia*)

4. Coarse Trevally (*Caranx tille*)

Coarse trevally has morphological characteristics there are scales on body, the body shape is elongated with rounded head. The body color in coarse trevally is silvery, with a grayish back color accompanied by yellow lines on the body of fish. Coarse trevally has larger and thicker sides at the base of tail than other trevally (Figure 8).

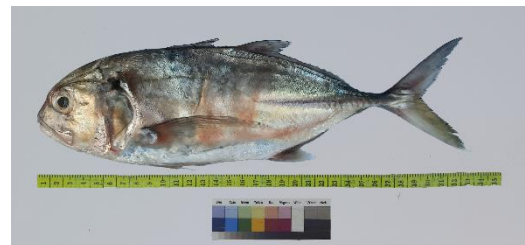


Figure 8. Coarse Trevally (*Caranx tille*)

3.4 Species Categorization

3.4.1 Percentage of Species Categorization

After categorizing landed catch species, the following percentages were obtained (Figure 9).

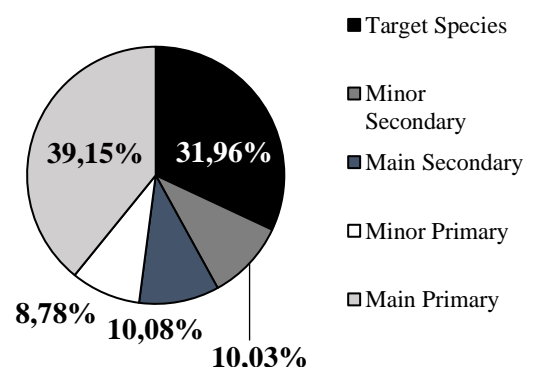


Figure 9. Species Categorization Percentage

The percentage of species categorization consists of 5 categories, which are target species, minor secondary, major secondary, minor primary and major primary. The highest percentage is major primary species at 39.15%, the lowest percentage is minor secondary species at 10.03%. In the species categorization, there were no Endangered, Threatened and Protected (ETP) species landed in Kandangsemangkong Small Landing Site.

The species composition of the landing in the small landing site requires fisheries management to allocate the catch amount of the supporting species. The catch amounts of supporting species are as much as the catch amount of main target which is assumed that the fishery of target species might affect other fisheries (Southall et al., 2016). In this situation, the Trevally fishery might give impact to other supporting fisheries, which may require typical management such as a regular monitoring for some species affected.

3.4.2 Categorization of Trevally Fishery Supporting Species

The following are the results of species supporting trevally fisheries categorization in Kandangsemangkong Small Landing Site, based on the percentage value of Unit of Assessment (UoA) catch (Table 1).

Table 1. Trevally Fishery Support Species Categorization

Species Target		
No	Species	Unit of Assessment (UoA)
1	<i>Caranx tille</i>	4.75%
2	<i>Carangoides malabaricus</i>	0.79%
3	<i>Carangoides plagiotaenia</i>	12.51%
4	<i>Carangoides coeruleopinnatus</i>	13.91%
Main Secondary Species		
No	Species	Unit of Assessment (UoA)
1	<i>Epinephelus areolatus</i>	10.08%
Minor Secondary Species		

No	Species	Unit of Assessment (UoA)
1	<i>Lutjanus argentimaculatus</i>	0.67%
2	<i>Lethrinus lentjan</i>	2.23%
3	<i>Plectorhinchus Pictus</i>	0.19%
4	<i>Plectropomus maculatus</i>	3.65%
5	<i>Nemipterus mesoprion</i>	0.47%
6	<i>Atule mate</i>	1.00%
7	<i>Megalarpis cordyla</i>	1.83%
Main Primary Species		
No	Species	Unit of Assessment (UoA)
1	<i>Lutjanus malabaricus</i>	31.33%
2	<i>Lutjanus erythropterus</i>	7.82%
Minor Primary Species		
No	Species	Unit of Assessment (UoA)
1	<i>Lutjanus russellii</i>	1.77%
2	<i>Pinjalo lewisi</i>	4.20%
3	<i>Lutjanus vitta</i>	2.82%

The highest percentage of target species is super trevally (*Carangoides coeruleopinnatus*) with 13.91% UoA catch value, for main secondary is spotted coral grouper (*Epinephelus areolatus*) with 10.08% UoA catch value, for minor secondary is trout sweetlips (*Plectropomus maculatus*) with 3.65%, for main primary is malabar blood snapper (*Lutjanus malabaricus*) with 31.33% UoA catch value, for minor primary is slender pinjalo (*Pinjalo lewisi*) with 4.20% UoA catch value.

3.5 Fishing Area Distribution

The tabulated data of vessel information and fishing ground points were processed using ArcMap to produce a trevally distribution map of Kandangsemangkong Small Landing Site fishing ground (Figure 10).

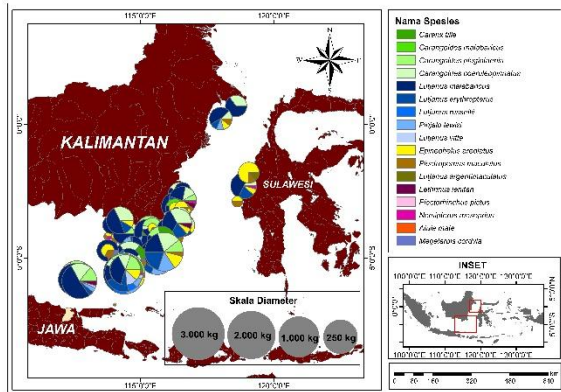


Figure 10. Trevally Distribution Map in Kandangsemangkon Small Landing Site

Based on interviews results with Kandangsemangkon fishermen, fishing areas are generally carried out on the islands of Batakan, Bawean, Kalamba, Karamian, Marabatuan, Maradapan, Masalembu, Matasiri, Kotabaru Area Waters, Kalimantan Waters, Northern Madura Waters and Sulawesi Waters. This is because in Lamongn Waters the target resources have been depleted due to the activities of Seine Nets and Trawl fishing gear. There are other types of species caught while catching trevally, which are Red Snapper (*Lutjanus* spp.), Grouper (*Epinephelus* spp.), Mangrove Red Snapper (*Lutjanus argentimaculatus*), Trout Sweetlips (*Plectorhinchus pictus*), Pink Ear Emperor (*Lethrinus lentjan*), Mauvelip Threadfin Bream (*Nemipterus mesoprion*), Yellowtail Scad (*Atule mate*) and Torpedo Scad (*Megalarpis cordyla*).

The distribution of trevally catches in other areas, such as in Pangkajene Waters, South Sulawesi that many trevally are caught because the substrate type is muddy sand (Akbar et al., 2017). In Youtefa Bay Waters, Jayapura City, trevally is mostly caught because of the basic substrate and water depth factor (Pujiyati et al., 2020).

3.6 Production Volume Analysis of Small Landing Site

The result of trevally production volume analysis that landed at Kandangsemangkon Small Landing Site, there is a significant amount of unreported and unrecorded data (Table 2).

Table 2. Trevally Production Volume

Month	Kandangsemangkon (kg)	Brondong (kg)
March	55,620	68,565
April	46,773	56,808
May	56,855	56,355
Total	159,248	181,728

$$\text{Production Volume (\%)} = \frac{159.248}{340.976} \times 100\% = 46.70\% \quad (2)$$

There is a reference confidence interval of 95%. The range used for parameter estimation with a 95% confidence level, where there are upper and lower limits of the estimated value so that it can provide information about the uncertainty in the estimate. The allowable error is 5% (Kindong et al., 2022). The results of trevally production volume analysis obtained by 46.70%, there is missing data and an underestimate of 46.70% data which unreported and unrecorded in the Lamongan District Fisheries Statistics Data. As is the case in Layeun Village, Aceh Besar with floating cage fishing gear obtained a yield of 151.666 kg/month of reported trevally production and tends to be stable production (Assyifa et al., 2019).

The data recording system has been regulated in PERMEN KP No. 48 of 2014 concerning fishing logbooks, with the aim of preventing leakage or los of data such as production data in Kandangsemangkon Small Landing Site (Ramdhani et al., 2022). As in Bungus Oceanic Fishing Port which has a good data recording system and according to regulations, to support the development planning (Khairani et al., 2022).

4. CONCLUSION

The conclusion of this study is the result of categorization of trevally supporting species are 4 target species, 1 major secondary species, 7 minor secondary species, 2 major primary species and 3 minor primary species. The trevally fishing grounds area was conducted in WPPNRI 712, precisely in Batakan Island, Bawean, Kalamba, Karamian, Marabatuan, Maradapan, Masalembu, Matasiri, Kotabaru Regional Waters, South Kalimantan Waters, North Madura Waters, and WPPNRI 713

which are North Kalimantan Waters and Sulawesi Waters. There are other types of species caught while catching trevally, which are Red Snapper (*Lutjanus* spp.), Grouper (*Epinephelus* spp.), Mangrove Red Snapper (*Lutjanus argentimaculatus*), Trout Sweetlips (*Plectorhinchus pictus*), Pink Ear Emperor (*Lethrinus lentjan*), Mauvelip Threadfin Bream (*Nemipterus mesoprion*), Yellowtail Scad (*Atule mate*) and Torpedo Scad (*Megalarpis cordyla*). The unreported and unrecorded production volumes of trevally species landed at Kandangsemangkong Small Landing Site is 46.70%, so there is 46.70% data did not contribute to statistical data of Lamongan Fishery Statistics.

5. AKNOWLEDGMENTS

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6. REFERENCE

- Akbar, H., Pujiyati, S., & Natsir, M. (2017). *Jurnal Teknologi Perikanan Dan Kelautan*, 4(1), 31–39.
- Assyifa, N., Arida, A., & Kadir, I. A. (2019). Analisis Kelayakan Usaha Budidaya Ikan kuwe Menggunakan Keramba Jaring Apung di Desa Layeun Kecamatan Leupung Kabupaten Aceh Besar. *Jurnal Ilmiah Mahasiswa Pertanian*, 4(1), 461–473.
- Hapsari, H., & Cahyono, A. B. (2014). Pemetaan Partisipatif Potensi Desa (Studi Kasus: Desa Selopatak, Kecamatan Trawas, Kabupaten Mojokerto). *GEOID*, 10(1), 99–103.
- Khairani, R., Syaifuddin, S., & Rengi, P. (2022). Struktur Pendataan dan Tingkat Akurasi Data Hasil Tangkapan Ikan di Pelabuhan Perikanan Samudera Bungus, Sumatera Barat. *Jurnal Ilmu Perairan (Aquatic Science)*, 10(1), 68–74.
- Kindong, R., Sarr, O., Wu, F., & Tian, S. (2022). Length-Based Assessment Methods for the Conservation of a Pelagic Shark, *Carcharhinus falciformis* from the Tropical Pacific Ocean. *Fishes*, 7(4).
- Pujiyati, S., Hamuna, B., Dimara, L., & Natih, N. M. N. (2020). Distribusi Target Strength Ikan Demersal Berdasarkan Deteksi Hidroakustik Di Perairan Teluk Youtefa, Kota Jayapura. *Jurnal Kelautan Nasional*, 15(3), 165–174.
- Rais, M., Abdaud, F., & Parman. (2019). Penilaian Praktek Illegal, Unreported and Unregulated Fishing pada Pukat Cincin di Kota Kendari. *Jurnal Inovasi Sains Dan Teknologi (INSTEK)*, 2(1), 1–13.
- Ramdhani, N. M., Sondita, F., & Nurani, T. W. (2022). Strategi Pengembangan Sistem Pemantauan Kuota Penangkapan Pada Perikanan Indonesia. *Marine Fisheries*, 13(1), 15–29. www.ccsbt.org
- Singa, F. G., Bustari, & Hutaeruk, R. M. (2018). Fasilitas Dan Aktivitas Tangkahan Pt. Putra Berombang Perkasa Di Pelabuhan Perikanan Samudera Belawan Provinsi Sumatera Utara. *Jurnal Fakultas Perikanan Dan Kelautan Universitas Riau*, 1(1), 1–14.
- Situmeang, R. S., Rahmah, A., & Miswar, E. (2019). Dampak Keberadaan Tangkahan Terhadap Nilai Produksi Hasil Tangkapan di Pelabuhan Perikanan Nusantara Sibolga Selama 5 tahun (2013-2017). *Jurnal Ilmiah Mahasiswa Kelautan Dan Perikanan Unsyiah*, 4(4), 192–200.
- Southall, T., Defeo, D. O., Tsamenyi, D. M., Medley, D. P., Japp, D., Oloruntuyi, D. Y., Agnew, D. D., Doddema, M., Good, S., Hoggarth, D. D., Lefebure, D. R., Atcheson, M., Liow, S. Y., Leisk, C., Norbury, H., Bianchi, P., Anderson, D. L., Bostrom, J., & Gutteridge, D. A. (2016). *Working towards MSC certification: A practical guide for fisheries improving to sustainability*. Marine Stewardship Council.