

The Influence Of Setting Speed And Hauling Speed On Mini Purse Seine Productivity In Sawu Sea Waters, Sikka Nusa Tenggara Timur District

(PENGARUH KECEPATAN SETTING DAN KECEPATAN HAULING TERHADAP PRODUKTIVITAS MINI PURSE SEINE DI PERAIRAN LAUT SAWU KABUPATEN SIKKA NUSA TENGGARA TIMUR)

Christofel Oktavianus Nobel Pale¹, Najamuddin², Muzbir³

¹ Fishery Science Study Program Student. Graduate School
Hasanuddin University (email: 16mei1988@gmail.com)

² Faculty of Marine and Fisheries Sciences.
Hasanuddin University (email :)

DOI: 10.29322/IJSRP.10.10.2020.p10681

<http://dx.doi.org/10.29322/IJSRP.10.10.2020.p10681>

Abstract:

Setting and hauling the technical aspects that were instrumental in the operation of mini purse seine fishing gear, previous studies have examined the setting and hauling of technical factors that affect the productivity of purse seine. In the scope of research just to the arrest of the night, so that should also be studied setting and hauling mini purse seine operated during daylight hours. This study aimed to analyze the influence of setting and hauling mini purse seine during the production of fish in the waters of the Savu Sea. This research was conducted in Sikka village Fisherman Village Mbengu precisely which is the object and the Savu Sea which is the operation of regional Mini purse seine fishing gear. Survey method is done by taking the data speed setting, hauling speed and the number of production units of a fleet of 24 units of the total population of mini purse seine trawler in the waters of the Savu Sea and follows the fishing operation for 40 days. The results showed F count $< F$ table (0.746 $<$ 2.06) so did the value of $t < t$ table (0.010 $<$ 1.97402). This shows Setting (X1) and Hauling (X2) simultaneously and partially not affect the production of the catch on mini purse seine fishing gear operated during daylight hours in the waters of the Savu Sea.

Keywords: *Hauling, Mini Purse seine, Production, Settings.*

I. INTRODUCTION

Large fisheries potential is a major factor in the increase of the potential fishing, various types of fishing gear used by fishermen as a tool to exploit fish resources available. Walden and Mcguire (2011) states that the marine waters of common pool resources (common property), where fishermen have the same rights to use resources or do fishing business. One of the fishing efforts that is developing is the fishing effort by using mini purse seine fishing the smaller size of the purse seine.

The use of mini purse seine fishing is used by fishermen to exploit the pelagic fish, according to McCluske and Lewison (2008) that the fishing effort is a measure to generate a number of catches or measure the productivity of fishing unit. To achieve maximum production yields so many ways made by fishermen from increasing the length and the inside of the gear to the increase the size of ships and speed boats. Any fishing gear used to have principles and work differently, so the ability to capture in production is also different (Nelwan *et al.*, 2012).

Purse seine fishing gear performance is influenced by technical factors that work, according to Picaulima (2012) that the technical factors that affect the productivity of purse seine is the size of the ship, Purwanto and Nugroho (2011) purse seine productivity is influenced by the speed of the ship, other technical factors also affect the productivity of the purse seine, according to Pratama *et al* (2016), is a long trip, the number of crews, Watt, net length, width or depth of the nets, engine power, fuel and skipper experience. Aside from the productivity of fishing gear depends on the design and physical characteristics of the materials used to build the fishing gear. Structural components such as a mesh that gives vary in chemical composition and specific gravity. Similarly, the size of the mesh, the thickness of the yarn, and the volume of floats and ballast weight is used to provide positive and negative buoyancy in various parts of the nets may affect the behavior and performance of gear (Kim *et al.*, 2007)

Utilization of mini purse seine fishermen in Sikka, especially in the southern region of Sikka used to catch pelagic fish during the day. The development of mini purse seine in the southern region of Sikka district in the year 2016 is developing a fleet of 18 units and increased in 2018 by 24 units of the fleet (village profile Mbengu 2018). The increase in the number of mini purse seine fleet is expected to take effect on increasing the production value of fish catches. Many factors work and affect the productivity of the workings of the purse seine especially during an operation carried out such fishing gear speed of the ship, vessel GT, net length and depth of the net. Technical factor of considerable influence upon the operation of mini purse seine is the speed setting and hauling speed. this corresponds Kefi *et al* opinion (2013), that the successful operation of the purse seine based research results show that the success of purse seine operations using FADs is speed at the time of setting (setting speed) and pursing speed (pursing speed).

The purpose of this study was to determine the effect on the production Setting and Hauling catches mini purse seine fishing gear operated during daylight hours.

II. METHODS

This research was conducted in November 2019 - December 2019 in the waters of the Savu Sea, Sikka Regency, to be precise in the Mini Purse Seine fishing village, Mbengu Village, Nusa Tenggara Timur Province. The method used is a survey method which case study that is taking data directly following the arrest of six unit processes Mini Purse seine fleet for two months. Data taken the form of data speed setting fishing gear or fishing gear release of the six units of the fleet. Calculated using a stopwatch, the data withdrawal hauling rope drawstring or data from a fleet of six units is calculated by using a stopwatch. Total production or catch fish every trip the arrest of the six units of the fleet is calculated by weighing the fish is done. The analysis used in this research is multiple linear regression analysis.

III. RESULTS AND DISCUSSION

A. Characteristics of the Mini Purse Seine

Mini purse seine in Sikka regency, to be exact, Savu Sea, namely the fishing village of Mbengu Village, totaling 24 units of fleet with mini purse seine sizes consisting of 3 Grosstonage, 5 grosstonage and 7 grosstonage. Mini size purse seine in the region has long nets between 250-300 meters with a depth of 12-15 meters.

1. Component Mini purse seine

One unit of mini purse seine fishing equipment consists of several components forming (Figure 1), such as nets, buoys, rings, weights or lead rope and rigging as RIS above, below ris rope, rope buoy, rope rings and rope drawstring. Each component has a different function. Nets used is made of Polyethylene (PE) with a mesh size of 2 inches, while the ring is made of tin or of brass, used ropes made of Polyethylene (PE), buoys are usually packed of plastic materials with different shapes, some are round and some are ovals.

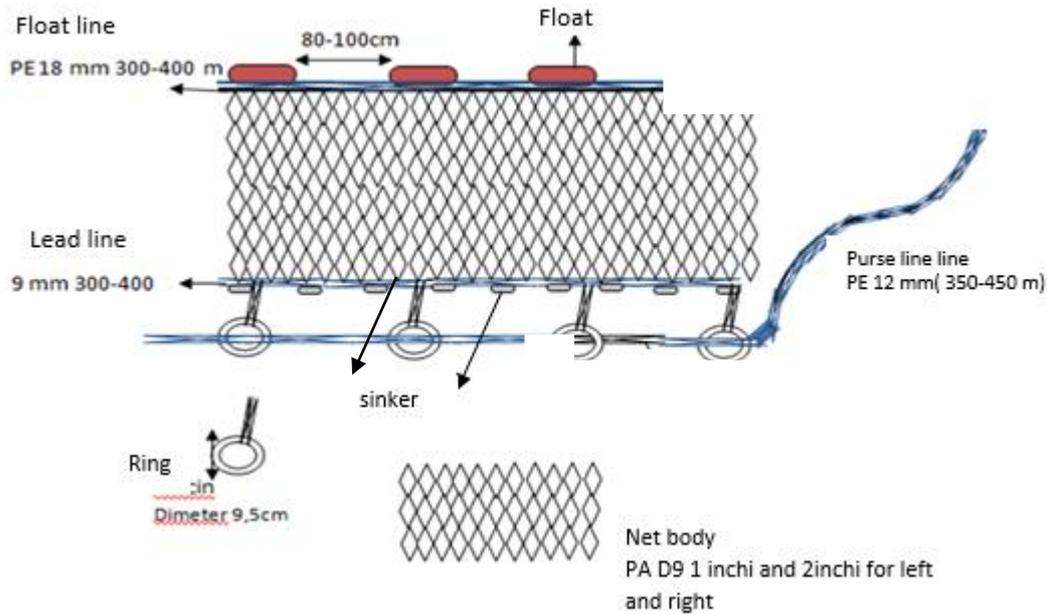


Figure 1. Component Mini Purse seine

2. Catching Mini purse seine operations

Operation Preparation Arrest

Before the ship set out to search the area fishing ground, routine activities performed by the skipper and all employees are engaged in preparing, technically good preparations such as preparation of fuel, engine inspection, preparation throw stones and setting fishing gear. The amount of fuel needed fisherman every day for 40 liters. Each fuel requirements are usually in accordance with the distance or length of time of arrest.

3. Catchment Area

Catching strip is an area that has the potential of fish and become a target region capture by fishermen. Fishing areas using mini purse seine fishing gear in pursuit of fish by fishermen system Mbengu village is along the waters of the territorial waters of the Savu Sea to the waters wolowirol ball. There is no definitive determination of the fishing area, the fishermen usually do a search along the waters. Determination seen fishing ground area of some signs such as discoloration of sea water, the presence of bubbles or water surface buoy, seen sea birds swooping or small fish leap above the water surface.

4. Mechanical Operation

Mechanical operation of mini purse seine fishing gear made after finding ground fishing areas or schools of fish, the operation of the process consists of two processes, among others:

1. Setting

- a. Setting is the process of decline in fishing gear, the early fishermen fishing ground or looking towards the fishing area begins from 6:00 to 11:00 hours. This is done because at that hour the surface of the sea water is not too hot and the fish can be seen or played above sea level, while in the afternoon the search process starts from 15.00- 17 .30 hours when the sun is not too hot or heat.
- b. When seen schools of fish quickly monitor your interpreter to convey to the skipper, so the skipper will steer the boat moved closer to the schools of fish as directed.

- c. Crew or all workers on board began to prepare for the position and duties of each
- d. Ships approaching the schools of fish to observe some things like, swimming direction of fish, water depth, type of fish, fish swimming speed, direction of currents and winds. A distance of approximately 40-50 meters monitor so that the fish do not escape or fear.
- e. Skipper will determine the starting point decrease in the net. Ships do if the motion to take a position prepare for loopin. The principle of the loop is to block the swimming direction of the fish, the maximum speed is according to the swimming speed of the fish so that the looping process is quickly completed.

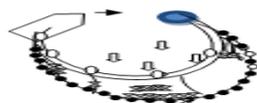


Figure 2. Illustration of Mini Purse Seine Settings in Mbengu Village

Hauling

“Hauling” or net withdrawal process will be done if both ends meet or mesh nets have been fused. Net withdrawal process is performed as follows:

- a. Withdrawal rope wrinkle as soon as possible in order to avoid the possibility of the fish being trapped can escape. Officers withdrawal wrinkle withdrawal rope rope together to close the vertical direction fish swimming.
- b. When the ring is almost reached the side rollers or information officer signaled to stop the withdrawal. Wrinkle rope hooked to the stopper in order not to sink.
- c. Appointment ring on the vessel, removal of the ring carried by several crews. This is done by fishermen for fishermen not to use the auxiliary engine or engine Derek but still using manpower.
- d. d. Once the ring is increased then the entire member simultaneously withdrawing a net weight starting from the withdrawal of the top rope ris (buoys) are landless and together.
- e. Body pulled nets so that the only remaining space is enough (which had bags of net section)
- f. Catches of fish (fish raised above board and inserted into the fish hold).
- g. After all the process has been completed and the fish in the hold then the nets will be trimmed back to the process of catching the next one.

B. Catch fish

Production of fish catches using mini purse seine fishing gear carried by a fisherman in the village of Mbengu is small pelagic fish species such as *Sardinella lemuru*, *Hemiramphus brasiliensis*, *Euthynnus affinis*, *Leioagnathus ecuulus*. Total production during the study can be found on the curve below.

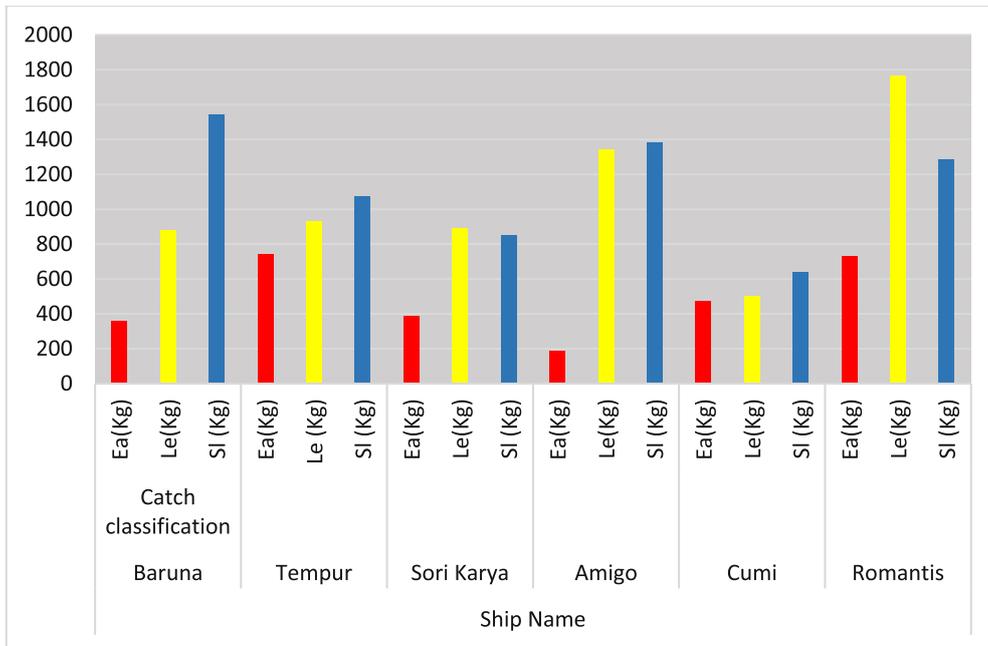


Figure 3. Curva Fish Production in November 2019

From the curve arrests made during research there are three dominant types of fish caught on a mini purse seine fishing gear during the day. Among the *Euthynnus affinis*, *Leioagnathus ecuulus* , and *Sardinella lemuru*. Of production during November catches most fish caught are *Sardinella lemuru* as shown in the diagram below.

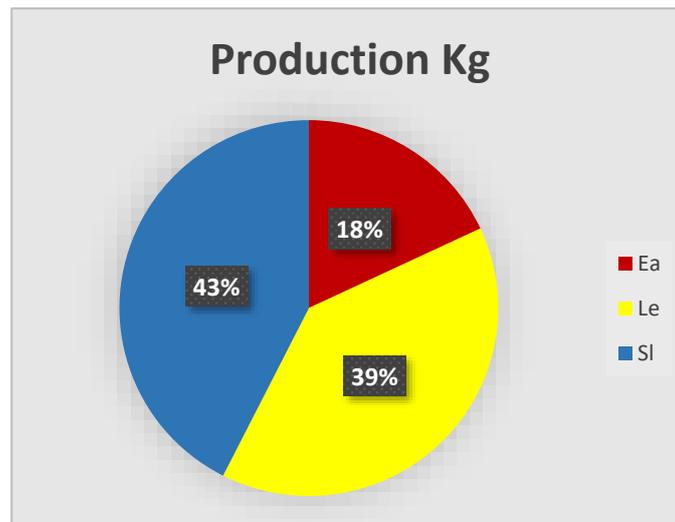


Figure 4. Diagram Catches Production Month November 2019

The most fish production in November 2019 was the type of *Sardinella lamuru*, which was 43% of the total catch, while *Leioagnathus ecuulus* was 39% and *Euthynnus affinis* 18%

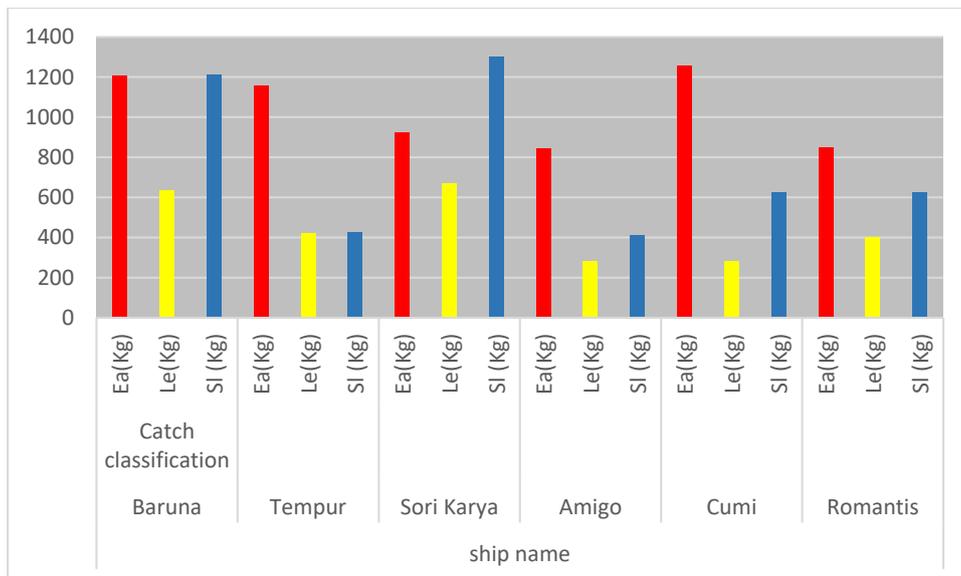


Figure 5. Production curva Month December 2019

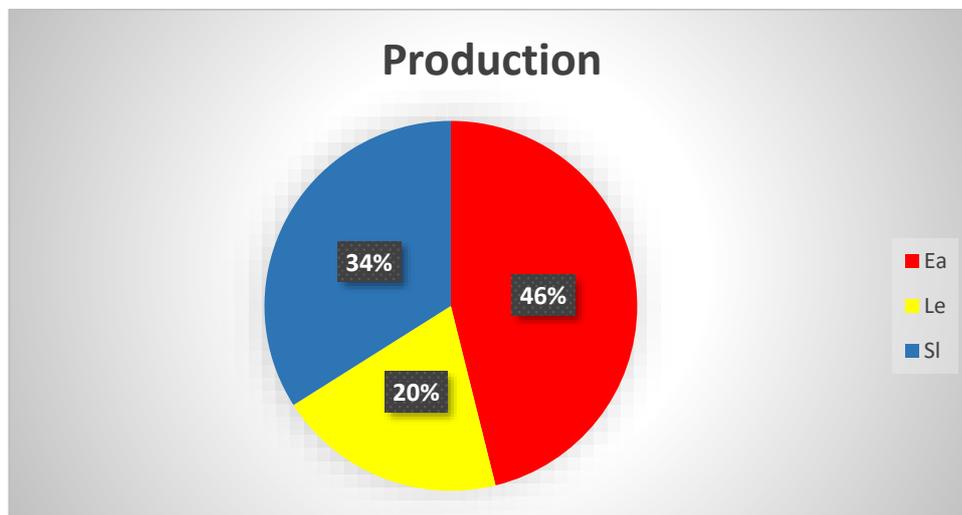


Figure 6. Diagram Production Month December 2019

Production of catches occurred in December as seen in the curves and diagrams explaining that the production catches in december catches the most is the kind *Euthynnus affinis* by 46% or 6231 kg, *Sardinella lamuru* 34% or 4592 kg and *Leioagnathus ecuulus* 20% or 2682 kg.

According to several researchers such as Safitri and Magdalena (2018), the composition of the catch of purse seine is *Decapterus makrosoma*, *Selaroides*, *euthinus affinis*, *Restrelliger*, *Parastromateus niger* and *Sardinella lamuru*. production quantities by fishermen is decreased compared to a few years ago. According to fishermen it is because of the excessive heat so the fish are not on the surface of the waters. Fluctuations catching perceived by fishermen is the impact of climate change that is very difficult to predict by fishermen. This is according to Saumanan (2012) that climate change is happening so quickly is a result of climate Variability is causing extreme weather. According Interter Governmental Panel on Climate Change (IPCC) (2014), states that climate change in the last decade has been in the spotlight of the world, causing climate change impacts on natural and human systems changes that can lead to the risk of harm associated with the interaction of the climate.



Figure 7. Fish from Mini Purse Seine Production

C. Setting Speed and Hauling influence on the production of the catch

1 Value The coefficient of determination (R^2)

Coefficient of determination can be used to determine the level of influence of the independent variable (X) to the value of the dependent variable (Y). In Table 2 the coefficient of determination of the analytical results is 0.38, or 3.8% Production is able to be explained by the variable setting, hauling, as well as speed, ABK, length, size, the depth of which is a supporting factor. And the rest is affected by environmental variables such as cuca and climate that are not described in this study.

2 F Test

For the F test can be used to determine the effect of variable X jointly or wholly to variable Y. Based on the test results in Table 3 obtained F F count = 0.746, F count <F table (0.746 <2.06). This shows the variable X no significant effect on production. It can also be seen from the significant value of 0.633 is > 0.05, which is a probability value.

3 T Test

The t-test is used to determine the effect of each variable X to Y regression model independent variable is the speed setting (X1), hauling speed (X2) and the dependent variable. Catch (Y) Based on Table 4 for the t test results showed that:

a) Speed setting (X1)

The speed setting (X1) has a sig. = 0.992 > 0.05. This shows that the speed setting no significant effect on produks. It can also be seen in the value of t <T table (0.010 <1.97402). It shows a little different from the opinions Maulana. (2017) says that the length of time the settings that affect the production of fish catches using a purse seine fishing gear, but not a dominant factor affecting the catch.

Setting speed has no effect because the use of the ship's engine, vessel size, and the size of the fishing gear by not having variety. Setting speed itself has a relationship with the ship's speed or power boats used as communicated by Pratama *et al.* (2016). That the process of looping fish schools will be faster if it is supported by the strength of the ship's engine. The same thing also delivered by Muntana *et al.* (2013). The use of large machines is needed in the process of looping fish schools. The process of setting fishing gear during the day requires precision from the skipper. This is because the fish are not concentrated so that the faster the circular then the less likely a fish out of the net.

b) Hauling Speed (X2)

Hauling speed has significant value = 0824 > 0.05 that is a probability value. It shows that the hauling speed does not affect the catch, but it also can be seen in the value of t <t table (0222 <1.97492). Which means that hauling did not affect the production of the catch. It is the possibility of the hauling speed is influenced both external factors and internal factors according to (Pratama *et al.*, 2016). Determination of setting and hauling speed, heavily dependent on technical factors, among others, the dimensions of the vessel, the size of fishing gear, engine power, and the number of crew. According to Imanda *et al.* (2016) to

maximize the time the withdrawal cord drawstring, replaced human labor with technology. This was deemed necessary to reduce the number of crews and the crews operating costs.

Overall the test results have shown that the speed setting and hauling speed does not significantly influence the production of the catch. According Maulana *et al* (2017) on the partial test duration setting only has an influence on the production of 27.8% while hauling only affect production by 3.3%. Another determining factor is also affected currents and winds. Currents and winds will affect the net circle become imperfect when looping and the net will be torn due to strong currents and waves.

Climatic factors are environmental factors which influenced the setting and hauling the impact on the production catches mini purse seine fishing. Changes in sea surface temperatures are increasing resulting in fish that are in the water column, making it hard fisherman when looking for fishing areas. This is resulting in setting and hauling can only be done one time in a day that originally could reach 4-5 times a day. According to Thomson *et. al.* (2014) climate change resulting in climate variability such as the frequency, intensity and duration of extreme weather. This resulted in certain months of the fishing very difficult to determine or predict the fishing season and the time of going to sea because climate change is happening so quickly and in the long term. It is also the Intergovernmental Panel on Climate Change (IPCC) (2014), states that climate change in the last decade has been in the world spotlight. Climate change is causing impacts on natural and human systems changes that can lead to the risk of harm associated with the interaction of the climate. Climate change is felt by fishermen, fishing became very little time so that the effect on the earnings of fishermen. As climate change is felt fishermen are the currents and waves.

Based on the results of multiple linear regression analysis obtained by value of setting and hauling is not significant so the regression model can not be used to determine the effect of variable X to variable Y constant value 186 931 If assumed that all of the variables X or independent variable is 0 then there will be an increase in production of 186.931kg.

IV. CONCLUSION

Based on the results it can be concluded that the factor of speed setting and hauling speed does not affect the catch on mini purse seine fishing gear. The dominant factor is the effect on other factors not tested as the aquatic environment, fishing seasons and climate.

For further research may add to environmental factors that are considered quite an impact, as well as a research and reproduced samples.

REFERENCES

- Imanda S.N., Setiyanto I. & Hapsari T.D. (2016). Analysis of the factors that influence the catch of mini purse seine in the fishery port of Pekalongan. *Journal of Fisheries Resources Utilization Management and Technology*, 5: 145-153.
- [IPCC] Intergovernmental Panel on Climate Change. 2014: *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA
- Kefi O.S., Katiandagho E.M. & Paransa I.J. (2013). Successful operation of the purse seine Sinar Lestari 04 with tools that operate in the waters FADs Lolak North Sulawesi. *Journal of Science and Technology of Capture Fisheries*, 1(3): 69-75.
- Kim H.Y., Lee C.W., Shin J.K., Kim H.S., Cha B.J. & Lee G.H.(2007). Dynamic simulation of the behavior of purse seine gear and sea-trial verification. *Fisheries Research*, 88 : 109–119.
- Maulana A.R, Sardiyatmo, Faik Kurohman 2017. Effect of Long Time Setting And Withdrawal Tali Wrinkle (Purse Line) Capture Device To Catch Mini purse seine fishing in the harbor of the archipelago Pekalongan. *Journal of Fisheries Resources Utilization Management and Technology* Volume 6, Number 4, Year 2017, Pg 11-19 Online at: <https://ejournal3.undip.ac.id/index.php/jfrumt/issue/archive>.

- McCluske SM, Lewinson RL. 2008. Quantifying Fishing Effort: a synthesis of current methods and their applications. *Fish and fisheries* (9): 188-200.
- Muntana A, Soemarno, Sahri M, Slamet W 2013. Research Vessel Speed Mini purse seiner To Catch Fish In Water Probolinggo. *MARINE Journal*, Volume 6, 1 April 2013 ISSN: 1907-9931
- Nelwan A.F.P., Sudirman., Nursam M., & Yunus M.A. (2012). The productivity of pelagic fishing in the waters of Sinjai Regency during the West-East Transition Season. *Journal of Fisheries (J. Fish. Sci.) XVII* (1): 18-26 ISSN: 0853-6384
- Pratama M.A.D., Hapsari T.D., & Triarso I. (2016). Factors affecting the production of the purse seine catchment unit (gardan) di fishing base ppp Muncar, Banyuwangi, Jawa timur, *Jurnal Saintek Perikanan*. 11 (2) : 120-128.
- Picaulima S.M. (2012). Analysis of Effect of Production Factors on Productivity of purse seine In Southeast Maluku District. *Journal of Tropical Fisheries*, 7(1): 611 – 616.
- Purwanto. & Nugroho D. (2011). The capability of purse seine vessels and fishing effort on small pelagic fisheries in the Java sea. Jakarta: Research Center for Fisheries Management and Conservation of Fish Resources.
- Safitri I & Magdalena W. 2018. Capture Fisheries Purse Seine at Nusantara Fishing Port (PPN) Pemangkat West Kalimantan, *Jurnal Laut Khatulistiwa*, 1(3): 89-96, October 2018 ISSN: 2614-6142
- Saumanan, N. S. 2012. Impact of Climate Variability. [Internet]. [Download October 14, 2019]. Available at: <https://theboundarylayer.wordpress.com/2012/09/18/impact-of-the-climate-variability/>: ISSN 2277-8616
- Village profile Mbengu 2018
- Walden, J. B. and C. J. McGuire. 2011. Who Owns The Fish? Moving From The Commons To Federal Ownership Of Our National Fisheries. *Marine Resources Committee Newsletter*, Vol. 14 (2) : 3-7.