

LOCAL WISDOM USING ONJHEM TO CATCH INDIAN SCAD (DECAPTERUS RUSSELLI) IN PASONGSONGAN WATERS (SUMENEP-MADURA REGENCY) AND SURROUNDING AREAS

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ABSTRACT

Onjhem is a fishing tool that has long been used by Pasongsongan fishermen to catch fish. The *Onjhem* function (read: onjem) is generally referred to by another name, namely rumpon (Indonesian)/ FADs (Fish Aggregating Device) to collect fish in a selected fishing area. Local wisdom has been maintained until now in the use of onjhem, namely by only choosing one of a number of onjhem placed in the sea. How the local wisdom with the preservation of Indian scad fish resources in the waters of Pasongsongan and its surroundings is the goal of this research. The method used for data analysis from 2015 to 2021, namely quantitative descriptive with an approach to technical, biological, and level of utilization aspects. The results showed that local wisdom in the use of Indian scad fishing aids in the form of onjhem can maintain the sustainability of the potential of these fish resources.

INTRODUCTION

Onjhem is the local name of the Pasongsongan fishing community for FADs made of coconut leaves tied to a 120 meter long rope with a float made of bamboo. The history of onjhem has started hundreds of years ago, namely fishing aids that are widely used by fishermen to create planned fishing areas with the aim that Indian Scad fish can gather so that fishing operations can be more effective and efficient (Rahman, Kusnadi, & Suharijadi, 2019). In connection with that, not a few experts and observers in the field of fisheries are concerned about the use of onjhem as a tool for collecting fish (FADs) which are considered disturbing and even damaging to fish ecological factors, especially for fish that have the behavior of migrating from an area waters from one waters to another, especially for fish that are long distance migration, for example Indian Scad fish (Adawiyah, Umiyah, & Setyati, 2015). FADs are floating devices used by fishermen to increase the harvest of pelagic fish such as tunas by combining them (Moreno et al., 2016). FADs can be identified quickly, reducing search time and operation expenses, and since they can be discovered at any time of day using a computer screen, they can be fished on as early as dawn (Davies, Mees, & Milner-Gulland, 2014). Another opinion

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states that the use of onjhem is very likely to cause overfishing (Dinas, 2013). In general, these concerns are about the sustainability of fish resources in a waters area. Since as a framework for fishery management, scientific stock evaluations are necessary for the sustainable use of fishery resources (Mu et al., 2021). In relation to the use of FADs (onjhem), the Ministry of Maritime Affairs and Fisheries of the Republic of Indonesia issued Ministerial Regulation No. 26/MEN/2014 concerning FADs with the hope that the use of FADs can be better regulated and monitored.

An average of 74 Purse Seine vessels per year in Pasongsongan use onjhem to catch kite (*Decapterus russelli*). As is known, that Indian scad can be caught all year round except during bad weather (Taeran, 2007). Moreover, Indian scad fish is a kind of small pelagic fish that is frequently found in Indonesian oceans (Ahmad, Susanto, & Hamisi, 2021). Indian scad in Pasongsongan has been practiced for a long time, starting with the operation of payang from natural fibers colored with natural dyes, namely from mangrove tree bark and operated by wind-powered wooden boats (using sails) (Mustofa & Setyobudiandi, 2019). At that time, fishermen were already using onjhem, although in limited quantities, no more than 2 per boat.

Currently, the Indian scad fishing has used Purse Seine fishing gear with nets made of synthetic materials and operated by boat using engine power. From year to year the number of onjhem used by fishermen is increasing. The increase in the number of onjhem in line with the number of ships is very worrying for various parties about the sustainability of Indian scad fish in these waters (Poojary, Tiwari, & Sundaram, 2015). However, there is a habit of fishermen or can be categorized as local wisdom, namely although each ship has many onjhem (7 ~ 12 units) installed in the sea, but every day they go to the sea, it turns out that only 1 onjhem is taken for fish with a note that they choose onjhem that are suspected to be onjhem (Suastra, 2018). Moreover, Use of FAD Onjhem in the operation of the instrument for catching payang in the Madura Strait, particularly in Gili Ketapang Probolinggo Regency, has an equally large impact on the yield of capture results (Primyastanto, 2016). Inhabited by Indian scad fish in large numbers. This habit or behavior of fishermen is something that is interesting to study, does this behavior have a positive impact on the survival of Indian scad fishing, especially in Pasongsongan waters or its vicinity? Could this behavior address the concerns of experts about the use of onjhem in fishing?

In this study based on those phenomenon, it was attempted to analyze with the following approaches: technical, namely the number of onjhem; biological, namely the distribution of the size and level of maturity of the gonads as well as the level of utilization. The results of this study are expected to provide a real picture of how the local wisdom of Pasongsongan fishermen maintains the sustainability of Indian scad fish resources in their waters.

METHOD

The method used for data analysis from 2015 to 2021, namely quantitative descriptive (Creswell, 2010) with an approach to technical, biological, and level of utilization aspects.

A. Technical Approach, analyzed data from 2016 – 2021.

The formula used are:

$$CPUE = Cy_i / FADs$$

CPUE = Catch per Unit Effort

Cy_i = Yearly of Catches

FADs = Yearly of Number of Onjhem

B. Biological Approach, 2019-2020 data

1) Distribution of Monthly Bodylength of Fish

2) Distribution of Gonado Maturity Level

C. Utilization Rate for data 2015 – 2021

The formulation used is as shown in Table 1 with a note that the effort used is the number of fishing trips

Table 1
Formula for calculating CPUE, MSY, TPC, TPf, and TAC

CPUE	MSY	TP _c dan TP _f	TAC
CPUE = Ct/Ft (Gulland, 1983)	$C = af + b(f)^2$ $f_{opt} = -a/2b$ $MSY = -a^2/4b$ (Suastra, 2018)	$TP_c = (C_i/MSY) \times 100\%$ $TP_f = (f_s/f_{opt}) \times 100\%$ (Taeran, 2007)	TAC = 80% x MSY (FAO, 1995)

Description :

CPUE = Catch per Unit Effort.

Ct = Catches in year Yi)(tons).

Ft = Number of trip in year

C = Number of catches (tons/trip)

a = Intercept

b = Slope

f = Number of trip in year

f_{opt} = Efforts optimum (trips)

TP_c=Yearly Level of utilization(%)

C_i = Yearly Catches (tons).

MSY= Maximum Sustainable Yield (tons).

TP_f = Level of effort in that year (%).

F_s= effort standart in that year (trips).

f_{opt} = Optimum effort (tons).

TAC = Total Allowed Catches (tons).

Table 2
Classification of Fisheries Resource Utilization Level

Classification		
1	Underfished	0-33%
2	Moderate	33,3-66,6%
3	Optimum	66,6-99,9%
4	Overfished	> 100%

(Ultokseja, 1991)

RESULTS AND DISCUSSION
A. Technical Approach

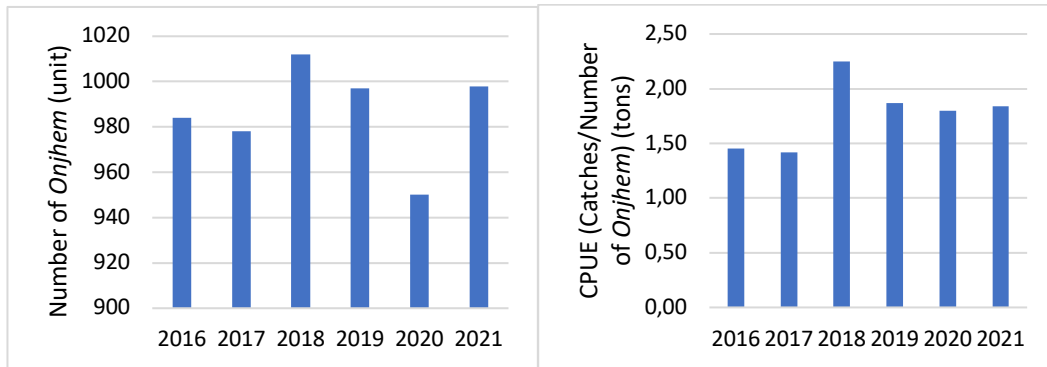
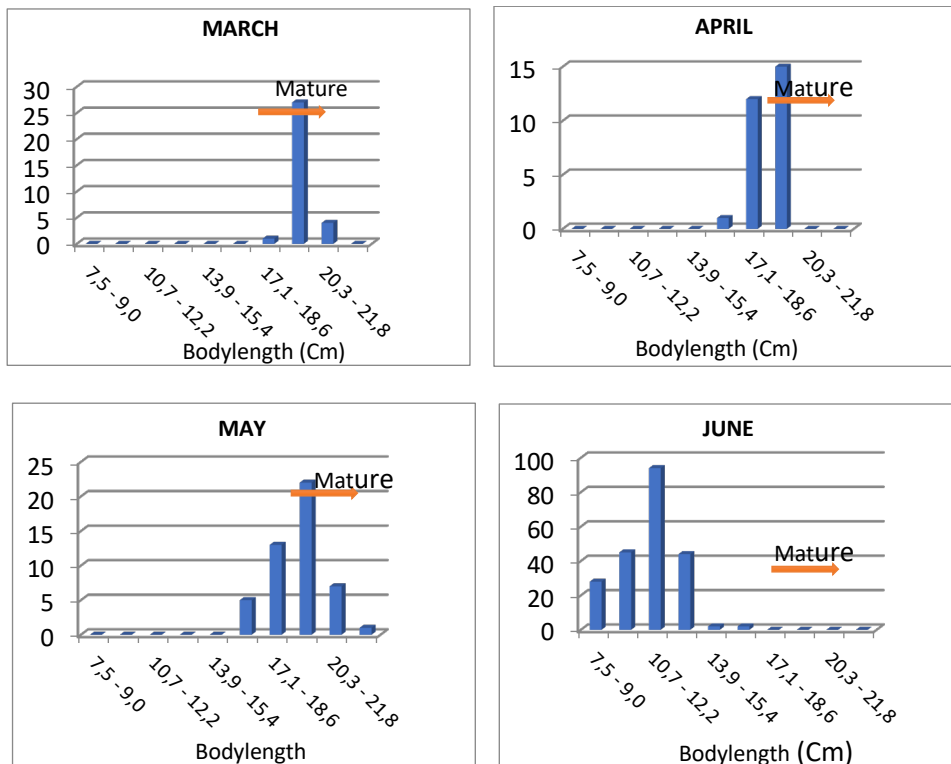


Figure 1. Graph of Number of Onjhem and CPUE (Catch per Number of Onjhem)

The number of onjhem used by fishermen annually fluctuates from 2016 to 2021 because they are damaged and lost and there are new additions. However, the catch per onjhem (CPUE= Catches/Number of onjhem) shows a positive result, meaning that a higher number of onjhem can still produce a higher number of fish. These results indicate that the use of onjhem followed by local wisdom in its operation can still maintain the sustainability of the potential of Indian scad fish in Pasongsongan waters.

B. Distribution of Bodylength and Gonadal Maturity Level of Indian scad



Local Wisdom Using *Onjhem* to Catch Indian Scad (*Decapterus Russellii*) in Pasongsongan Waters (Sumenep-Madura Regency) and Surrounding Areas

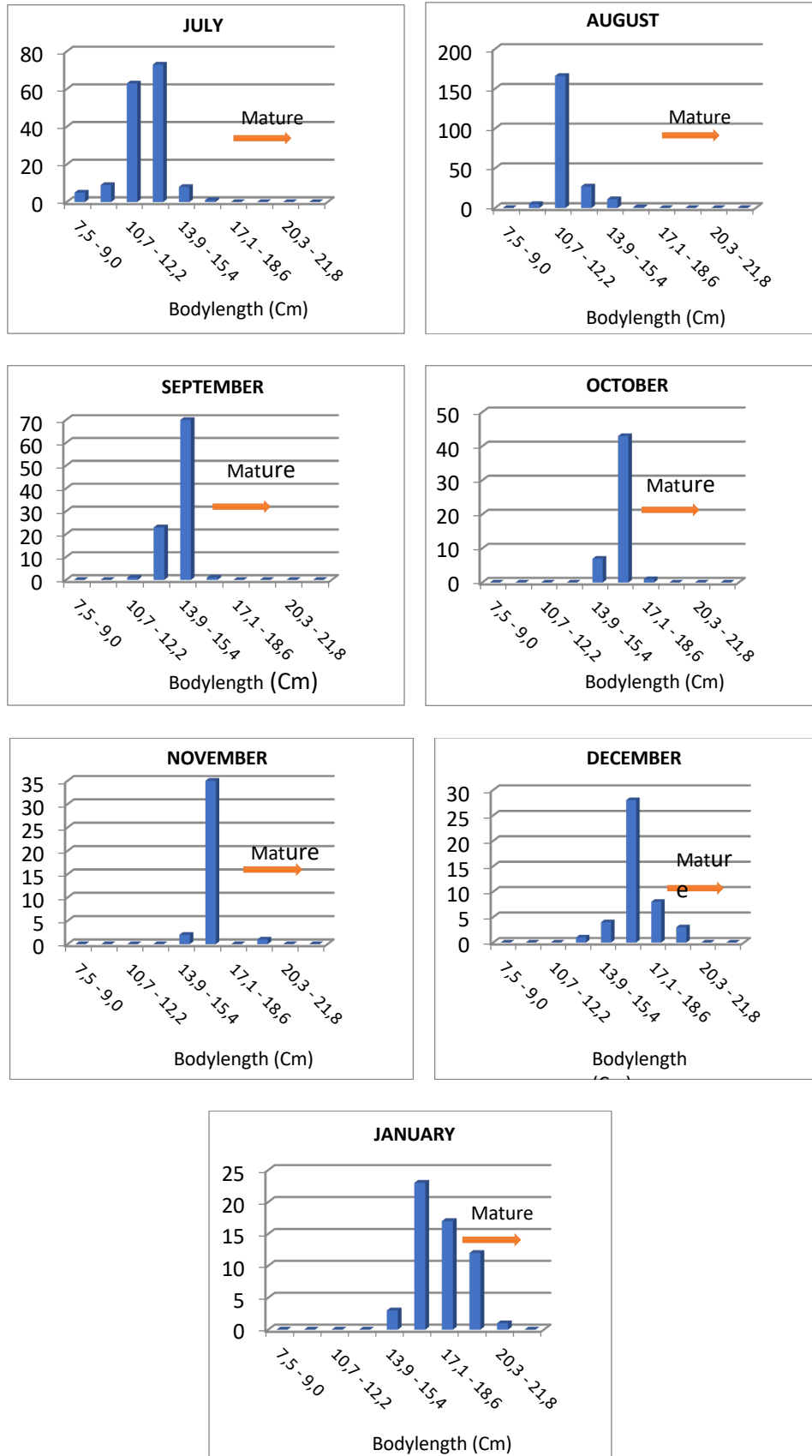


Figure 2. Graph of the Monthly Distribution of Body Length of Indian scad

Figure 2 shows that the presence of Indian scad in the fishing area still varies based on body length. In December ~ May the proportion of fish with body length was 17.1cm ~ 18.6 cm and 18.7cm ~ 20.2 cm more than other sizes, that is, the size of the fish was larger than that caught in September ~ November; September ~ November the proportion of fish with body length of 13.5 cm ~ 15.4 cm is more than other sizes; The smaller fish bodylength size can also be caught in June ~ August, which is 9.1 cm ~ 13.8 cm. The distribution of the bodylength size of the Indian scad in this annual period shows that the variation in body size is very clear which indicates that the regeneration of the scad in the fishing area is going well. As a reference for gonadal mature scad using the research results of [Pralampita and Chodriyah \(2017\)](#), that gonadly mature scad in Rembang waters starts from 18.9 cm. So the evidence from the analysis of the bodylength distribution of Indian scad caught with Purse Seine based on data from 2019 and 2020 shows that local wisdom of using onjhem by Pasongsongan fishermen can still maintain the sustainability of the potential of Indian scad in these waters.

Further analysis was carried out on the gonads of fish caught based on data in 2019 and 2020. These results are shown in Figures 3, 4 and 5 which are also the results of studies by [\(Maskuriyah & Zainuri, 2021\)](#). In Figure 3, it is known that all the increase in gonad maturity of the male scad are still caught throughout the year with monthly variations. Especially for the month of January, Indian scad are still caught with gonad maturity level 1 and 2; Entering February, the gonad maturity level 2 and 3. In July it was found that Indian scad with gonad maturity level 1 were caught again as well as 2 and 3; August completes the maturity level of the gonads caught in the previous month, namely 1, 2 and 3, then more mature fish are also caught with a gonadal maturity level of 4. In September - November the fish are ready to spawn, namely the gonad maturity level 5 can be caught, specifically for the month of November, the size of fish with gonad maturity level 1 caught back. These results indicate that the capture of Indian scad fish with variations in the level of gonad maturity 1 to 5 provides an overview of the local wisdom of using onjhem to complement the existing evidence.

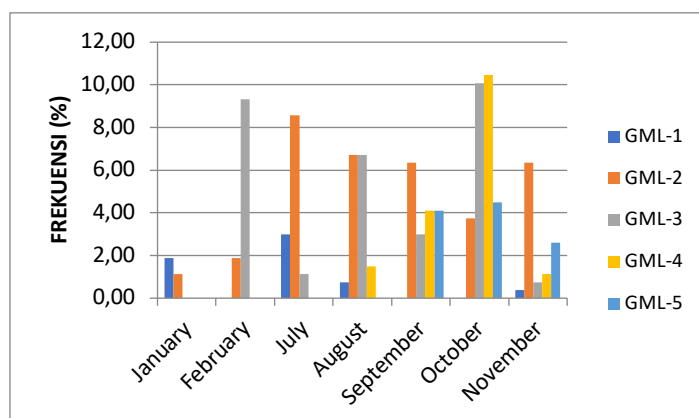


Figure 3. Frequency Distribution of Monthly Gonad Maturity Level (GML) For Male

The trend of the same results was also shown for the distribution of female scads, namely the varying levels of gonad maturity as a catch from the Purse Seine, ranging from gonadal maturity level 1 to 5 (Figure 4).

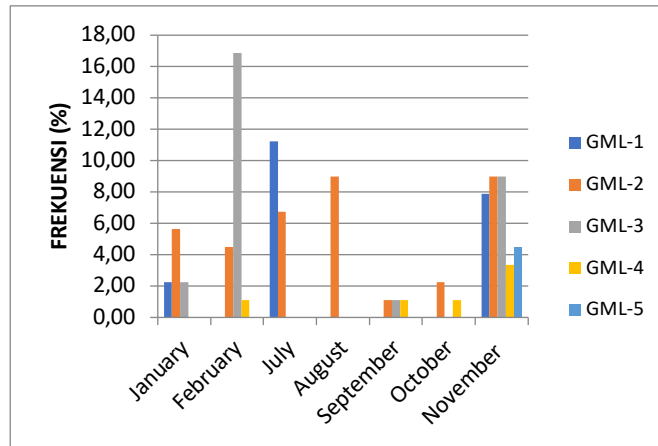


Figure 4. Frequency Distribution of Monthly Gonad Maturity Level (GML) For Male

On the basis of the same data, when viewed by season, the evidence of local wisdom using *onjhem* for catching Indian Scad fish in Pasongsongan and surrounding waters will be more visible. In both the Rainy Season and Dry Season (Figure 5) all levels of gonad maturity from level 1 to 5 can be caught, although in different proportions. This means that the potential and regeneration of Indian Scad fish in Pasongsongan and surrounding waters is not threatened by the use of *onjhem* by fishermen. Local wisdom, namely by utilizing only one (1) *onjhem* in each fishing operation, is still able to maintain the sustainability of the scad fish resources.

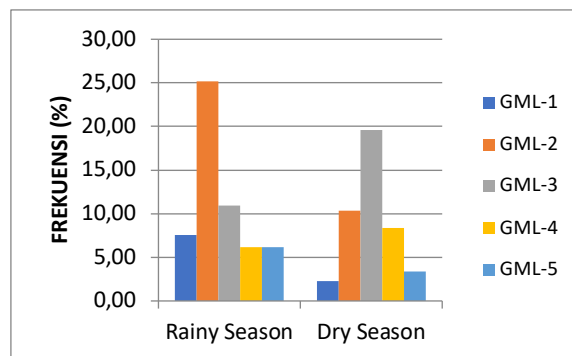


Figure 5. Frequency Distribution of Gonad Maturity Level (GML) by Season

Note : GML= Gonado Maturity Level

C. Utilization Rate

Complementing the previous results, Table 3 below shows the Utilization Level of Indian Scad Fish in Pasongsongan waters. In the table, it can be seen that the Average Utilization Level of Indian Scad Fish is in the optimum position. Although in 2018 it showed an overfishing utilization rate, in the following years it turned out that the reuse rate was in the optimum position. This further emphasizes how local wisdom using *onjhem* eliminates concerns that the use of FADs (Fish Aggregating Devices/FADs) can interfere and even threaten the sustainability of fish.

Table 3
Utilization Rate (TPC), Effort Level (TPF) and Allowable Utilization Rate (TAC) of Indian Scad Fish in Pasongsongan Waters

Year	Catches (tons)	Number of Trip	TPC = Catches / 1.873,17 (MSY) (%)	TPF = Effort / 3.419,40 (Fopt) (%)	TAC = Produksi / 1.498,53 (TAC) (%)
2015	872.73	1259	46.59*	36.82	58.24
2016	1424.02	1273	76.02**	37.23	95.03
2017	1386.00	3028	73.99**	88.55	92.49
2018	2279.66	3351	121.70?	98.00	152.13
2019	1865.84	3826	99.61**	111.89	124.51
2020	1707.10	3289	91.13**	96.19	113.92
2021	1840.94	3402	98.28**	99,49	122.85
Mean	1625.18	2775.43	86.76	81.17	108.45

Noted: * = moderat; ** = optimum; ? = overfishing

CONCLUSION

The number of onjhem used by fishermen annually fluctuates from 2016 to 2021 because they are damaged and lost and there are new additions. Moreover, the evidence of local wisdom using onjhem for catching Indian Scad fish in Pasongsongan and surrounding waters will be more visible. The results showed that the Pasongsongan fisherman's habit of catching Indian Scad fish (*Decapterus russelli*) using FADs (onjhem) which became local wisdom could maintain the potential and sustainability of Indian Scad fish resources in these waters.

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