WWW.IJRPR.COM

**International Journal of Research Publication and Reviews**

Journal homepage: www.ijrpr.com ISSN 2582-7421

# Analysis of Distribution Seagrass Ecosystem in Tunda Island Serang Regency

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*DOI:* https://doi.org/10.55248/gengpi.4.623.46378

**A B S T R A C T**

Seagrass ecosystem is one of the productive ecosystems in coastal and has an important role to support the livelihood of coastal communities by utilizing economical biota living in seagrass ecosystem for sale and private consumption. This study aims to provide seagrass resources and distribution. The method used in this research is the transect method measuring 100x100cm and interview using questionnaires at four different locations in the Tunda Island, Serang regency. The results indicated there is five seagrasses species that found, which is Enhalus acoroides Thalassia. hemprichii Cymodocea serrulata, Cymodocea rotundata Syringodium isoetifolium. The cover value of seagrass condition in Tunda Island is included in the rare category with a cover value of 22.58% ± 1.51. The pattern of exploiting of seagrass ecosystem in four different location have similar pattern of seagrass ecosystem utilization, that is catching fish and crab for sale and private consumption thereby seagrass ecosystem has become source of income (livelihood) of peasent fisher.

Keywords: seagrass ecosystem, peasant fisher, utilization, Tunda island

## 1. Introduction

Seagrass is one of the productive ecosystems in coastal waters besides coral reefs and mangroves. One of the ecological functions of seagrass is to become a habitat for various marine biota, because it can be used as a spawning, nurturing and foraging area as well as providing protection from natural activities such as strong currents and high waves. As an ecosystem, seagrass also provides direct and indirect benefits for the people who live around the seagrass ecosystem. Torre-Castro and Ronnback (2004) explained that seagrass ecosystems have an important role to support the lives of coastal communities by utilizing economic biota that live in seagrass ecosystems such as fish, crabs and shellfish.

Tunda Island in Serang Regency has quite extensive seagrass vegetation. The seagrass ecosystem found on Tunda Island is one of the sources of livelihood for local people who work as traditional fishermen who catch fish, shellfish and crabs for their own consumption or for sale. This was also confirmed by Barker et al. (2015) which states that there are case studies around the world regarding the benefits provided by the existence of seagrass ecosystem resources, namely as a source of income and a source of food security. The existence of seagrass ecosystems as fishing grounds for economic marine biota is inseparable from threats that can disrupt the seagrass ecosystem and the resources in it.

Threats that can have an impact on the seagrass ecosystem on Tunda Island are land conversion from development activities or zoning in coastal and marine areas that are inappropriate and or do not pay attention to ecological aspects so that it can trigger pollution and damage to seagrass ecosystems, which in turn will result in loss of livelihood for the local community as traditional fishermen. This happens due to a lack of information about the benefits of seagrass ecosystems which are often only seen from the ecological aspect without seeing the benefits from the social aspect.

In connection with the ecological roles and functions of seagrass ecosystems that have been described above, as well as other functions utilized by the community, especially traditional fishermen by catching economic biota for self-consumption or sale, the purpose of this research is to identify seagrass resources and their utilization patterns on Tunda Island.

## 2. Research Method

This research was conducted on Tunda Island because it has a large seagrass meadow area and there are fishing activities for fish resources by traditional fishermen. This research was conducted on 22 May – 25 June 2019.

### *3.1 Data Sampling*

Seagrass cover data was collected using the quadratic transect method at three different points with a distance of 25 m at each station. The transect is drawn perpendicular to the shoreline from point 0 m (the position of the first seagrass found) to the edge or the last point of seagrass found. On each transect line, seagrass ecosystems were observed with the help of quadrant plots measuring 100 x 100 cm with the squared distance of the next transect 10 m. The data taken includes the dominance of seagrass species and seagrass cover on the surface of the sediment in percent units and their standard deviation. Data collection on environmental factors (physics-chemistry) such as the type of substrate, temperature, salinity, pH, DO was carried out in situ.

The data taken to determine the utilization of seagrass consists of primary data and secondary data. Primary data obtained from interviews with questionnaires and field observations.

### *3.2 Data Analysis*

Data on the percentage of seagrass cover in one station is calculated using the following equation:

$$seagrass\ cover = \frac{Sum\ of\ average\ seagrass\ cover\ values\ of\ all\ sampling\ points}{Number\ of\ sampling\ points\ in\ one\ location}\ X\ 100\%$$

The results of this equation will determine the value of the appropriate seagrass cover category at the research location (Rahmawati et al. 2014).

The data that has been obtained from the results of interviews and questionnaires is set forth in the form of tables and figures which are then described descriptively. The data obtained is grouped and arranged hierarchically. The first hierarchy is the utilization of seagrass as a source of income and consumption. The second hierarchy is the source of income from the catch. The third hierarchy is the treatment of the catch.

## 4. Discusion of Result

The results of observations in the study found that the area of seagrass beds in each village was different, it was known that the area of seagrass beds was (2 ha). This area is a place for traditional fishermen to catch fish and crabs. There are 5 species of seagrass found at the study site, as can be seen in Table 1. Each area will have a variety of compositions and a variety of species, the more types of seagrass that can be found, it can be said that the condition of the waters and even the surrounding environment is in good condition. which is good, because it can support the life and existence of many types of seagrass, and can be used as a bioindicator of a coastal waters (Fahruddin et al. 2017).

Table 1. Distribution of seagrass species in the study location

| **Family** | **Species** | **Acronym** | **TI[1]** |
|---|---|---|---|
| Hydrocharitacea | *Enhalus acoroides* | Ea | √ |
| Cymodoceaceae | *Thallasia hemprichii* | Th | √ |
| | *Cymodocea serrulata* | Cr | √ |
| | *Cymodocea rotundata* | Cs | √ |
| | *Syringodium isoetifolium* | Si | √ |

[1]Tunda Island

Based on the calculation results, the percentage of seagrass cover at the research location is included in the rare category, this refers to the value of the seagrass cover category according to Rahmawati et al. (2014) in Table 2, with a range of seagrass cover percentage values between 0-25%. The percentage value of seagrass cover is 24.51% ± 4.25.

Table 2. The value of seagrass cover at the research location

| **Location** | **SegarasscCover average %** | **Dominance of seagrass species** | | | | |
|---|---|---|---|---|---|---|
| | | **Ea[1]** | **Th[2]** | **Cs[3]** | **Cr[4]** | **Si[5]** |
| Tunda Island | 24,51 | 2, 20 | 2,69 | 1,77 | 1,26 | 0,86 |

[1]E. acoroides [2]T. hemprichii [3]C. serrulata [4]C. rotundata [5]S. isoetifolium

The condition of the aquatic environment is an important factor for the survival of seagrasses and the biota that live in seagrass ecosystems. The condition of the aquatic environment at the study site is presented in Table 3

Table 3. Conditions of the aquatic environment at the study site

| **Location** | **Temp** | **Salinity** | **pH** | **DO** |
|---|---|---|---|---|
| | **°C** | **ppt** | | **mg/l** |
| Tunda Island | 29,3 ± 0,58 | 30 | 7 | 4,87 ± 0,06 |

The results of the study show that the temperature on Tunda Island is 29.3 °C. The temperature conditions of the coastal waters in the four villages are in accordance with those expressed by Lee et al. (2007), where in tropical and sub-tropical regions seagrass is able to grow optimally in the temperature range of 23 - 32 °C. Dissolved oxygen (DO) values in this study in the four villages ranged from 4.73-4.83 mg/l. Dissolved oxygen content is used by seagrasses for root and rhizome respiration, respiration of aquatic biota and use by nitrifying bacteria in the nitrogen cycle process in seagrass beds (Felisberto et al., 2015).

The use of seagrass ecosystems on Tunda Island is widely used by traditional fishermen. Fish is the catch target for 76 fishermen, 72 crabs and 38 shellfish. The types of marine biota caught by traditional fishermen are blue swimming crab (*Portunus pelagicus*), mullet fish (*Valamugil buchanani*), petek fish (*Leiognathus nuchalis*), and lancam fish (*Lethrinus lentjan*). The results of the questionnaire show that land use in the largest seagrass ecosystem is used as a place to find fish using beach nets and anco (41%).

The traditional fishermen referred to in this study are fishermen who carry out fishing activities in seagrass ecosystems. The total number of fishermen in the research location is 186 people. They are called traditional fishermen because they have limited fishing facilities and infrastructure and have relatively narrow fishing grounds. The means used to go to sea are by foot and or by rowing boat. The fishing gear used is only operated around seagrass ecosystem waters.

The treatment of the catch is divided into two. Most of the catch is sold to local collectors and the rest is for personal consumption. The number of collectors in the research location is 2 people. The catch in the form of small fish is sold and used as crab bait. Marketing of fresh and processed catches is sold to different places. Fresh fish and crabs are sold outside Tunda Island, namely to Serang Regency, partly to Cilegon City.

## 5. Conclusions

The results of closing observations, seagrass conditions on Tunda Island are included in the rare category. The pattern of utilization of seagrass ecosystems by traditional fishermen, namely catching fish and crabs for sale and personal consumption, thus seagrass ecosystems have become a source of income (livelihoods) for traditional fishermen on the one hand, while on the other hand the dependence of traditional fishermen on collectors of their catch is relatively high. The advice that can be given from this research is that the condition of seagrass density on Tunda Island needs to be improved, one of which is the need for regulations regarding the management of seagrass beds so that activities that can cause a decrease in seagrass density can be limited. It is necessary to empower fishermen groups by the government so that these traditional fishermen can distribute their catch directly to collectors or larger buyers so that the selling price of the catch is not determined unilaterally by local collectors.

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