

Study of Space Needs In Fishermen's Fishery Activities, Seberang Fishing Village, Paluh Kurau, Indonesia

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Abstract — *Kampung Nelayan Seberang, Paluh Kurau is a coastal area located in Muara Belawan, Indonesia Province, where the community relies heavily on capture fisheries as their primary economic activity. Socio-economic and cultural challenges faced by the fishing community contribute to low income levels and a reduced quality of life. The need for adequate spatial support for fishing activities serves as a key driver of the local economy. This study aims to examine the relationship between economic activities and community behavior in shaping spatial patterns, particularly those related to fisheries. A descriptive analysis method was employed, using Behaviour Mapping and Place-Centered Mapping approaches. The results indicate that the coastal fishing community in Kampung Nelayan Seberang has unique characteristics, living, growing and developing in the transition area between land and sea areas. The terrace of the fishermen's house as a mooring or dock for ships, the main space for fishing activities is directly accessible to the waters that are the source of life for fishermen.*

Keywords: *Spatial needs, Behaviour Mapping, Kampung Nelayan Seberang, Dock*

I. INTRODUCTION

Indonesia has a lot of marine potential, has 17,504 islands, the sea area covers 2/3 of the entire area of Indonesia, which is 6.8 km² and the length of the coastline is 108,000 km (Ministry of Maritime Affairs and Fisheries, 2019). Coastal areas play an important role in fisheries activities and maritime economy (Law No.27 of 2007 concerning the Management of Coastal Areas and Small Islands). Fishery activities in the form of fishing and cultivation are the livelihood of the community in the coastal environment (Subri, 2005). An area inhabited by fishing communities whose livelihoods and livelihoods are supported by the sea, grow and develop between sea and land areas, as a survival system consisting of social categories that form social unity, with system values and cultural symbols as a reference for their daily behavior (Kusnadi, 2004) and is a form of cultural space that accommodates human activities towards the environment (Rapoport, 1977).



Figure 1.1 Muara Belawan, Indonesia Province

Seberang Fishing Village, Paluh Kurau Village, Hamparan Perak District, Deli Serdang Regency, Prov. Indonesia, is a coastal area inhabited by fishing communities, with an area of 26.25 km² with a density of 4,187% people/km². Seberang Fishing Village is a fishing village that can be reached about 1 hour drive from Medan City by 4 or 2 wheeled vehicles then continued by boat to the village. Villages located on sea level geographically border:

- North with Paluh Kurau Village
- South with Muara Belawan
- East with Paluh Nonang
- West with Paluh Lumbu





Figure 2.1 Seberang Fishing Village, Paluh Kurau, Muara Belawan

Seberang Fishing Village, Paluh Kurau was originally a coastal land that had no inhabitants. The area that is geographically at the estuary and directly accessible to the Strait of Malacca, has the potential for Belawan residents who are generally fishermen. The area above the waters is in accordance with their activities to moor boats and is comfortable because it is inhabited by fishing communities in coastal areas.

Coastal communities are oriented towards a culture that is in harmony with nature, utilizing natural resource technology that is adaptive to environmental conditions. Low education, income depending on the season, limited business capital, lack of supporting facilities, and poor market mechanisms, result in coastal communities finding it difficult to develop and tend to be poor (Kusnadi, 2003). Poverty is due to complex factors that are interrelated so that it weakens the ability of the community to encourage regional development and improve social welfare (Sipahelut, 2010).

The increase in modern fishery activities, the number of population, and the need for the development of infrastructure to support trade and logistics connectivity have led to an increase in the need for facilities and supporting infrastructure in the area of fishery activities and fishermen's settlements as well as a decrease in protection of the estuary environment, as a habitat for mangroves and marine ecosystem cycles (Irawan, 2017). Space includes land, sea and air, including space within the earth as a unit of territory, is a container for humans and other living things to carry out activities and maintain their survival (Law No. 26 of 2007 concerning Spatial Planning). Space as a resource to support survival, so that space use activities can have a positive or negative impact on other activities, or it can be said that space has a limited nature, so it is necessary to arrange and use of space optimally so as to reduce conflicts (Muta'ali, 2013).

II. LITERATURE REVIEW

Urban and Regional Planning

Urban and regional planning as a decision-making step to achieve economic, social, cultural and environmental goals through the development of spatial planning visions, strategies and plans, and the application of a set of policy principles, tools, institutional participatory mechanisms and regulatory procedures. Urban and regional planning contributes to sustainable development closely related to three complementary dimensions: social development and inclusion, sustainable economic growth, and environmental protection and management (UN-Habitat, 2015).

Environment, Behavior Patterns and Architecture

Architecture is formed from the results of human behavior patterns as social creatures, which cannot be separated from the environment as a character builder. Consciously or unconsciously, buildings are formed as a result of the influence between humans and patterns of behavior and activities on the surrounding environment as a form of behavior, which affect each other so that a unique building or environment is formed (Tandali & Agam, 2011).

Main Factors of Economic Activity

The main economic activities are divided into three main activities (Rahmatullah, Inanna, Nurdiana, 2019), namely:

1. Production
The basis in producing goods and services, which can be interpreted as an activity that can improve an economy by producing or making a good or service in order to achieve an economic value.
2. Distribution
An activity that aims to distribute, distribute or deliver a good or service from a producer to a consumer.
3. Konsumsi.
The activity of using a product of goods or services produced or produced by a manufacturer, to meet the needs of users called consumers.

Patterns of Traditional Fishermen's Economic Activities

The definition of economic activity is a process in which natural or human resources in the form of capital are used to produce and distribute goods or services so that they can be consumed by others in society (Floyd, 2020). Traditional fishing activities in coastal areas are related to the process of catching marine products or production from marine natural resources and distributing or selling them oriented to meet their own living needs, with simple and traditional fishing gear (Lubis, 2014).

III. METHOD

This study uses a descriptive qualitative approach, which aims to describe and analyze the phenomenon only on the activities of traditional marine fishermen. The qualitative approach focuses more on understanding the problems, challenges, and solutions related to the management of coastal spaces that support the fisheries sector. Qualitative approaches are used to gain a deeper and more comprehensive understanding of a social phenomenon, so as to provide a clear picture of the factors that affect the use of space (Creswell,

2017; Yin 2000 in Milanie et al., 2020; Abdiyanto, 2020; Milanie et al., 2021).

The data collection technique in this study is by primary and secondary surveys. Primary surveys were conducted with interviews that aimed to explore information, understanding, and experiences (Yin, 2000 in Nuraini, 2024; Nuraini, 2019) on fishery activities in Sebrang Fishermen's Village. Interviews allow researchers to dig deeper into the experiences of the research subjects and gain a broader perspective (Moleong, 2017, Yin 2000 in Nuraini, 2024, Nuraini, 2019). The researcher also studied literature, scientific papers, reports, and other literature related to the need for fisheries activity space as a secondary source (Nuraini, 2019; Nuraini, 2024; Milanie et al., 2022). Miles & Huberman (2017) emphasized the importance of using documents as a source of data in qualitative research, to provide more comprehensive information.

The data analysis method used in this study is Behaviour Mapping, which is used to find out how human activities interact with the space itself (Ratodi, 2017; Abdiyanto & Sari, 2024), so that it can identify patterns of human activities in certain environments or spaces, then cross-tabulation is carried out using the Place Centered Mapping method, in order to map human phenomena in accommodating their behavior in certain conditions, circumstances and spaces (Adhitama, 2013; Nuraini, 2019; Nuraini, 2024), thus strengthening the results of descriptive analysis.

The variables used in this study based on the theory of traditional fishery activities are:

Variable	Subvariable
Production <ul style="list-style-type: none"> Geographical and Natural Conditions Workforce Capital Technology and Experience Distance Traveled to Sea 	<ul style="list-style-type: none"> Production Activity Pattern Patterns of Spatial Activity
Distribution <ul style="list-style-type: none"> Market/ Consumer Thing About Us 	<ul style="list-style-type: none"> Distribution Activity Pattern Patterns of Spatial Activity
Konsumsi <ul style="list-style-type: none"> Income Price Habits/tastes 	<ul style="list-style-type: none"> Consumption Activity Patterns Patterns of Spatial Activity

Table 1. Variables and Subvariables of Fisheries Activities

IV. RESULTS AND DISCUSSION

A. Fishermen's Production Activities

Kusnadi (2009) in Fishermen's Empowerment in Coastal Economic Dynamics explained that fishermen's production activities are influenced by several aspects:

1. Nature

Geographical and Natural Conditions

Sebrang Fishing Village, located in the eastern coastal area of Indonesia, has abundant marine fisheries potential and is the main livelihood for most people in the area, ranging from capture fisheries, fish farming, to fishery product processing activities (BPS, Indonesia, 2022). Some of the natural factors that affect it include :

a. Coastal Topography and Sea Depth: This area has sufficient sea depth to support fishery activities, such as fish landing sites, has great potential for fisheries development. In addition, coastal topography that is in accordance with the needs of fishermen's activities is also an important factor in

determining locations for the use of fishery space (Pouye, et al. 2022).

b. Coastal Ecosystems: The existence of healthy coastal ecosystems, such as mangroves, greatly supports the continuity of fishery activities (Badjeber, N. 2020). Mangroves function as a barrier to coastal erosion, expanding the land to the sea for organic waste processing, spawning sites and food chains for aquatic biota that support fishery activities and have the potential to be educational and recreational areas (Senoaji & Hidayat, 2017).

1. Workforce

The number of workers gives an indication that the more the number of workers, the more opportunities for fishermen to get a large number of catches (fish). This may happen because the large number of workers makes it easier to operate fishing gear in the fishing business (Prakoso, 2013).

a. The fishing community of Kampung Nelayan Sebrang is a community whose livelihood depends directly on marine products, both by fishing and cultivation consisting of labor fishermen, collector fishermen and individual fishermen (Mulyadi, 2007). Labor fishermen are fishermen who do not have fishing equipment, but they rent fishing gear from other people or those who are laborers or workers for people who have fishing equipment (Satria, 2002), and based on their status fishermen are divided into 2 groups, workers and non-laborers (Leonardo, 2002):

1. Fisherman Labor

Fishermen who help other fishermen in the process of going to sea with wage income and agreed revenue sharing.

2. Non-Labour Fishermen

i. Individual Fisherman (Private)

Fishermen who have personal fishing gear in the process of their fishing activities.

ii. Collector Fisherman

Fishermen who rent fishing gear and distribute their catch to consumers.

iii. Fisher Group

Fishermen who do not have fishing equipment and rent fishing gear to collector fishermen.

3. The pattern of fishermen's activities, based on the group:

Yes	Information	Production Activities	Activity Room
1	Fisherman Labor	<ul style="list-style-type: none"> Start activities from private fishermen's moorings, collectors or groups to reach objectives of fishery product activities, both from Preparation of seafaring equipment, seafaring to the process processing of marine products. 	Following the direction of its leaders
2	Non-Labour Fishermen A. Private Fisherman	<ul style="list-style-type: none"> Start activities from the ship's own mooring Prepare your own fishing gear or assisted by labor fishermen. Sail alone with your own boat or together and assisted by labor fishermen. 	Main Facilities : <ul style="list-style-type: none"> Ship/Dock mooring Fishing gear repair site Processing site Supporting facilities : <ul style="list-style-type: none"> Fishing gear store Catch support shop such as ice, plastic, fiber drum etc Fuel Providers
	B. Group Fishermen	<ul style="list-style-type: none"> Start activities from the moorings of collector fishermen. Preparing the fishing gear provided rented from collector fishermen. Going to sea with the ship provided or rented from collector fishermen. 	Prepared by collector fishermen

C. Collector Fisherman	<ul style="list-style-type: none"> • Collecting catches from fishermen collector. 	Main Facilities : <ul style="list-style-type: none"> • Ship/Dock mooring • Fishing gear repair site • Processing site Supporting facilities : <ul style="list-style-type: none"> • Fishing gear store • Catch support shop such as ice, plastic, fiber drum etc • Fuel Providers
	<ul style="list-style-type: none"> • Start activities from the ship's own mooring and usually not at sea. • Preparing fishing gear for fishermen workers or group fishermen. • Receiving catches from labor fishermen or group fishermen, then processing or disciplining. 	

Table 2. Patterns of Fishermen in Seberang Fishing Village

3.Capital

Working capital is the amount of funds used during a certain period to generate short-term income (Current income) according to the main purpose of starting a business (Irawan & Suparmoko, 2002). Capital is a supporting factor for production results, production results can be increased with efficient production machine tools. Production increases, so income will also increase (Jati, 2013). In starting their business, fishermen need sufficient capital to catch fish. The capital is needed to buy motorboats, fishing equipment, and additional equipment that can support to increase the catch (Lanes, et al., 2013). The private capital system is only owned by private fishermen and collector fishermen, as owners of fishing gear capital, while labor fishermen help private fishermen and group fishermen have rental capital to rent equipment belonging to collector fishermen at a cost or system that they have agreed upon (Sipahelut, 2010).

4.Technology and Experience

Technology is knowledge that is applied to the implementation of certain tasks/activities to be more effective, so technology is the organization and application of knowledge to achieve practical goals, it includes physical manifestations such as tools and machines, but also techniques and intellectual processes that are used to solve problems and obtain desired results (Rosenzweig, 2000). Fishing equipment technology used by fishermen is divided into two categories, namely modern fishermen and traditional fishermen. Modern fishermen's businesses are supported by advanced fishing technology compared to traditional businesses (Satria, 2017). Technology combined with fishermen's experience is able to support increased productivity and higher income (Halim & Susilo, 2013).

5. Distance Traveled to Sea

The distance traveled by the fishing area is influenced by the capital and the size of the boat used to go to sea. Fishing on the high seas allows for a much larger and larger catch, with longer and longer distances, with a larger capital supply, affecting the level of income from the production of the catch (Masyhuri, 1999).

B. Fishermen Distribution Activities

Fishermen's income is the result of production obtained at a distributed selling price and always differs every day depending on the amount of fishing results obtained (Erlansyah, 2024). The form of distribution of fishery products by the fishing community, namely fisher-consumers, fishermen-retailers-consumers, fishermen-collectors-retailers-consumers, and fishermen-collectors-retailers-consumers (Bone, 2018). Other patterns in the

distribution of catch are fishermen-consumers, fishermen-collectors-consumers, fishermen-collectors-traders and fishermen-collectors-traders-market-consumers (Imansyah et al., 2022). The distribution activities of the Seberang Fishing Village are only carried out by private fishermen and collector fishermen.

Yes	Information	Consumption Activities	Activity Room
1	Private Fisherman	<ul style="list-style-type: none"> • Purchase fishing gear support. • Purchase supporting materials for catches. • Buying fuel. 	<ul style="list-style-type: none"> • Fishing Gear Shop • Plastic stores • Ice Block Kiosk • Fuel kiosks or distributors
2	Fisher Group	<ul style="list-style-type: none"> • Depends on cooperation with fishermen collector. 	
3	Collector Fisherman	<ul style="list-style-type: none"> • Purchase fishing gear support. • Purchase supporting materials for catches. • Buying fuel. 	<ul style="list-style-type: none"> • Fishing Gear Shop • Plastic stores • Ice Block Supplier • Gas stations

Table 3. Distribution Activities of Fishermen in Seberang Fishing Village

C. Fishermen's Consumption Activities

The consumption activities of fishermen in Seberang Fishing Village, in fishery activities include:

1. Income

Fishermen's income includes all sources of income obtained from fishing activities and other related businesses (Pamungkas, 2023). The difference in income from fishermen groups also differentiates consumption patterns of goods or services to support fishery activities.

- The labor fishermen group, it can be said that they do not carry out consumption activities because this group of fishermen are only fishermen who work to support the activities of other group fishermen.
- Private fishermen groups, usually only buy equipment or support for fishery activities from small shops or kiosks of suppliers, while for fuel procurement they usually buy by means of ketengan with drums from small distributors with a term payment system.
- Group fishermen can also be said to only go to sea without carrying out consumption activities because all the needs and needs of going to sea have been provided by collecting fishermen.
- The collecting fishermen group carries out consumption activities with a better system, for example collaborating with fishing gear supplier shops, stores that supply fishing support goods such as plastic, fiber drums and so on, as well as fuel that has been purchased through petrol stations that have been systemed.

2. Price

Fishing gear used by fishermen in the operational context of fishery activities requires the allocation of costs for each fishing activity, including the procurement of fishing gear, fuel, consumption, and ice for the preservation of catches (Waileruny & Matruty, 2015). Fishermen of Sebrang Fishing Village, try to buy fishing gear or support for fishery activities at low prices, although to get these goods requires a longer distance. Traditional private fishermen are faced with more expensive financing for the procurement of quality tools because of the time-consuming purchasing system so that the price increases, while for collector fishermen with larger capital, they even get much cheaper prices even though they are the same as the futures payment system, because the

number of equipment purchases is much higher (Elanda, Y., & Alie, A., 2020).

3. Habits/ Tastes

Limited income causes traditional private fishermen to still use traditional methods with simple fishing tools (Suan, et al., 2023). Collector fishermen who have more capital, use more modern fishing equipment, are able to produce a lot of income, are effective and efficient, and save in the long term process (Jaya, 2011).

Yes	Information	Consumption Activities	Activity Room
1	Private Fisherman	<ul style="list-style-type: none">• Purchase fishing gear support.• Purchase supporting materials for catches.• Buying fuel.	<ul style="list-style-type: none">• Fishing Gear Retail Store• Plastic Retail Stores• Ice Block Kiosk• Fuel kiosks or distributors
2	Fisher Group	<ul style="list-style-type: none">• Depends on cooperation with fishermen collector.	
3	Collector Fisherman	<ul style="list-style-type: none">• Purchase fishing gear support.• Purchase supporting materials for catches.• Buying fuel.	<ul style="list-style-type: none">• Fishing Gear Wholesale Stores• Plastic Wholesale Stores• Ice Block Supplier• Gas stations

Table 4. Consumption Activities of Fishermen in Seberang Fishing Village

D. Patterns of Spatial Activity

Fishermen in general are people who live, grow and develop in coastal areas, transitioning between land and sea areas (Kusnadi, 2009). They make their living from marine products and live in coastal or coastal villages (Sastrawidjaya, 2002), settlements on the coast with residents living as fishermen are synonymous with fishermen (Fama, 2016).



Table 5. Production Activity Patterns of Fishermen in Seberang Fishing Village



Table 6. Distribution Activity Pattern of Fishermen in Seberang Fishing Village



Table 7. Consumption Activity Patterns of Fishermen in Seberang Fishing Villages

V. CONCLUSION

A. Fisheries Activities

The fishery activities of fishermen in Seberang Fishing Village are dominated by private fishermen. Fishery activities are carried out independently or assisted by labor fishermen with a revenue sharing system. The catch system returns to the day, with small boats and simple fishing gear, due to the limited cost of fuel and the ability to limit the ship's power. After going to sea, private fishermen sort the catch on the veranda of the terrace of the house, right in the mooring area, selling the fresh catch to stalls, markets, consumers, collectors or fish auction places. Other products are made into processed products, such as salted fish and shrimp paste, which are also processed in mooring areas or terraces. The procurement of fishing gear and other supporting fisheries activities are simple fishing equipment purchased in accordance with the limited cost of income. Group fishermen in collaboration with collector fishermen get their fishery activity facilities with an agreement system with collector fishermen, namely renting to collector fishermen or with a profit-sharing system. Fishing activities are carried out for days depending on the ship's power and capital capability. The catch is landed on the mooring of the fishing fishermen, sorted and distributed directly or semi-automatically. Direct distribution is direct distribution to the market, consumers, other large collectors or Fish Auction Places, while semi-distribution is the catch collected in cold storage until a certain amount is then distributed to other collectors. The procurement of fishing gear and supporting activities is supported by more modern tools.

B. Fisheries Activity Room

The activities of fishermen in the Seberang Fishing Village are centered on the mooring of boats or piers that surround the border with water. The mooring or boat dock is the main space that functions to support all fishermen groups with all the main activities of fishery activities, from starting sea activities to lowering marine products. Moorings or piers are also used as places to sort, process processed and repair fishing gear. The pier is the most important central space for fishermen, the existence of the pier is usually in front of the terrace of the fisherman's residence, in the form of a display, can be used as a public or private function, depending on the fisherman's residence. Residences or fishermen's houses that are located right behind the pier as well as to protect boats and other fishing equipment that are usually always on the

ship and are on the dock or ship mooring, so that the location of the pier and residence is indeed binding in terms of location and function.

C. Patterns of Fisheries Activity Spaces

The spatial layout of fishery activities in Seberang Fishing Village is related to the lifestyle patterns of fishermen in coastal areas. The main activity space patterns used by fishermen are:

A. Ship moorings or docks

The pier is a center for fishery activities that are used by all fishermen groups to carry out the main activities of fisheries with various other supporting activities, namely:

1. Boat or fishing gear repair place
2. Marine Products Processing Site
3. A place for socialization that can also be used as a place to sell fishery products.

B. Residence or Fisherman's House

The residence of the fishing community cannot be separated from their activities and behavior as fishermen. Houses not only serve as shelters, but houses that are exactly moored also serve many functions, including:

1. Fishing equipment storage
2. Storage of fishery products
3. The function of guarding vessels and fishing gear.

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