

Development of a Ferry Port in Bajoe Village to Support Tourism on Bokori Island, Southeast Sulawesi, based on the Linkage System

Haryani, Septiana

Regional & Urban Planning Department, Faculty of Engineering, Brawijaya University

Imma Widyawati Agustin

Regional & Urban Planning Department, Faculty of Engineering, Brawijaya University

Usman, Fadly

Regional & Urban Planning Department, Faculty of Engineering, Brawijaya University

Wa Ode Safina Tunnaja

Regional & Urban Planning Department, Faculty of Engineering, Brawijaya University

他

<https://doi.org/10.5109/7183412>

出版情報 : Evergreen. 11 (2), pp.1103-1115, 2024-06. Interdisciplinary Graduate School of Engineering Sciences, Kyushu University, Japan

バージョン :

権利関係 : Creative Commons Attribution 4.0 International



Development of a Ferry Port in Bajoe Village to Support Tourism on Bokori Island, Southeast Sulawesi, based on the Linkage System

Septiana Haryani^{1*}, Imma Widyawati Agustin¹, Fadly Usman¹,
Wa Ode Safina Tunnaja¹, Jacqueline Hiddlestone-Mumford²

¹Regional & Urban Planning Department, Faculty of Engineering, Brawijaya University, Indonesia

²School of Management, Faculty of Humanities and Social Sciences, University of Liverpool,
United Kingdom

E-mail: septianaharyani@ub.ac.id

(Received December 7, 2023; Revised March 15, 2024; Accepted April 30, 2024).

Abstract: The Bajoe Village Ferry Port serves as a facility to facilitate traveler access to Bokori Island. The port today plays a significant role in tourism, despite the fact that inadequate accessibility (roads without public street lighting) and subpar port conditions (no designated passenger lanes accessible and dirt roads) have an impact on the industry. The purpose of this study was to identify a suitable development plan for the Ferry Port enhancement in Bajoe Village. The analyses used were road network analysis, linkage system analysis, hydro-oceanographic analysis, potential and problem analysis, and SWOT analysis. The results of the road network analysis showed that the access road to the port had a width that did not meet road traffic standards and demands. System linkage analysis showed that the access road to the port was integrated with tourist attractions, culinary and souvenir centers, and accommodation facilities. The potential and problem analysis described the potential and regional problems from the spatial, policy, social, economic, technical, and environmental aspects of the Bajoe Village Ferry Port. The results of the research were a port development strategy in the form of expanding road network access to the port and providing street lighting, floating docks, and facilities at the port so that accessibility to Bokori Island tourism became easier and port facilities increased to provide comfort to port visitors.

Keywords: Water Transport; Port; Tourism

1. Introduction

Water transportation was related to the tourism sector because transportation had a role as an element of tourism planning in terms of supporting efficiency, comfort, and safety, which supported the creation of overall travel satisfaction^{1,2}. The role of water transportation was an element of tourism planning in terms of supporting efficiency, comfort, and safety, which supported the creation of overall travel satisfaction³. Based on the Republic of Indonesia Government Regulation Number 50 of 2011 concerning the National Tourism Development Master Plan for 2010 - 2025, transportation facilities and infrastructure were factors of tourism accessibility that supported the movement of tourists from their areas of origin to tourist destinations. The use of water transportation in tourism was to help tourists move towards marine tourism located on small islands⁴.

Water transportation is divided into the physical transport of ships and boats, and infrastructure facilities

such as ports⁵. Ports, as water transportation infrastructure played an important role in efforts to strengthen the regional economy since the colonial era⁶. A port is an area consisting of land and water with defined boundaries, used as a place for government and economic activities, such as berthing ships, boarding and disembarking passengers, and loading and moving goods⁷. A port has three hierarchies, based on Ministerial Regulation Number 50 of 2021 concerning the Implementation of Sea Ports. Namely, main ports, collection ports, and feeder ports (local feeder ports and regional feeder ports)⁸.

The Ferry Port of Bajoe Village, located in Bajoe Village, Soroia District, Konawe Regency, has a hierarchy as a local feeder port. Local feeder ports are ports that function as mobile bridge nodes that serve ferry transportation on routes within districts/cities; and/or connect the district/city road network. The Ferry Port was built by the provincial government in 2015 and inaugurated in 2016, being located in the Environmental Service Center (PPL) area. The PPL is an area designed

to provide services to activities on a sub-district scale or several villages in the sub-district⁹). All ship activities in Indonesian ports are still using conventional methods and manual labor, as well as at the ferry port of Bajoe village¹⁰). This port serves movement within the regency, with a primary function of facilitating the movement of tourists to Bokori Island.

Bokori Island is an island inhabited by Bajo tribal people, however, because Bokori Island often experiences abrasion, the government relocated the Bajo tribal community to the mainland of Konawe Regency Village, which is located opposite Bokori Island, namely Bajoe Village, in 1984. As a result of this relocation, Bokori Island finally became empty and uninhabited, so in 2014, the government began developing the island into a new tourist attraction in Southeast Sulawesi by building tourism support infrastructure in the form of clean water networks, electricity, gazebos, villas, and accessibility facilities for tourists. Bokori Island is a marine tourism area in Konawe Regency based on the Regional Spatial Plan (RTRW) of Konawe Regency 2014-2034 and is managed by the Southeast Sulawesi Provincial Government¹¹). Accessibility to Bokori Island can only be achieved by water transportation, one of which is through the Ferry Port of Bajoe Village.

The problem at the Ferry Port of Bajoe Village is that the road network has not been equipped with street lighting, so movement at night relies on the light from vehicles¹²), creating a safety hazard. The access road, which is an inter-district crossroad, has a road width of only 6 meters and a length of 8 km. This width does not comply with the width of arterial roads in Indonesian Order No. 34 of 2006, which stated that roads with arterial hierarchy should have a minimum width of 11 meters¹³). The road network is part of the port linkage system that allows an efficient connection between the port and the water transportation system, and the

hinterland area through the land transportation system¹⁴). This system was designed to optimize the flow of goods and passengers between ports and distribution or consumption points¹⁵).

The success of port development is strongly influenced by several port facilities, so these facilities need to be equipped with adequate infrastructure¹⁶). However, the problem at the Ferry Port of Bajoe Village is that it does not have the required health, security, and disability facilities. These three facilities in port service standards in Indonesia are important and affect the comfort level of visitors. In addition to the facility side, port development is also reviewed from spatial, economic, social, technical, and environmental perspectives¹⁷). From the technical side, the port pier of Ferry Port of Bajoe Village has not been adjusted to the conditions of the tides. Thus affecting the ship's operations when docked at the pier, this of course reduces passenger comfort when boarding the ship¹⁸).

The Ferry Port of Bajoe Village from the center of Kendari City, the capital of Southeast Sulawesi, is 22 km, approximately an hour's drive from the center of Kendari City. According to data from the Southeast Sulawesi Tourism Office, the proximity to Kendari City saw 96,725 tourists visit Bokori Island in 2019. The number of passengers at the Ferry Port of Bajoe Village Port in 2019 amounted to 40,194, based on Ferry Port of Bajoe Village Data¹⁹). This meant that as many as 42% of tourists used the Ferry Port of Bajoe Village to access Bokori Island. Therefore, with the problems that hinder the development of the port while the number of passengers is increasing, it is necessary to improve accessibility and the development of port facilities to support the movement of tourists. This research aims to provide a strategy for developing the Ferry Port of Bajoe Village to support tourism on Bokori Island.

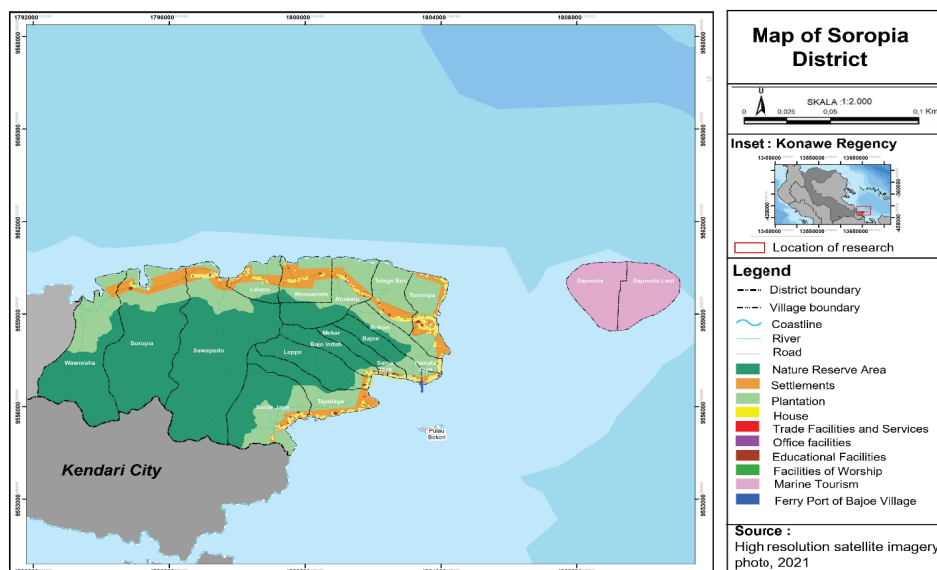


Fig 1: Research location on a map

2. Methods

The research method consisted of an explanation of the research location, data, and analysis used. The method explanation was equipped with a method framework that clarified the research process as follows:

2.1 Study Area

This research was conducted in the port area of Bajoe Village, Soropia District, Konawe Regency. Soropia District is a port zone identified in the 2017-2037 Southeast Sulawesi Province Coastal Area and Small Islands Zoning Plan (RZWP3K). The location of the study area is shown in Fig. 1.

2.2 Data and Analysis

Figure 2 illustrates the stages of data collection in research, both primary data collection by observation and secondary data. The yellow boxes in the picture are the variables used in this study and their sub-variables. The data obtained was then analyzed, consisting of the following:

1. Road Network Analysis

This analysis evaluates the access road to the Ferry Port of Bajoe Village located in Soropia District. In addition, to identify road conditions like Asphalt roads, Unpaved roads, and Paved roads²⁰) and the potential demand for traffic from road sections, road volume data was collected, road capacity was calculated, and road level of service (LOS) values were calculated.

The formula used was the road capacity in MKJI, 1997²¹), being:

$$C = Co \times FCw \times FCsp \times FCcs \quad (1)$$

$$VCR = \frac{V}{C} \quad (2)$$

1. Linkage System Analysis

This analysis studies the continuity or relationship of a tourism destination with a micro to macro-scope²³). Linkage system analysis is used to determine the relationship between sectors that influence tourism development and the linkage between tourism objects in Konawe Regency called backward linkage. As well as to find out the relationship between tourist attractions and other attractions around the area or on the route of travel, both land and water routes to the tourist area are called Forward Linkage.

2. Hydro-Oceanographic Analysis

Hydro-oceanographic analysis in this study is in the form of a description of sea depth mapping, wind direction, speed, and tidal height based on secondary data. Data analysis using ArcGIS software to produce marine bathymetry maps at the port²⁴).

3. Potential and problem analysis

Potentials and problems were an analysis in which the results of the analysis were in the form of an explanation of the potentials and problems that existed in the planning study area in terms of the characteristics of the area and port conditions. The aspects reviewed in this study included spatial, social, economic, technical, environmental, and infrastructure aspects²⁵).

4. SWOT Analysis

SWOT stands for Strengths and Weaknesses of the Internal Environment and Opportunities and Threats of the External Environment²⁶). SWOT analysis in this study is used to determine the direction of development of the Ferry Port of Bajoe Village by analyzing external factors in the form of opportunities and threats and internal factors in the form of strengths and weaknesses.

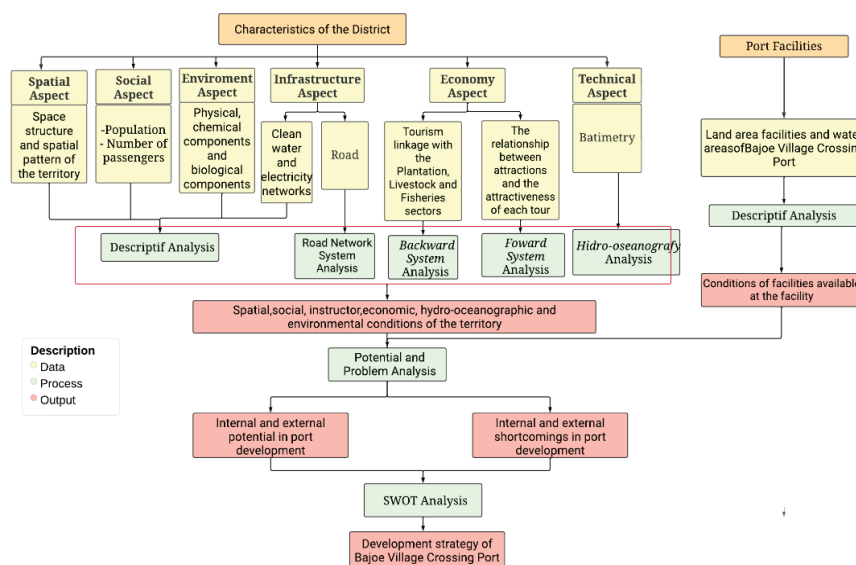


Fig 2: Method Framework

3. Result and Discussion

3.1 Result

A. Spatial Condition

The Ferry Port in the Bajoe Village area was an Environmental Service Center (PPL) which was an area that functioned to serve sub-district-scale activities or several villages in a sub-district, and it was located in Toronipa Village (Fig. 1). This sub-district had been designated as a regency strategic area for Minapolitan in the Soropia sub-district and as a strategic area for the development of small islands, one of which was Bokori Island (RTRW Konawe Regency 2014-2034). Then, within the zoning scope, was the port zone.

B. Social Condition

The social characteristics in this study were seen in the population of Konawe Regency and Kendari City because these two areas were the majority of areas of origin for Bajoe Village Ferry Port service users based on the results of the questionnaire. Based on data from the Central Statistics Agency for 2022, the population of Konawe Regency has reached 261,116 people, and that of Kendari City has reached 350,267 people. Based on data obtained on the number of passengers in 2019 before the pandemic, the number of passengers at this port had reached 40,194 people.

C. Environment Condition

Figure 1 shows that the area around the port did not have an industrial area, so that area was free from air pollution caused by B3 waste (Hazardous and Toxic Waste) like water waste from industries. Furthermore, based on this map, the area around the port was dominated by the Murhun Grand Forest compared to settlements, indicating that this sub-district had remained rich in biological components. This large forest was a protected area that would continue to be preserved by the Konawe Regency RTRW.

D. Infrastructure Condition

1) Road

The access road to the port has one main road, namely RE. Martadinata Street, with a secondary artery hierarchy, but not the width needed to meet the standard (Table 1). Based on Fig. 3, the road condition is good, with asphalt roads, but the road from the beginning of entry to the Soropia sub-district to the port had no street lighting available. This road is also connected to Kendari City. According to Table 1, Martadinata Hierarchy Road has a road width of 7.2 meters, which does not meet the road hierarchy standards as an arterial road because it is less than 11 meters. Therefore, road widening needs to be done.

Table 1. Road Network Analysis

No	Street	Hierarchy	Road Dimensions			
			Standard	Existing		
			Government Regulation No. 34/2006	Rumaja (Road space utilization)	Rumija (right of way)	Ruwasja (Road surveillance area)
1	RE. Martadinata from the border with Kendari City	Arterial	Rumaja: 11 meters Rumija: 15 meters Ruwasja: 20 meters	7.2 meters	8.8 meters	8.8 meters
2	RE. Port-front martadinata			8 meters	9.6 meters	12.2 meters
3	Poros Kendari-Soropia Street	Collector	Rumaja: 7.5 meters Rumija: 8.6 meters Ruwasja: 12.5 meters	6.5 meters	10 meters	15.7 meters

(Source. Primary Survey, 2023)

Based on Table 2, Vehicle volume data for each road was obtained based on secondary data (The Southeast Sulawesi provincial transportation service). Both roads had a level of service (LOS), which meant that the congestion level on these roads did not reach a severe level. In this condition, the traffic flow tends to be stable, the speed is slightly limited by traffic, and the driver still has the freedom to choose their speed.

2) Clean Water and electric network

Based on Fig. 3, the Konawe Regency area had been served by the electricity network, particularly in the port area. The classification of the electricity network in the port area was a low-level overhead line. The distance between PLN and the port was 900 meters. Furthermore, all villages already had clean water infrastructure in the form of drilled wells.

Table 2. Level Of Service

Hours	Volume (pcu/Hour)	CO	FCw	FCsp	FCsf	FCcs	C (Pcu/H)	VCR	Los
	A	b	c	d	e	f	$g = (b * c * d * e * f)$	(a/g)	
RE. Martadinata Steet									
Morning	535	2900	1.14	1	0.92	0.86	2616	0.19	A
Afternoon	436	2900	1.14	1	0.92	0.86	2616	0.17	
Evening	974	2900	1.14	1	0.92	0.86	2616	0.37	B
Poros Kendari-Soropia Steet									
Morning	300	2900	1	1	0.97	0.86	2419	0.12	A
Afternoon	188	2900	1	1	0.97	0.86	2419	0.08	
Evening	591	2900	1	1	0.97	0.86	2419	0.24	B

(Source. Analysis result,2023)

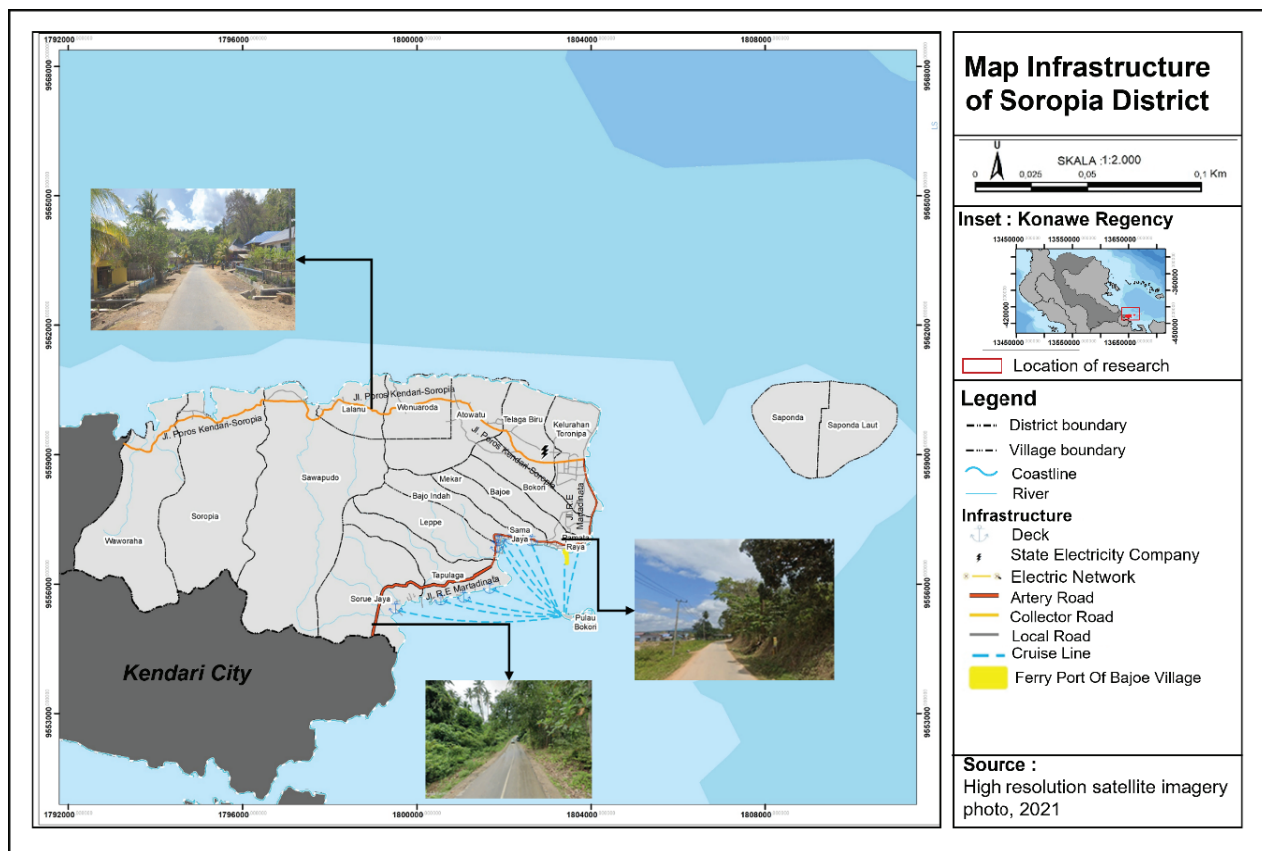


Fig 3: Map of Access Road Network to Ferry Port of Bajoe Village

E. Economic Condition

This aspect will be analyzed using linkage system analysis is an analysis that studies the existence of backward linkage and forward linkage. This analysis was used to see the relationship between the Ferry Port of Bajoe Village and surrounding tours.

1. Foward System

Based on Fig. 4, there are 5 tourist attractions connected to the Ferry Port of Bajoe Village through cross-district roads within the province and connected to Kendari City. The access road is connected to culinary centers, souvenirs, and hotels. This attracts tourists to use port services in Soropia District, where in 2019 the number of users of crossing port services in Bajoe Village, Soropia District reached 40,194.

Table 3. Potential Attractions

No	Tourism	Something to see	Something to do	Something to buy
1	Bokori Island	The beauty of the sea of Bokori Island and the magrove forest	Conduct family events or outbound activities, Swim, Volleyball, Banana boat, and donut boat	Food and souvenirs typical of Southeast Sulawesi such as cashews in Bokori Island restaurant
2	Saponda Island	The underwater beauty of Saponda Island	Snorkeling	Fresh fish from local fishermen
3	Toronipa Beach	The beauty of the sea, Toronipa Beach with a stretch of white sand	Banana boat, Swim	Green coconuts on tours
4	Bintang Samudra Beach	The beauty of the sea, Fish in the Caramba	Fishing, Swim, Eat selected seafish directly in the Caramba	Fish from the Caramba on this tour
5	Rock Climbing Cave	View the beauty of the Sulawesi Sea from the top of the cliff	Rock climbing	-

(Source. Analysis result,2023)

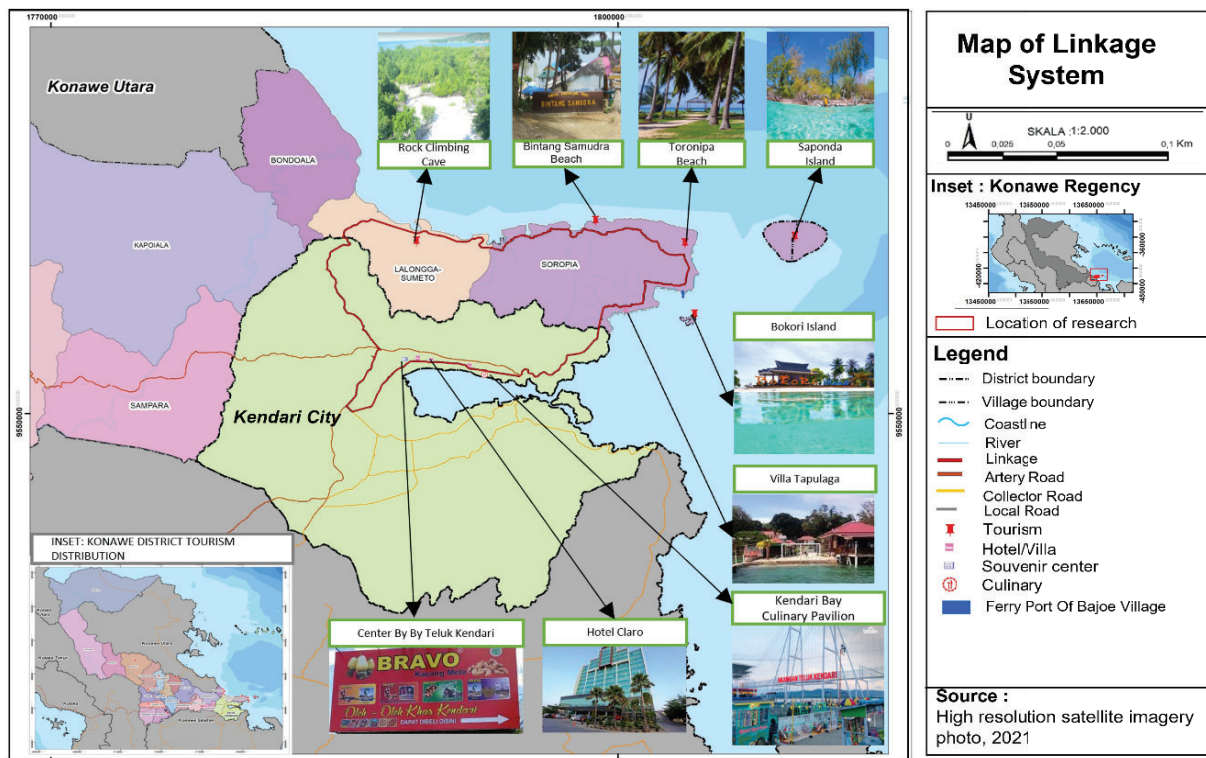


Fig 4. Linkage System Map

2. Backward System

Backward linkage is used to determine the linkage of the tourism sector with other sectors. Konawe Regency has potential in the plantation, livestock, and fisheries

sectors. Table 5 shows five tourist attractions connected to the Ferry Port of Bajoe Village that have connections with these sectors.

Table 4. Backward Linkage

No	Tourism	Intersectoral linkages
1	Bokori Island	Bokori Island tourism has no relationship with the fisheries, livestock, or plantation sectors. This island is an uninhabited island that is used as a tourist attraction by the Government of Southeast Sulawesi. Bokori Island is only a tourist spot.
2	Saponda Island	Saponda Island tourism has links with the fisheries sector. People work as fishermen on Saponda Island. The catch of fish on this island is sold to tourists as fresh fish. The fish, therefore, do not have special preparations as souvenirs from the island.
3	Toronipa Beach	Toronipa tourism has a connection with the plantation sector. This tour has coconut tree plants scattered in the Toronipa Tourism area, which has a length of about 4 km. The coconut fruit is sold to tourists who visit.
4	Bintang Samudra Beach	Bintang Samudra Beach tourism has links with the fisheries sector. Because this tour has fish cages, tourists can buy fish. In addition, tourists can catch fish directly from the sea.
5	Rock Climbing Cave	Rock Climbing Cave is a cliff cave tourism that has no relationship between fisheries, livestock, or plantation sectors. This tour is only for people who want to see the view from the top of the cliff.

(Source. Analysis result,2023)

F. Technis condition

Figure 5 depicts a pier with a depth of 5 meters. Based on sea elevation data, the Ferry Port of Bajoe Village had the lowest ebb of the dock at 1.8 meters. This means that the depth of the sea goes from 5 meters down to 1.8 meters, which disrupts the performance of the ship. Even though the dock is equipped with stairs, it does not help passengers when boarding the ship, where passengers still need to be careful and assisted by the crew to board the ship. According to BMKG (Meteorology Climatolgy and Geophysics Council) data,

the wind direction at the pier is towards the north at 1-2 km/h.

G. Port condition

Figure 6 depicts the types of facilities that were available at the Ferry Port of Bajoe Village. The main facilities in the mainland area were the core facilities that had to be owned by this port, including waiting rooms, parking areas, lodges, toilets, and lighting. Water area facilities were facilities located in the water area of the Port to facilitate the movement of ships, including decks, ship mooring, and wave breakers.

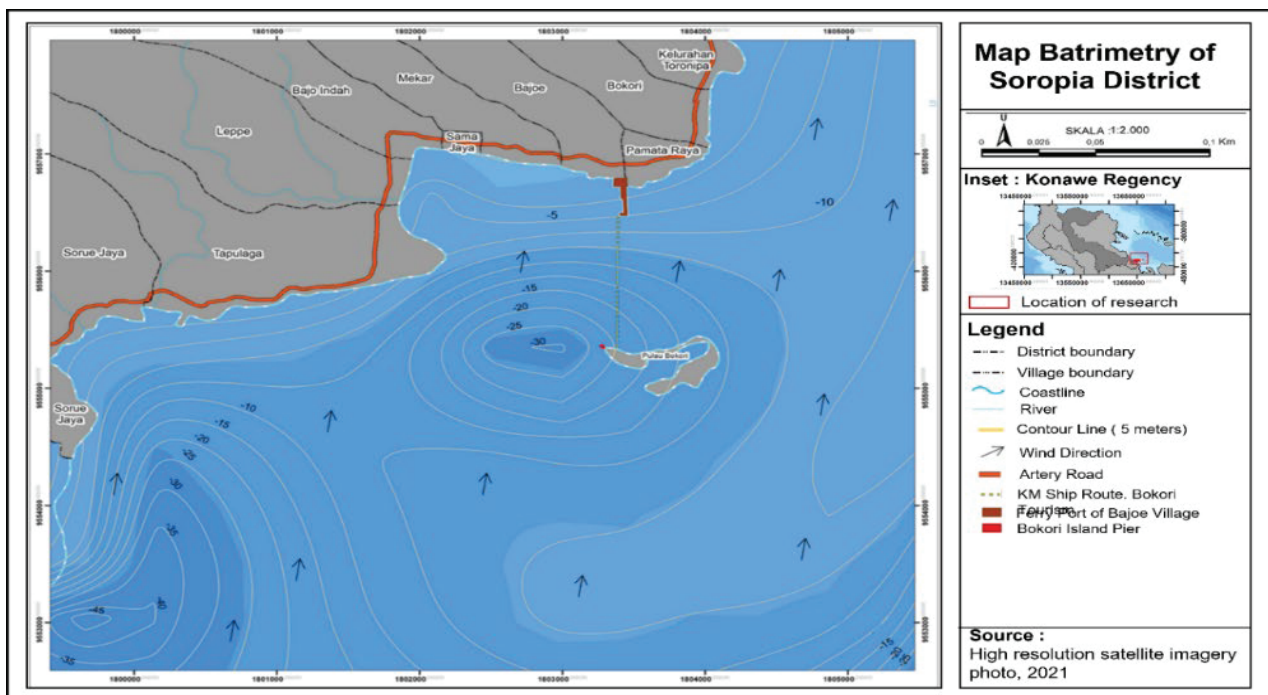


Fig 5: Batrimety Map Bajoe Village Jetty

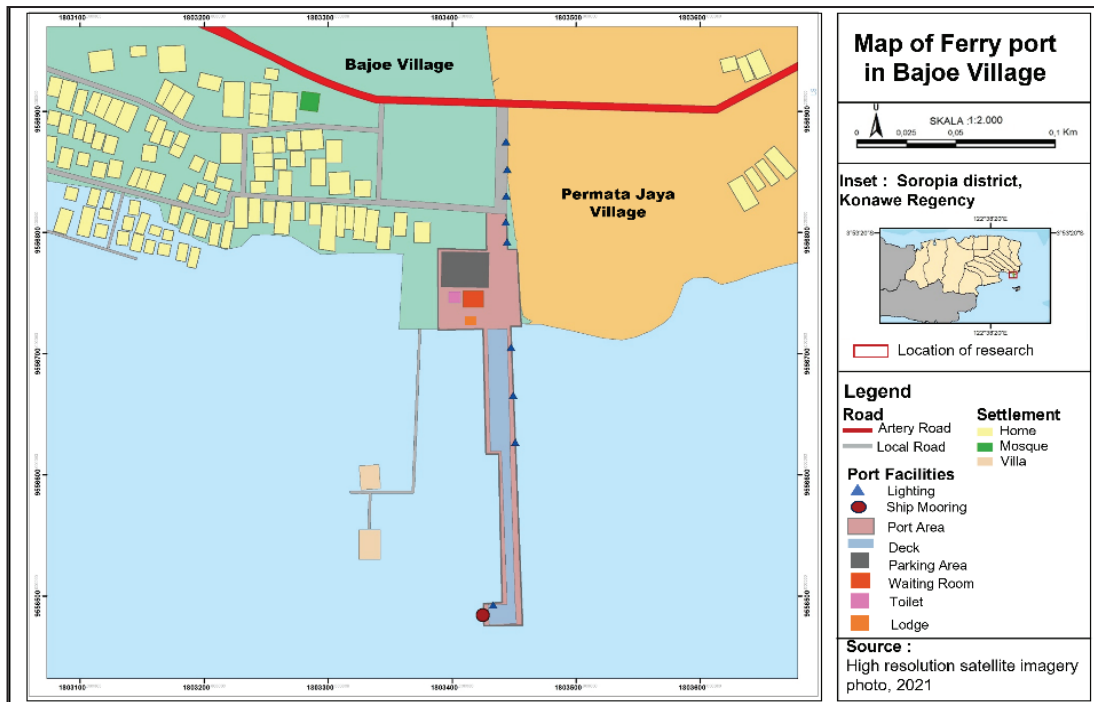


Fig 6: The facility of Ferry Port in Bajoe Village Map

3.2 Discussion

This study used five aspects to determine the direction of development of the Bajoe village ferry port: spatial, social, economic, infrastructure, and technical. The spatial aspect shows that the location of the Bajoe Village port is within the strategic area of Konawe Regency. The infrastructure aspect shows that the Bajoe village port is connected to tourist attractions in Konawe District, one of Bokori Islands, thus influencing the number of tourists using the services of this port (socio-economic aspect). The technical aspect shows the hydro-oceanographic conditions of the Bajoe village port. As well as the environmental aspect, it shows that the port is in an area that is clean from pollution. These aspects were used in research to assess the feasibility of developing facilities for the Ufmar Sea Port and Weduar Sea Port in Maluku Province¹⁷⁾ and in research to evaluate the development planning for the Prigi fishing port in East Java Province²⁵⁾. In evaluating the port to determine its direction, this study added one additional aspect, namely port facilities, to find out the facilities that needed to be developed at this port because, judging from Table 5 which contained the condition of land facilities that were still lacking, the land facilities aspect played a key role in developing and improving port

operational efficiency, so it needed to be prioritized²⁷⁾. This port had been operating for 8 years, so there were already problems with service facilities. Based on research evaluating the performance of Bokori tourist motorboats at the Bajoe village ferry port, Southeast Sulawesi, one of the shortcomings identified was the lack of facilities for disabled people, which were not yet available at the port. Therefore, this research used the SWOT matrix to determine the direction for providing service facilities at Bajoe Village Ferry Port¹²⁾.

Aspects of the Bajoe Village Port, ranging from social, economic, environmental, technical, and infrastructure to port facilities, were described in sub-chapter 3.1. So it can be concluded, that these aspects influence the development of the Bajoe Village Port as (spatial, social, economic, infrastructure, technical, and environmental) aspects influence the improvement of the port area externally while aspects of port facilities influence the improvement of the area internally. Based on a study of these aspects, the potential of the region could support the development of the Bajoe Village Ferry Port and could also pose problems that hindered the development of the Bajoe Village Port, which was planned to facilitate movement to the Bajoe Village Port. Table 5 describes the potential and problems of each aspect, as follows:

Table 5. Potential and problems

No	Aspect	Potential	Problem
1	Spatial	<ol style="list-style-type: none"> 1. Soropia District is an Environmental Service Center (PPL) located in Soropia Village, approx. 2 km from the port. 2. The Ferry Port of Bajoe Village is 22 km from Kendari City Center the provincial capital. 3. The area around the Ferry Port of Bajoe Village is a strategic area of the district in minapolitan activities and the development of small islands. 4. The area of the Soropia sub-district is included in the port. 	-
2	Social, Economic	<ol style="list-style-type: none"> 1. Kendari City dominates Port service users with a population of 350,267, followed by Konawe Regency with a population of 261,116. 2. The area around the Ferry Port of Bajoe Village has considerable tourism, including Bokori Island tourism, which has seen an annual increase in tourist numbers. Additionally, there is potential for fisheries, plantations, and animal husbandry. 3. Accessibility to the Ferry Port of Bajoe Village from Kendari City is connected to tourist attractions, culinary, hospitality, and souvenir centers. 	-
3	Infrastructure	<ol style="list-style-type: none"> 1. The power grid has water sources from boreholes. 2. The condition of the access road to the Ferry Port in Bajoe Village is suitable. There is no severe road damage and the road has asphalt pavement. 3. The <i>level of service</i> value on the access road to the port has a service level of A-B. The road does not reach severe congestion with stable traffic flow. 	<ol style="list-style-type: none"> 1. The width of the access road to the Ferry Port of Bajoe Village is less than the standard as an arterial road, with a width of only 6 meters. 2. There is no street lighting available on the access road to the Ferry Port of Bajoe Village.
4	Environmental	<ol style="list-style-type: none"> 1. Devoid of B3 waste pollutants from industries that pollute the air.. 2. Especially the 27.8 Km² Murhun Forest, which is rich in biological diversity. 	-
5	Technical	<ol style="list-style-type: none"> 1. The sea depth of the Ferry Port of Bajoe Village is 5 meters, supporting the operation of motor boats. Speedboat operations are also possible. 2. The wind speed reaches 1-2 km/h at sea level, and the wave height reaches 0-0.2 meters. It is still relatively safe for ship operations at the pier. 	<ol style="list-style-type: none"> 1. The receding height on the pier reaches 1.8 meters, but the dock's condition has yet to be adjusted to the receding height of seawater.
6	Port Facilities	<ol style="list-style-type: none"> 1. The port has facilities for electricity and clean water. 2. There is a large waiting area at the port (65 m²). 3. There are restrooms available.. 4. There's a sizable parking area that can hold vehicles, busses, and motorcycles. 5. Near the port area are villas and mosques. 6. The port lounge has a trading stand. 	<ol style="list-style-type: none"> 1. There are no health facilities available at the port. 2. Security facilities for CCTV are yet to be available. 3. There is no lighting available in the waiting room. 4. Facilities for the disabled are not yet available. 5. There is no pedestrian path for passengers as yet.

No	Aspect	Potential	Problem
		7. The port features a pier with breakwater structures, ladders, and boat moorings.	

The potential results and problems in Table 5 were used as a reference in developing a strategy for the development of the Bajoe Village ferry port. Based on Table 5, apart from the port facilities aspect, the economic aspect was an aspect that had a lot of potential, which meant it influenced the development of this port. This was the same as the research results of the evaluation of the feasibility of developing the Weduar Port¹⁸⁾ and the evaluation of the development planning for the Prigi fishing port²⁴⁾, which stated that the regional economic aspect was very influential on Port Development because it acted as a revenue multiplier effect driving the strength of port economic growth.

Both port studies¹⁸⁾²⁴⁾, used regression analysis, so the presentation of port development strategies between the two studies and this study was different. Meanwhile, this study used a SWOT matrix, which examined the six aspects used by this study in determining the development direction for the Bajoe Village Ferry Port. The use of the SWOT matrix referred to research into the development of Port Gresik to determine an aggressive strategy, namely by utilizing strengths to maximize existing opportunities and as a strategy that could be applied to the development of Port²⁵⁾.

Table 6. SWOT Matrix and associated strategies

SWOT	Strengths (S) 1. The distance between the Ferry Port of Bajoe Village and Kendari City Center the provincial capital, is 22 km. 2. The number of service users until 2019 reached 40,194 people. 3. Clean water and electricity facilities are already available at the Port. 4. The port has a spacious waiting area (65 m ²). 5. The port has clean toilets. 6. A large parking lot that can accommodate buses, motorbikes, and cars is offered. 7. There is a trading stand in the port lounge. 8. The port has a pier equipped with ladders, boat moorings, and breakwater buildings.	Weakness (W) 1. The port does not have any medical facilities.. 2. The port did not have CCTV. 3. The waiting area lacks any kind of lighting. 4. Facilities for those with disabilities do not exist.. 5. The port's roads are paved with dirt. 6. For passengers, there is no pedestrian pathway.
	Opportunities (O) 1. There is a program to rehabilitate and build the Ferry Port of Bajoe Village pier in the Konawe Regency Medium-Term Development Plan for 2018-2023. 2. Soropia District, which is the location of the Ferry Port of Bajoe Village, is included in the Port zone. 3. Accessibility to the Ferry Port of Bajoe Village from Kendari City and Konawe Regency Center (Unaaha) is connected to tourist attractions as well as culinary, hospitality, and souvenir centers. 4. There is no air pollution in the area due to B3 waste products coming from industry. 5. The number of cars moved at a smooth flow rate of 10,824 (ump/day).	Threats (T) 1. District roads in Soropia District still need complementary road facilities, namely street lighting. 2. The width of the access road to the Ferry Port of Bajoe Village does not meet the standard arterial highway requirements, being only 6 meters wide. 3. The receding height on the pier reaches 1.8 meters, but the dock's condition has yet to adjust to the receding size of the seawater.
Strategies	ST - Strategies 1. Restructuring of the road network to access the Ferry Port of Bajoe Village (S2-T2, T3). 2. Development of a floating dock at Ferry Port of Bajoe Village (S9-T4).	WT - Strategies 1. Development of accessibility services for Ferry Port of Bajoe Village service users (W5, W6-T1).
	SO - Strategies 1. Increase the number of Ferry Port of Bajoe Village Service users (S1, S2, S7- O2, O3, O4, O5).	WO - Strategies 1. The availability of medical facilities (W1-O1). 2. Provision of security facilities (W2-O1).

	2. Developing service facilities raised as concerns by customers for the Ferry Port of Bajoe Village (S3, S4, S5, S6, S8,-O1).	3.The provision of facilities for disabled people (W4-O1). 4.Availability of passenger line amenities (W5, W6-O1). 5. A higher quantity of lighting lamps (W3-O1).
--	--	--

(Source. Analysis result,2023)

There were four strategic directions for the development of the Bajoe village ferry port based on Table 6, namely strategies based on strengths and threats, strengths and opportunities, weaknesses and threats, as well as weaknesses and opportunities. This study used the same analysis (SWOT) and results (Port Development Directions) as the Operational Performance Study and Development Strategy for the Gresik Public Port. The results of the SWOT matrix from this study²⁵⁾ identified one strategy, namely the SO (Strengths-Opportunities) strategy, as a very urgent direction to be developed at the port under study. In this study, all the directions generated in the matrix were used as directions for developing the Bajoe village ferry port. However, the SO strategy, as an aggressive strategy, became an urgent direction in this research, which consisted of:

- 1) Increased the number of Ferry Port of Bajoe Village service users (S1, S2, S7- O2, O3, O4, O5).
- 2) Developed service facilities that had been raised as concerns by customers for the Ferry Port of Bajoe Village (S3, S4, S5, S6, S8,-O1).

4. Conclusion

The area around the port has the potential for developing the Ferry Port of Bajoe Village in terms of policy, spatial, socio-economic, technical, infrastructure, and environmental aspects. One of the potential opportunities for Soropia District is to be included in the Port zone. Another is the access road to the Bajoe Ferry Port of Bajoe Village, namely R.E. Martadinata, which is connected to Kendari City, souvenir centers, culinary centers, hotels, and five tourist attractions, including Bokori Island, Saponda Island, rock climbing tourism, Toronipa Beach, and Bintang Samudra Beach. thus making access to the Bajoe Village Harbor very strategic, therefore many Bokori Island tourists use the services of this port. where in 2019, before the pandemic there were 40,194 passengers/year to Bokori Island using the Bokori village port.

However, there are problems related to road access to the port (the width of the road must meet arterial road standards and there is no street lighting), so the strategy implemented is to improve road access to the port by widening the road and providing street lighting. The low water depth at low tide at the pier means the strategy applied is to plan a floating pier as a pier that can adjust the height to tidal water conditions. and the main problem is also the lack of land facilities so the strategy implemented is health facilities, security facilities,

disability facilities, passenger line facilities, and lighting lamps. These strategies are solutions to overcome existing problems and increase passenger comfort at this port. The implementation of these strategies needs to involve the provincial and regional governments because the Bajoe Village ferry port is part of the regional infrastructure.

Acknowledgments

The authors thank all who supported this research activity, especially the Government of Konawe Regency and the Government of Southeast Sulawesi Province, for supporting the provision of secondary data, and research grants from Faculty of Engineering, Brawijaya University.

Nomenclature

<i>C</i>	Capacity (smp/hour)
<i>Co</i>	Base capacity
<i>FC_w</i>	Road width adjustment factor
<i>FC_{sp}</i>	Traffic direction adjustment
<i>FC_{sf}</i>	factors Side obstacle adjustment factor
<i>FC_{cs}</i>	City Size Adjustment Factors
VCR	Volume capacity ratio
<i>V</i>	Traffic volume (pcu/hour)
<i>C</i>	Road capacity (pcu/hour)

Reference

- 1) N.S. Zulkefly, H. Hishamuddin, F.A.A. Rashid, N. Razali, N. Saibani, and M.N.A. Rahman, "The effect of transportation disruptions on cold chain sustainability," *Evergreen*, 8 (2) 262–270 (2021). doi:10.5109/4480702.
- 2) A. Nisaa', and S. Humaira, "Implementation Of Integrated Water Transport System For Accelerating National Connectivity," *Warta Penelitian Perhubungan.*, 27 (1) 39-54 2014. doi:10.25104/warlit.v27i1.773.
- 3) Jangra, R., Kaushik, S.P., Singh, E., et al, "The role of transportation in developing the tourism sector at high altitude destination, Kinnaur. *Environ Dev Sustain.*" 26 (2) 56-74 2023. doi:10.1007/s10668-023-03099-y.
- 4) S. Kundra, S.S. Kushwah, N. Kundra, U. Nabobo-Baba, M. Alam, and M.A. Alam, "Tourist experience at port and town: assessing cruiser

- satisfaction during self-organized onshore excursions at Lautoka port, Fiji, in 2018–2019,” *Heliyon*, 8 (5) (2022). doi:10.1016/j.heliyon.2022.e09426.
- 5) O.R.M. Baddal Hayat Al Abror, “(Transportation services in tourism development in Kerinci District),” *Jurnal Manajemen Transportasi & Logistik*, 06 (02) 125–134 (2019). doi:10.25292/j.mtl.v6i2.306
 - 6) R.A. Kusumawardhani, K.R. Kurniawan, and S. Zuhdi, “Between sacred nagara and resilience planning: the transformation of Banten port city in the 16th to 17th century,” *Evergreen*, 9 (2) 571–576 (2022). doi:10.5109/4794204.
 - 7) M.H., & S. Yudhistira, “Seaport status, port access, and regional economic development in Indonesia,” *Maritime Economics & Logistics*, 20 (4) 1–22 (2017). doi:10.1057/s41278-017-0089-1.
 - 8) Nanda Angga Parahita; Putu Alit Suthanaya; Dewa Made Priyantha Wedagama, “(Analysis of the performance and facility needs of the Padangbai ferry port),” *Jurnal Spektran*, 9 (2) 95–106 (2021). doi:10.24843/SPEKTRAN.2021.v09.i02.p01.
 - 9) Mahmud, Tjandra Buana, and Ima Astuty Wunawarsih, “(Utilization of fishermen's information sources in economic adaptation in Bokori village, Soropia sub-district, Konawe district),” *Jurnal Ilmiah Membangun Desa Dan Pertanian*, 4 (3) 58–61 (2019). doi:10.33772/jimdp.v4i3.7988.
 - 10) S. Sunaryo, and M.A. Aidane, “Development strategy of eco ship recycling industrial park,” *Evergreen*, 9 (2) 524–530 (2022). doi:10.5109/4794183.
 - 11) A.S. Khaqiqi, A. Damara, M.P. Azuningrum, and W.N.H. Nisa, “Evaluation analysis of commercial port hierarchy in Indonesia: a case study of ports in east Java province,” *Jurnal Penelitian Transportasi Laut*, 23 (2) 67–76 (2022). doi:10.25104/transla.v23i2.1783.
 - 12) W. Ode, S. Tunnaja, S. Hariyani, and A. Yudono, “Evaluasi kinerja kapal motor wisata bokori di pelabuhan penyeberangan desa bajoe, sulawesi tenggara,” *Planning For Urban Region And Environment*, 12 (03) 79-88 (2023). <https://purejournal.ub.ac.id/index.php/pure/article/view/555>
 - 13) Nawaf Arrasidy, “(Analysis of the performance of the unsignalized intersection, Jalan Kol Yos Sudarso km 9.5 - Slaughterhouse Road in Mabar Subdistrict, Medan Deli District, Medan City),” *Buletin Utama Teknik*, 17 (1) 47–80 (2021). <https://jurnal.uisu.ac.id/index.php/but/article/view/4318/3094>.
 - 14) Y. HAYUTH, “Intermodal transportation and the hinterland concept,” *Tijdschrift Voor Economische En Sociale Geografie*, 73 (1) 13–21 (2008). doi:10.1111/j.1467-9663.1982.
 - 15) Murillo Caldeira Dos Santos, “Planning and organization of road port access: the case of the port of Santos,” *Transp Res D Transp Environ*, 75 (01) 13–21 (2008). doi:10.1016/j.trd.2019.08.030
 - 16) Q. Lei, “Assessing the role of port efficiency as a determinant of maritime transport costs,” *Marit Econ Logist*, 22 (03) 562–584 (2020). doi:10.1057/s41278-019-00135-5..
 - 17) W. Prasetya, A, “(Feasibility of construction of Ufmar sea port and Weduar sea port facilities),” *Jurnal Penelitian Transportasi Laut*, 17 (03) 103-111 (2015). doi:10.25104/transla.v17i3.1407.
 - 18) M Tukan et all, “Decision Support System for Determining Floating Dock Locations in Maluku Islands Using AHP-TOPSIS,” *Journal of Physics: Conference Series*, 1577 1–10 (2020). doi:10.1088/1742-6596/1577/1/012001.
 - 19) Junius, and H. Waruwu, “(Strategic planning for tourism development on Bokori Island in Southeast Sulawesi),” *Jurnal Ilmiah Mahasiswa FEB*, 9 (02), 1-17 (2020). <https://jimfeb.ub.ac.id/index.php/jimfeb/article/view/6459>.
 - 20) A. Chaudhary, and Dr. PrabhatVerma, “Road surface quality detection using light weight neural network for visually impaired pedestrian,” *Evergreen*, 10 (2) 706–714 (2023). doi:10.5109/6792818.
 - 21) A. Sufyan, R. Akhwady, J. Risandi, and N. Syadiah, “ANALISA hidro oseanografi pulau liwungan untuk studi kelayakan struktur dermaga apung,” *Jurnal Kelautan Nasional*, 12 (3) 127 (2017). doi:10.15578/jkn.v12i3.6261.
 - 22) S. Andayani, M. Ruslin Anwar, “(Hydro-oceanographic analysis of Liwungan Island to study the feasibility of a floating dock structure),” *Jurnal Rekayasa Sipil*, 6 (02), 168-178. (2020). <https://rekayasasipil.ub.ac.id/index.php/rs/article/view/217>.
 - 23) Wardani, A, “(Traffic Analysis of Jolotundo Road Capacity in Semarang City)”. *ENVIRO: Journal of Tropical Environmental Research*, 24 (2), 47–53 (2022). doi:10.20961/enviro.v24i2.70719.
 - 24) H. Kausarian, Lady Redyafry, J. Tetuko, S. Sumantyo, A. Suryadi, and M.Z. Lubis, “Structural Analysis of the Central Sumatra Basin Using Geological Mapping and Landsat 8 Oli/Tirs C2 L1 Data,” *Evergreen*, 10 (02) 792-804 (2023). doi:10.5109/6792830.
 - 25) E. Irawati, B. Sugiarto, A. Suharyanto, “Evaluasi perencanaan pengembangan pelabuhan perikanan prigi terhadap pertumbuhan ekonomi wilayah kabupaten trenggalek,” *Jurnal Tata Kota dan Daerah*, 1 (01) 71-77 (2009). <https://tatakota.ub.ac.id/index.php/tatakota/article/view/101/100>.

- 26) A. Triyono, A. Wicaksono, and M. Ruslin Anwar, “(Study of the operational performance and development strategy of the Gresik public port),” *Jurnal Tata Kota dan Daerah*, 7 (01) 1-12 (2015). <https://tatakota.ub.ac.id/index.php/tatakota/article/view/206/175>.
- 27) Márquez-Ramos, Laura, “Port facilities, regional spillovers and exports: Empirical evidence from Spain”, *Regional Science Association International*, 95 (02) 329-351 (2016). doi:10.1111/pirs.12127. Toronipa Beach, and Bintang Samudra Beach. thus making access to the Bajoe Village Harbor very strategic, therefore many Bokori Island tourists use the services of this port. where in 2019, before the pandemic there were 40,194 passengers/year to Bokori Island using the Bokori village port.