Development of Minapolitan Road Network Infrastructure in Bantaeng Regency

Andi Tenriola[1], Shirly Wunas[2], M. Yamin Jinca[3]

[1]Master Degree of Transportation Planning, Hasanuddin Universit,y
[2]Professor, Urban and Regional Planning, Hasanuddin University,
[3]Professor for Transportation Planning, Urban and Regional Planning, Hasanuddin University,
Makassar 90245, Indonesia
Corresponding Author: Andi Tenriola

Abstract: *The road network in the Minapolitan area of Bantaeng which is a liaison between the nodes of production, processing and marketing has not been functioning optimally, hampered by the construction of two bridges that have not yet been connected. It is expected that with this study, it can be seen how the availability of infrastructure and facilities supporting the Minapolitan area and the strategy of developing road network infrastructure. The method used and samples according to Slovin formula, analysis of Location Quotient (LQ) to find out the base and non-base areas and SWOT analysis used for formulating a strategy for developing road network infrastructure, prioritizing the construction of bridges to connect the distribution of fisheries and marine products.*

Keywords: *Infrastructure, transportation, minapolitan, distribution system*

I. Introduction

Bantaeng Regency is designated as a minapolitan area, an area that has the main economic function in the form of production, processing, marketing of marine and fishery commodities, services, and/or other supporting activities. The requirements to become a minapolitan area are regional commitments, having superior commodities, and the availability of supporting infrastructure and facilities such as access roads, ports, processing industries, electricity and others. Bissappu, Bantaeng and Pa'jukukang are three sub-districts in the Minapolitan area with production centers for pond fisheries, capture fisheries and seaweed cultivation.

The road network in the Minapolitan area consists of 10 km of national roads and 8.2 km of coastal alternative roads. This road connects production nodes in the form of fish landing centers (FLC) and seaweed production centers to the processing industry and marketing access and links to coastal tourism objects. Land and sea access are interrelated and mutually supportive in the effort to develop the Minapolitan area. Alternative roads as connecting access have not been able to function optimally, due to the lack of two bridges on alternative road networks.

II. Materials And Research Methods

This research is classified as qualitative and quantitative descriptive and direct observation, carried out along coastal alternative roads in Bissappu District and Bantaeng Subdistrict, Bantaeng Regency, South Sulawesi Province. Research design through survey methods is to obtain data on the conditions of production, processing and marketing nodes as well as road network infrastructure and facilities. Population data, economic growth, location and area of research location, data on road infrastructure and facilities were obtained from the local government of Bantaeng Regency. The description of the research location can be seen in Figure 1.
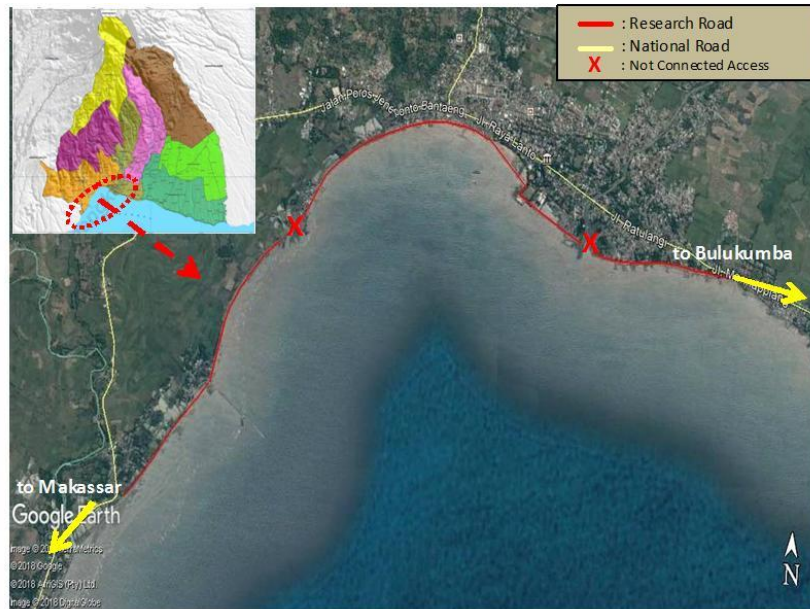

Figure 1. Research Sites

The population data in this study are all residents in the Minapolitan area who work as fishermen and seaweed entrepreneurs. The sample or respondent is the head of the family who lives along the coastal road. Sampling uses probability cluster random sampling method. Analysis of regional potential data uses Location Quotient Analysis (LQ) by comparing the contribution of district/city sector value added to the contribution of value added to one sector in the Provincial or National scale by dividing it into base and non-base sectors. This analysis uses the value of production as an indicator of regional growth. The SWOT analysis is used to consider the direction of the road network development policy as in **Table 1**.

Table 1. SWOT Matrix

IFAS EFAS	(Strength) Internal forces	(Weakness) Internal weaknesses
(Opportunity) External Opportunities	(Strategy SO) Create a strategy that uses power to take advantage of opportunities	(Strategy WO) Create strategies that minimize weaknesses to take advantage of opportunities
(Threat) External threats	(Strategy ST) Create a strategy that uses strength to overcome threats	(Strategy SW) Create strategies that minimize weaknesses and avoid threats

III. Results And Discussion

Characteristics of Respondents

Most of the residents living along the coastal road mostly look for fishing, fishponds and seaweed farming. In addition there are also activities of fish collectors and seaweed and their processing. The biggest seaweed cultivators and fishermen are in Bantaeng Subdistrict while pond fishermen are in Bissappu District. Sampling was taken by a number of residents in two of the three sub-districts in the coastal area, namely Bissappu sub-district with a number of fisheries and marine households 1,431 families and Bantaeng sub-districts with 1,723 families, using the Slovin formula obtained as many as 135 (4.28%) fisheries households.

Respondents the study was conducted in 135 households with different age levels and types of activities. In one household there is usually more than one type of work carried out by the head of the family and other family members.

Minapolitan Nodes of Bantaeng Regency

Production Nodes

Seaweed cultivation activities and aquaculture in Bissappu sub-district are priority livelihoods while catching fishermen are a side job. Bonto Jai Village is a center for aquaculture production while the Bonto Lebang and Bontosunggu Villages are seaweed production and capture fisheries. The Bantaeng Regency Government facilitated the distribution of capture fisheries by building a Fish Landing Center (FLC) in this Sub-district. In Bantaeng Subdistrict, seaweed cultivation and capture fishermen are also carried out by the majority of the population living in coastal areas. Farm cultivation is a minority job for the To find out which villages

have a base sector or superior commodity, a Location Quotient (LQ) analysis is conducted. The results of the LQ analysis for other villages are in Bissappu and Bantaeng sub-districts which are passed by coastal alternative roads as in Table 2.

Table 2. LQ values for each village

Sector	Bissappu			Bantaeng			
	Bonto Jai	Bonto Lebang	Bonto sunggu	Tappan jeng	Pallanti kang	Letta	Lembang
Seaweed	0.998	0.999	1.002	1.002	1.002	1.001	1.002
Pond	2.041	1.915				0.337	
Marine Fisheries	0.429	0.838	2.652		0.979	1.879	1.151

Source: Analysis Results, 2019

Processing nodes

Processing of fisheries and marine products includes processing raw materials into ready-made materials for further processing, for example seaweed is processed into ready-to-use seaweed and processing raw materials into ready-to-consume materials, such as fish processing. The production and processing centers as shown in Figure 2, production and processing centers for fish, fish and seaweed fisheries are scattered in several villages / kelurahan which are located around coastal alternative roads.

Figure 2. Fisheries and marine production and processing centers

Marketing Nodes

Based on the results of the questionnaire and interviews with respondents, it can be seen that the activities of Capture Fisheries, Ponds and Seaweed Cultivation have their own distribution. Seaweed Fishermen and Seaweed Farmers in seven Villages in two Subdistricts namely Bissappu and Bantaeng sell their products to collectors where collectors who take their own fisheries and marine products themselves.

Figure 3. Distribution of production of pond fishermen

Can be seen in Figures 3 and 4, the distribution map of capture fisheries and ponds, where fishermen living in the villages of Bonto Jai, Bontolebang, Bontosunggu, Pallantikang, Tappanjeng, Letta and Lembang villages market their products to collectors from BontoSunggu Village, Letta Village and Lembang. Furthermore, collectors market their products to the market and some food stalls in Bantaeng City.
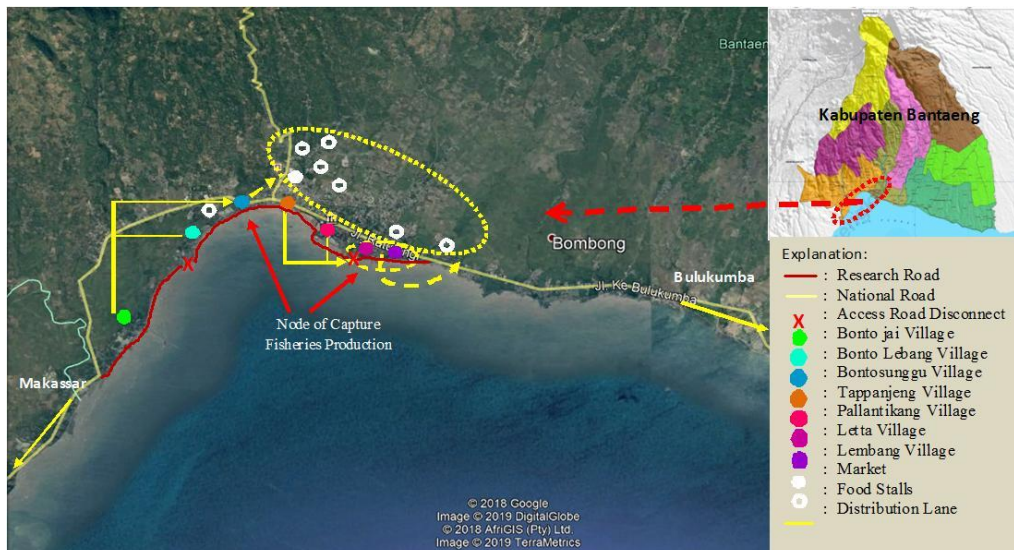

Figure 4. Distribution of captured fishermen's products

The markets around the Minapolitan area are Bantaeng Central Market. This market is one of the distribution destinations for the production of capture fishermen and pond fishermen. As for Seaweed Cultivation, farmers market to collectors who take their own produce to the homes of farmers and then collect it in one location to reach a certain amount and then redistribute out of Bantaeng Regency, Makassar. The pattern of distribution can be seen in Figure 5.

Seaweed production in the villages of Bontosunggu, Tappanjeng, Pallantikang, Letta and Lembang were distributed to the North Ring Road, Letta, Lasepang, Tanetea, and Loe Board. The collectors pick up the production of seaweed and collect it at that location. After reaching a certain amount of production, then seaweed is distributed to Makassar. The dependence of seaweed farmers and fishermen on collectors is due to the lack of facilities available in the Minapolitan area, especially in terms of marketing where there are no special rural transportation modes that can be used to support the distribution of fisheries and marine products in Minapolitan areas and business or financial institutions. It is expected that with these facilities the prices of natural resources for fisheries and marine resources can also compete nationally.
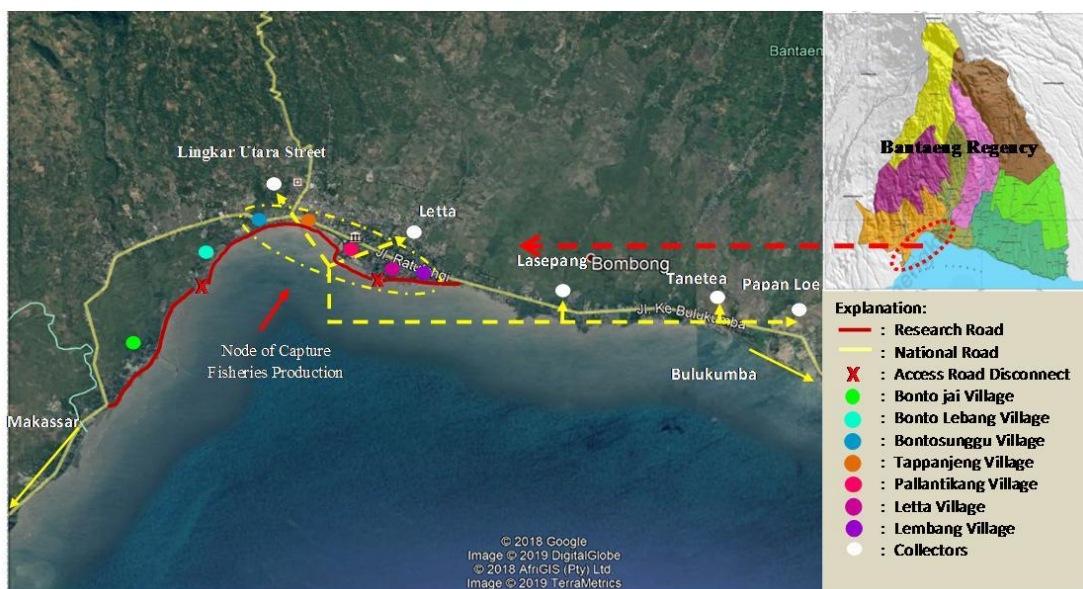

Figure 5. Distribution of seaweed production

Production, processing and marketing nodes are located at several points on coastal alternative roads. The road serves as a liaison between the nodes, is very needed for fisheries and marine business actors. The existence of these roads can shorten the distance and time from the village to the center of Bantaeng city. But in reality there are two points on the road that have not yet been connected so access to several production, processing and marketing nodes must use the National Road. Construction of access that has not been connected in this case two bridges is certainly very expected for the smooth distribution of fisheries and marine products and the development of the Minapolitan area of Bantaeng Regency.

Road Network Infrastructure and Services
Transport Mode

Potential of Capture Fisheries, Ponds and Seaweed Cultivation supported by the existence of adequate Road Network Infrastructure and Services. Infrastructure in this case are highways, namely coastal alternative roads and National roads, while services are available modes of transportation and are used to facilitate the production and marketing process. The modes of transportation used in the production and marketing process of fisheries and marine products in the Minapolitan area of Bantaeng Regency are land and sea transportation modes. The mode of land transportation is usually used for the marketing or distribution process while the sea transportation modes, namely boats are used during the production process.

Figure 6. Mode of sea and land transportation

The mode of land transportation used by fishing fishermen, ponds and seaweed farmers is a cart. They only use this mode because the distance between the coast and their place of residence is quite close; no motorized vehicles are needed to transport the products. They also wait for collectors who take their own products. The mode of land transportation is used by fish collectors and seaweed to transport produce to nodes along alternative roads which will then be distributed to several places in Bantaeng Regency and outside the Regency, Makassar.

Average Daily Traffic (ADT)

Average Daily Traffic (ADT) is used to calculate the volume of traffic on a road segment. Traffic volume is the number of vehicles that pass through a road segment.

In traffic surveys enumeration or calculation is carried out on alternative coastal roads. This road segment is divided into three segments, the first from port access to FLC Kaili where access is cut off because the connecting bridge has not been built. The second segment is FLC Kaili up to Seruni Street, where access is also cut off because the bridge has not yet been built. The third segment is Bolu Street until A. Mannappiang. ADT survey results for two days as in Table 3. It can be seen that the number of vehicles passing along the coastal alternative roads averages 413 in total, each of which is dominated by bicycles and motorbikes. The rest were pick up and the cart then a small number of sedans and trucks.

Table 3. Average Volume of Traffic on Alternative Coastal Areas

No.	Vehicle Type	Number of Vehicle						Total
		Segment I		Segment II		Segment III		
		In the same direction	Opposite direction	In the same direction	Opposite direction	In the same direction	Opposite direction	
1	Pick Up	3	2	15	15	4	6	45
2	Truk Kecil	1	1	2	1	1	2	8
3	Sedan	3	5	5	12	5	6	36
4	Sepeda motor	26	32	33	36	15	22	164
5	Sepeda/Becak	23	25	31	29	6	6	120
6	Gerobak	4	5	10	13	4	4	40
Amount		60	70	96	106	35	46	
		130		202		81		413

Source: Analysis Results, 2019

Access to uninterrupted coastal roads causes a small volume of traffic. There are two bridges with a length of 230 m and 170 m each which have not yet been built, so the conditions built are 95% of the total length of the coastal road which is 8.2 km. Traffic that is not crowded is used by seaweed farmers to carry out their activities along the road. Seeding and drying activities of seaweed on the shoulders and body of the road have become a common sight along alternative coastal roads. Instead the function of the road is for passing vehicles and humans to become a place of activity for seaweed farmers.

Minapolitan Road Network Infrastructure Development Strategy

The strategy for developing road network infrastructure in the Minapolitan Area of Bantaeng Regency is carried out using SWOT Analysis (Strength, Weakness, Opportunity and Threat) which aims to identify internal and external factors, where internal factors include strengths and weaknesses while external factors include opportunities and threats. Indicators in determining internal and external factors are obtained from LQ (Location Quotient) analysis and analysis of road network infrastructure and services.

The preparation of SWOT indicators is done by identifying internal and external factors can be seen in Appendix one Figure 1 and Appendix two in Table 1. Based on the internal and external factors, the strategy is formulated based on established indicators and determine the weight of influential factors. Based on the weighting results on internal and external factors, the position of the minapolitan area of Bantaeng Regency is located in quadrant III in the WT (Weakness-Threat) area with coordinates {(- 0.359), (- 1,256)}

Can be seen in Appendix two Table 1, there are several strategies obtained and the priority is the procurement of rural transport modes and the development of road network infrastructure.

IV. Conclusions And Recommendations

The nodes of production, processing and marketing are scattered at the village level according to the potential of each in the Minapolitan area. Road network infrastructure has not been optimally functioned by the community, constrained by the realization of a road network connecting bridge. Transportation services include sea and land modes, where the sea mode is a boat used by the community to support their production. Land transportation is used to transport produce to nodes along alternative roads to be distributed further from Bantaeng Regency to other regions, especially to Makassar. Strategies in developing Minapolitan area network infrastructure and services are the provision of rural transportation modes and development of road network infrastructure as well as facilitating fisheries and marine activities primarily in terms of distributing superior production and processing of natural resource commodities.

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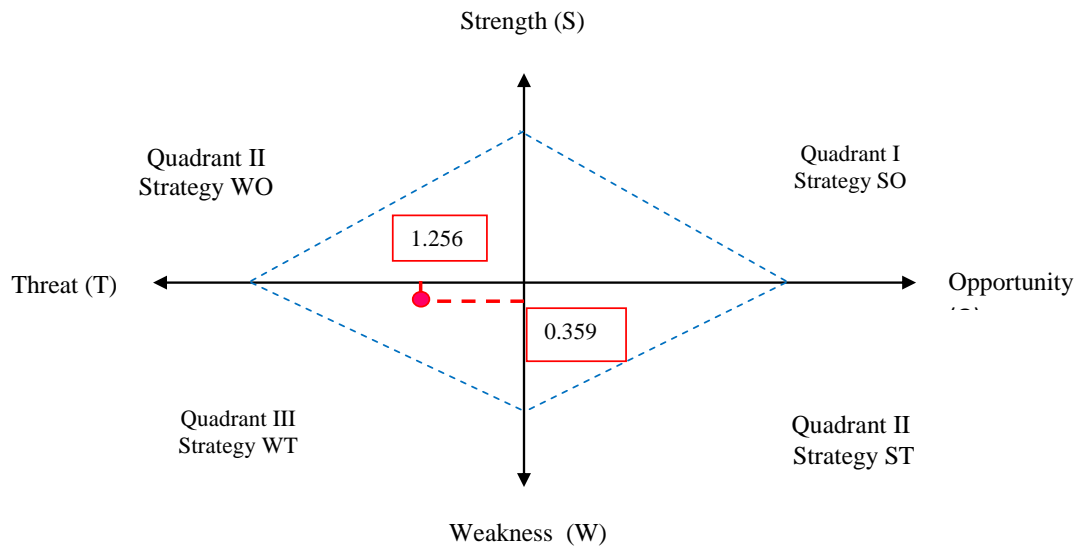
Appendices:
Appendix 1

Figure 1. The map of Development strategy conditions

Appendix 2

Table 1. Policy Strategy According to SWOT Analysis Matrix

External		Opportunity (O)		Threat (T)	
		1	The high demand for natural resources commodities	1	The price of natural resource commodities cannot compete nationally
		2	The existence of public ports and FLC	2	Regional Government budget limitations
Internal					
	Strength (S)		**Strategy (SO)**		**Strategy (ST)**
1	Potential of Fisheries and Marine Natural Resources commodities	1	Improving the quality of commodities in Natural Resources	1	The role of the government in controlling market prices
2	Government commitment to regional development	2	Maximizing the role of Public Ports and FLC	2	Community empowerment in local economic development
3	Banyaknya UKM Pengolahan SDA				
	Weakness (W)		**Strategy (WO)**		**Strategy (WT)**
	There are many collectors.	1	Improving the quality of road network infrastructure	1	Procurement of rural transportation modes
1					
2	Access roads that have not been connected			2	Improving the quality of road network infrastructure
3	The absence of rural transportation modes in the Minapolitan area	2	Procurement of rural transportation modes		
4	Limited marketing facilities resulting from processing				

Source: Analysis Results, 2019