Sea Transportation Network Development of the Liukang Tangayya Islands

Chairunnisa Mappangara
Department of Naval Architecture
Hasanuddin University
Gowa, Indonesia
andi.chairunnisa@yahoo.co.id

Syamsul Asri
Department of Naval Architecture
Hasanuddin University
Gowa, Indonesia
satnrikapalso@yahoo.com

Lukman Bochary
Department of Naval Architecture
Hasanuddin University
Gowa, Indonesia
lukmanbocha56@gmail.com

M. Rizal Firmansyah
Department of Naval Architecture
Hasanuddin University
Gowa, Indonesia
mr.firmansyah@gmail.com

Abstract—One of the archipelago subdistrict in the Pangkep Regency is Liukang Tangayya District with an area of 11,960 km2 which consists of approximately 55 large and small islands. Connectivity between regions can be improved by providing adequate and reliable transportation facilities and infrastructure, as well as efficient operation that will have an impact on economic growth, equity and sustainability to reduce growth gaps and disparities in Wellbeing between regions. The determination hierarchy of the islands contained in the Liukang Tangayya subdistrict is carried out to identify potential islands as hubs of the sea transportation network within the respective island clusters. The islands contained in the island cluster area of Liukang Tangayya Subdistrict from their geographical position are grouped into 3 (three) small island zone groups namely the first zone with Sapuka Lompo Island as the economic center, the second zone with the service center on Matalaang Island and the third zone with the service center on Sailus Lompo Island. The recommended capacity of the people transport fleet to serve the route network in the cluster of islands is around 5 - 15 GT. Meanwhile, the main route connecting the island cluster centers with the main activity center in the provincial capital will still be served by pioneer transportation.

Keywords: connectivity, sea transportation, island cluster

I. INTRODUCTION

Strengthening connectivity is an effort to achieve the well-being of the Indonesian people as contained in the Master Plan for the Acceleration and Expansion of Indonesia's Economic Development (MP3EI) 2011 – 2025 [1]. Weak connectivity can be seen by the concentration of economic activity in urban areas and industrial activities that do not extend to underdeveloped and isolated areas due to limited transportation infrastructure [2]. Connectivity between regions can be improved by providing adequate and reliable transport facilities and infrastructure, as well as efficient operation to improve industrial access from processing centers to commercialization areas [3]. Strengthening connectivity will have an impact on economic growth, equity and sustainability to reduce growth disparities and welfare inequalities between regions [4].

Fig. 1. Map of the Pangkep Regency Island Cluster Area.

Pangkajene and Kepulauan Regency are located on the west coast of the South Sulawesi province. Geographically, Pangkajene Regency and Archipelago consist of land and islands that require the support of the maritime transport network to improve connectivity between regional growth centers and local growth centers, especially those on the islands, as shown in Fig. 1. One of the islands in the Pangkep regency is the Liukang Tangayya district with an area of 11,960 km2 consisting of approximately 55 large and small islands. The Liukang Tangayya sub-district borders Selayar Regency in the east, NTB Province in the south and East Java Province in the west. The capital of
Liukang Tanggaya district is located on Sapuka Island, 302 km from the district capital [5]. With the state of the archipelago like this, to create an integrated, harmonious and synergistic traffic of the archipelago in the regency of Pangkajene, which represents an efficient and efficient service of traffic movement people and goods and in the context of achieving the vision and mission. In addition to the development goals, an examination of the maritime development plan by island group needs to be established.

The aim of this research is therefore to examine the model of efficient and efficient maritime network services and to draw up plans for the development of a network of maritime transport facilities and port infrastructures in the region. Islands of Liukang Tanggaya District, Pangkep Regency.

II. DISCUSSION

A. Existing Condition of Transportation Network in the Island Cluster Region Pangkep Regency

There is a maritime infrastructure known in the Continental Pangkep region as the dessert of the Iles group. Infrastructures include Pangkajene, Baji Maccini, Kassi Kebo, Jennae, Pangkep Poros, Pungkalawaki and Bawasalo Kalukue. The regions Liukang Tanggaya, Sapuka, Balobaloang, Langkoitang, Matalaang and Bali Kapoposang are displayed.

The shipping network connecting island cluster region the Liukang Tanggaya District with Regency Capital is KM Papa Dua with navigation routes over the islands Pangkep Regency, namely Makassar - Maccini Baji - Balang Island Lompo - Balo Balaloang Island Lompo - Matalaang P. Island - Sapuka Lompo Island - Lompo Lompo Island - Badas / Khayangan - P. Sailus Lompo Island - P Sapuka Lompo - Matalaang P. - Balobaloang P. Lompo - Balang Lompo P. - Maccini Baji – Makassar, as shown in Fig. 2 and Fig. 3.

B. Island Hierarchy in the Archipelago of Liukang Tanggaya Subdistrict

One approach to optimizing a transport network system is to build a hierarchical network. The advantages of the hierarchical model include: economies of scale on high-frequency routes, economies of scale in regional activity centers (cars) for the development of car potential. And in Sistranas [6] it was noted that the organization of a transport system takes into account the structure of the Economic Service Center, the Government Service Center and the Service Center.

The purpose of identifying the island hierarchy in the Liukang Tanggaya District is to identify the islands that are likely to become the hub of the shipping network within each archipelago. The hierarchy is organized according to the facilities available on the island, the socio-economic potential and the available port infrastructures [7].

The islands in the archipelago area of Liukang Tanggaya District can be divided into 3 (three) small groups of island areas from their geographical location.

- The first Sapuka Lompo Island area as a business center with service islands, namely Kambang Lamari Island and Stayingugan Island.
- The second area with a service center on Mataalang Island serving Sabalana Island, Sanane Island, Makarangani Island, Lilikang Island, Pammolikang Island, Sabaru Island and Balaloang Island, Sumane Island, Sanane Island, Sanipa Island, Pelokang Island and Langkuitang Island.
- The third area with a service center on the island of Sailus Lompo serving the islands of Sailus Kecil, Marabatuang, Kawassang, Makarangan, View Island and Tampang. Aloang Island, Sapinggang Island, Kapoposang Island Bali and Satanger Island.

III. IDENTIFICATION OF THE MARITIME TRANSPORT NETWORK

The hierarchy of the Liukang Tanggaya sub-district infrastructure network has been established in the RIPN, namely the ports of Sapuka Island and Sailus Island as harbors. While the ports of Balaloang Lompo, Langkoitang Island, Kapoposang Island on Bali and Mataalang Island are included as ports in the RIPN port location and hierarchy plan. Premises.

The Liukang Tanggaya Island Group's shipping network consists of distribution networks that are linked as local network centers to business centers. There are three (3) local hubs, namely Mataalang Port, Sapuka Lompo Port and Sailus Port. The power grid is as follows:

- Sabaru Tangayya Island – Balaloang Lompo Island – Balaloang Kecil Island – Sumanga Island – Makaragana Island – Mataalang Island
- Lilikang Island – Sabalana Island – Sanane Island – Mataalang Island
- Pelokang Island – Mataalang Island
• Langkotang Island – Sanipa Island – Matalaang Island
• Kambang Lemari Island – Tinggalungan Island – Sapuka Lompo Island
• Kapoposang Bali Island – Satanger Island – Sailus Lompo Island
• Sailus Kecil Island – Sailus Lompo Island
• Tampaang Island – Pandangan Island – Makarangan Island – Marabatuang Island – Sailus Lompo Island
• Kawassang Island – Sapeningan Island – Aloang Island – Sailus Lompo Island

The Liukang Tangayya Island Group’s shipping network as shown in Fig. 4.

![Maritime Route in Liukang Tangayya](image)

Connectivity between the three hub ports of Liukang Tangayya Island Group is currently connected through an innovative transport network across the three hubs. The main current transport routes are: Port Baji Maccini - Balobaloang Island Lompo - Matalaang Island - Sapuka Lompo Island - Sailus Island Lompo - NTB Badas Harbor (pp).

IV. FLEET NEEDS ANALYSIS

In the Liukang Tangayya island region for road networks:

- Island Sabaru Tangayya - Island Balobaloang Lompo - Island Balobaloang - Island Sumanga - Island Makaragan - Island Matalaang, Island Lilikang - Island Sabalana - Island Sanane - Island Matalaang, each with a fleet of 10-15 GT.
- Pelokang Island - Matalaang Island, Langkotang Island - Sanipa Island - Matalaang Island, Kambang Lemari Island - Residence Island - Sapuka Lompo Island, Kapoposang Island Bali - Satanger Island - Sailus Lompo Island, Tampa Island - Pandangan Island - Makarangan Island - Marabatuang Island - Sailus Lompo Island, Kawassang Island - Sapeningan Island - Aloang Island - Sailus Lompo Island each served by a fleet of size 5-10 GT.
- Sailus Kecil Island - Sailus Lompo Island is served by a fleet of 2 - 5 GT.

V. CONCLUSIONS

Islands in the archipelago of Liukang Tangayya District can be divided into three (3) small groups of island regions due to their geographical location. The islands of Kambang Lamari and Stayingungan are the first areas where the island of Sapuka Lompo is the center of the economic and service islands. The second area with a service center on the island of Matalaang serves the islands of Sabalana, Sanane, Makarangan, Lilikang, Pammolikang, Sabaru and Baloang Sumanga Island, Sanane Island, Sanipa Island, Pelokang Island and Langkuitang Island. The third area with a service center on Sailus Lompo Island serving Sailus Kecil Island, Marabatuang Island, Kawassang Island, Makarangan Island, Island View, Tampaang Island, Aloang Island, Sapeningang Island, Kapoposang Island Bali and Satanger Island.

Recommended network route specifications and fleet capacity are as follows:

- Island Sabaru Tangayya - Island Balobaloang Lompo - Island Balobaloang - Island Sumanga - Island Makarangan - Island Matalaang is served by a Pelra fleet with a capacity of 10-15 GT.
- Lilikang Island – Sabalana Island – Sanane Island – Matalaang Island is served by a Pelra fleet with a capacity of 10-15 GT
- Pelokang Island – Matalaang Island served by a Pelra fleet with a capacity of 10-15 GT
- Langkotang Island – Sanipa Island – Matalaang Island is served by a Pelra fleet with a capacity of 10-15 GT
- Kambang Lemari Island – Tinggalungan Island – Sapuka Lompo Island is served by a Pelra fleet with a capacity of 10-15 GT
- Kapoposang Bali Island – Satanger Island – Sailus Lompo Island is served by a Pelra fleet with a capacity of 10-15 GT
- Tampa Island – Pandangan Island – Makarangan Island - Marabatuang Island - Sailus Lompo is served by a Pelra fleet with a capacity of 10-15 GT
- Kawassang Island - Sapeningan Island - Aloang Island - Sailus Lompo Island is served by a Pelra fleet with a capacity of 10-15 GT
- Sailus Kecil Island - Sailus Lompo Island is served by a Pelra fleet with a capacity of 10-15 GT

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