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The Priority of the Road Network Development in Anticipating the Disparity of the Regional Development in Palopo City

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Abstract: *The regional development often causes a disparity phenomenon. This research aims to analyze the potential of production of natural resources in terms of regional disparity and the availability of road infrastructure network in supporting logistic transport to the potential of each region, and to prioritize development of road infrastructure network of production nodes as an effort to reduce regional development disparities. This research was conducted in 9 districts in Palopo City. Analysis used (1) Williamsons Index Analysis, (2) Entropy Index Analysis, (3) Regional Typology Analysis, (4) Scalogram Analysis, (5) Location Quotient Analysis, (6) Qualitative and Quantities Descriptive Analysis, and (7) Process Hierarchy Analysis. The results of the research determined 5 districts with disparities, although very potential from agriculture, plantation, forestry and fishery sectors. The transportation mobility aspect of logistics in 5 districts has not been well served because there is 49.63% of pebble/ground surface and damaged by 47.68%. The priority arrangement of road network development is directed to improve road structures, road network maintenance, and road farm development.*

Keywords: *Regional Development, Disparity, Road Networks*

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I. Introduction

The growth of the capabilities and community needs in a region require balanced regional development [1]. Often the development of districts/cities causes a disparity phenomenon. This is not only happening in the scope of cities/districts, even in the district or rural areas. Disparity issues have the potential to trigger conflicts on financial and social grounds and can weaken each other between regions. The city center can become weak due to massive urbanization while the hinterland area is weakened due to the utilization and distribution of natural resources that are not maximal [2]. Development disparities of the region due to several things, namely 1) Differences in the potential of natural resources; 2) Differences in human resource capability; and 3) Differences in accessibility and mobility aspects. It distinguishes between 1) The developed regions; 2) The area is developing; 3) Undeveloped region; and 4) The region is not developed [3].

The regional disparity indicator appears as the value of GRDP [4]. Based on the Central Bureau of Statistics (CBoS 2016), the largest PDRB per capita value is East Wara District (IDR.32.854.008,88 per capita), and the lowest is Telluwanua District (IDR 9.445.190,90 per capita).

The growth of natural resource production potential of a region is followed by an increase in demand for freight transport from production node to marketing location and upgrading of road infrastructure network (accessibility). Based on the World Bank study, the proportional change of indicators of Gross Domestic Product (GDP) to infrastructure in a country can range from 0.07 to 0.44 [5]. This means that every 1% increase in infrastructure provision will grow GDP by 7-44%. Therefore, indicators of road infrastructure provision and GDP value are closely related in a region [6]. Where accessibility is low, the production of existing natural resources cannot be transported maximally, due to low access to economic service centers (markets) [7].

The discussion shows the level of equity of development can not be felt thoroughly in the district area of Palopo City. Thus a priority study of road network development is needed to reduce regional disparity. This research aims to analyze the potential production of natural resources reviewed against the disparity of the region and the availability of road infrastructure network in supporting the transportation of logistics to the potential of each region, as well as to prioritize the development of road network infrastructure in the production nodes as an effort to anticipate the disparity of regional development in Palopo City.

II. Results And Discussion

Economic Activities Area

The implementation of the development needs to pay attention to the development of a region. One method of analysis of regional inequality is based on the Williamson index [1], using a value between Zero to One. If the value of the Williamson index approaches 1 means very unbalanced, and when the Williamson index approaches 0 then the development is very uniform [8]. Based on the analysis, the Williamson index among districts in Palopo City (2016) was 0.30. This figure indicates that there is an imbalance of regional development in Palopo City. The inequality between sub-districts within Palopo City is assessed based on performance indicators in the economic and social field of the population can be analyzed based on the entropy index methods, regional typology, and *scalogram.*

District priority areas of road network development based on entropy index, regional typology, and hierarchy of a region those are the District of South Wara, Sendana, Mungkajang, Telluwanua, and West Wara in Table 1.

Table 1. Priority and non priority areas of road network development

No.	Criteria analysis	District Non Priority	District priority
1.	Entropy Index (IE) (If the district of IE value > IE average in Palopo City is 0.444, then the region is a priority)	a. Wara (0.973) b. East Wara (0.998) c. North Wara(0.532) d. Bara (0.650)	a. South Wara (0.973) b. Sendana (0.118) c. Mungkajang (0.217) d. Telluwanua (0.154) e. West Wara (0.125)
2.	Regional Typology (If the economic growth rate <1 then the region is a priority)	a. Wara (1.23) b. East Wara (1.28) c. North Wara (1.03) d. Bara (1.05)	a. South Wara (0.71) b. Sendana (0.60) c. Mungkajang (0.92) d. Telluwanua (0.37) e. West Wara (0.41)
3.	Regional Hierarchy (If the ISM value ≤ Maximum ISM Order IV value is 285.74 then the region is a priority)	a. Wara (958,87) b. North Wara (503,65) c. East Wara (364,05) d. Bara (352,71)	a. South Wara (108,29) b. Sendana (61,36) c. Mungkajang (103,41) d. Telluwanua (127,89) e. West Wara (119,76)

Source: Result of analysis, 2018

Economic sector base

The analysis of the basic economic sector is an attempt to identify regional comparative advantages. Determination of base sector and non base of a region can be done through Location Quotient (LQ) analysis. The valuation is that if LQ> 1 is called the base sector (superior sector in its territory), if LQ <1 is called the non-base sector (not the leading sector of regional economic development) and if LQ = 1 (equally).

Based on the analysis with the number of base sector with the value of LQ> 1 in Table 2, the largest is the district of Telluwanua, Wara, and Wara Timur, and Wara Selatan (9-11 sectors). The regions with the smallest economic sectors are North Wara, Bara, Sendana, West Wara, and Mungkajang (3-8 sectors)

Table 2. LQ Value per Economic Sector in Palopo City Year 2016

District	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
South Wara	**1.49**	0.00	**1.54**	0.00	**1.11**	**1.03**	0.54	0.57	0.92
Sendana	**2.30**	0.00	0.27	0.00	0.00	0.00	**1.27**	0.00	**2.29**
Wara	0.67	0.00	0.92	**1.16**	**1.81**	**1.23**	0.81	**1.14**	0.94
East Wara	0.84	**1.55**	0.88	**1.12**	0.00	**1.18**	0.81	**1.10**	0.93
Mungkajang	**1.50**	**2.99**	0.62	**1.03**	0.85	**1.55**	0.68	**1.05**	0.34
North Wara	0.98	0.00	**1.03**	0.92	0.00	0.58	**1.58**	0.91	0.98
Bara	0.97	**1.71**	**1.06**	0.89	**1.96**	0.98	**1.28**	0.98	**1.01**
Telluwanua	**1.55**	**2.94**	**2.18**	**2.57**	**2.13**	0.00	**1.05**	**1.47**	**2.01**
West Wara	**3.06**	**3.52**	**1.64**	0.00	**1.92**	0.00	**1.21**	0.00	**1.48**
Total	**13.36**	**12.70**	**10.13**	**7.69**	**9.79**	**6.54**	**9.24**	**7.24**	**10.89**

District	J	K	L	M	N	O	P	Q	Total of sector
South Wara	**1.35**	**1.93**	0.00	**1.93**	0.94	0.39	**1.18**	**1.85**	**9**
Sendana	0.00	0.00	0.00	0.00	**2.46**	**1.04**	0.92	**2.16**	**6**
Wara	**1.18**	**1.33**	**1.41**	**1.33**	0.96	**1.11**	**1.01**	**1.34**	**11**
East Wara	**1.14**	**1.28**	**1.36**	**1.29**	0.93	**1.07**	0.98	**1.29**	**10**
Mungkajang	**1.03**	0.00	**1.58**	0.00	0.90	0.79	0.72	**1.41**	**8**
North Wara	0.92	0.64	0.55	0.63	**1.03**	0.99	0.98	0.00	**3**
Bara	0.90	0.74	0.68	0.73	0.75	0.99	0.98	0.00	**5**
Telluwanua	0.00	0.00	0.00	0.00	**2.33**	0.87	**2.38**	**3.53**	**11**
West Wara	0.00	0.00	0.00	0.00	**1.17**	0.64	0.00	0.00	**7**
Total	**6.51**	**5.91**	**5.59**	**5.91**	**11.49**	**7.90**	**9.15**	**11.58**	**70**

Information:

A = Agriculture, Forestry, and Fisheries
B = Mining and Quarrying
C = Processing Industry
D = Procurement of Electricity and Gas
E = Water Supply, Waste Management, Waste and Recycling
F = Construction
G = Large and Retail Trade, Car Repair and Motorcycles
H = Transportation and Warehousing
I = Provision of Accommodation for eating and drinking
J = Information and Communication
K = Financial Services and Insurance
L = Real Estate
M = Company Services
N = Government Administration, Defense and Mandatory Social Security
O = Educational Services
P = Health Services and Social Activities
Q = Other Services

Source: Analysis Results, 2018

Distribution node

The results of interview surveys in 5 districts with economic sectors of agriculture, forestry and fishery base (Sendana, Mungkajang, Telluwanua, Wara Barat, South Wara), generally distributed their products through individual collectors who came directly to pick up on production land and farmers' houses to be marketed in several distribution nodes: *Bulog* (Agency for Logistics and Food Affairs), Market and Fish Auction Place in Palopo, Luwu, Toraja, Makassar and Surabaya.

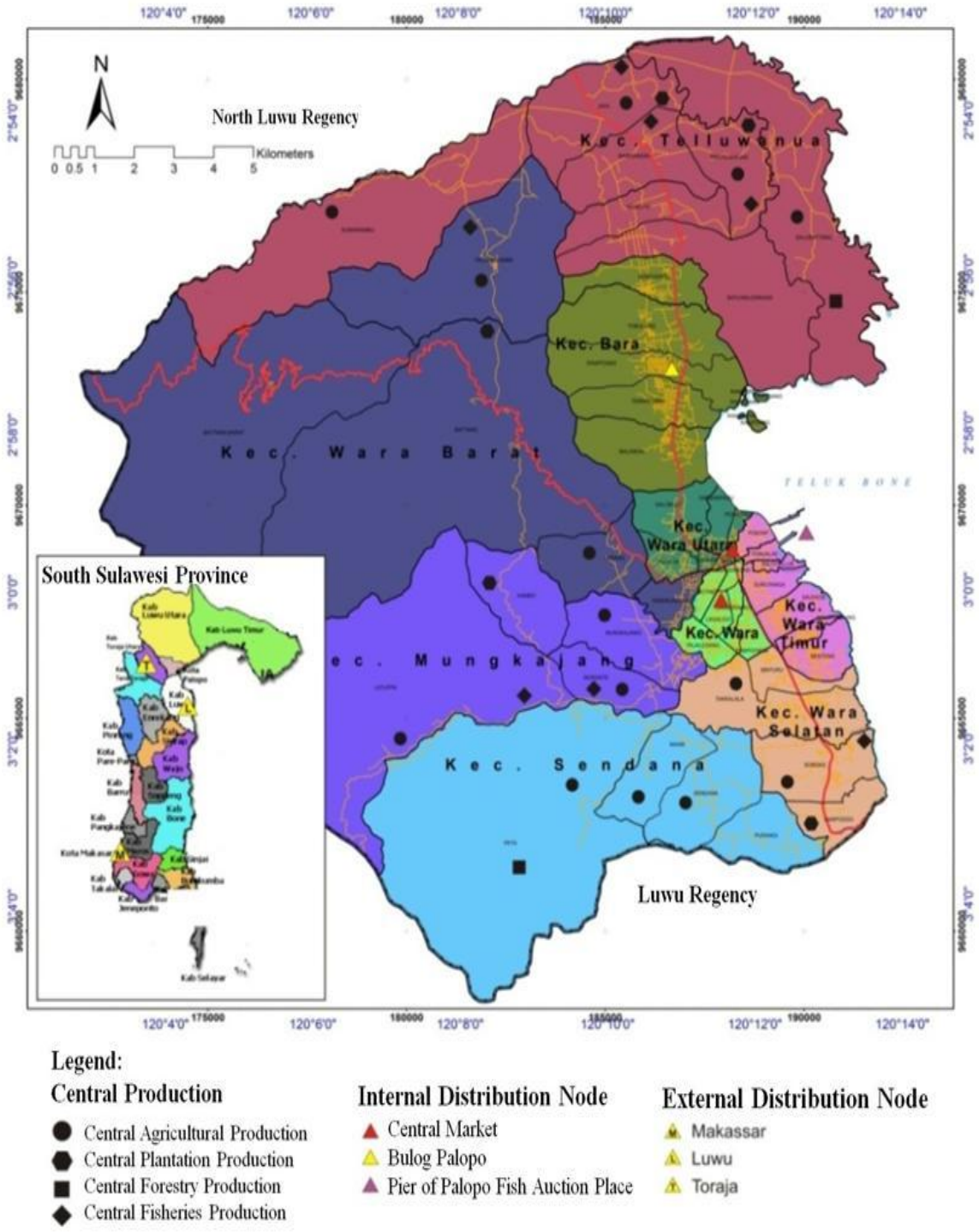

Figure 2. Map of Distribution centers and distribution nodes in Palopo City

Road Network Condition

Based on the data of the Public Works and Spatial Planning (2017), road infrastructure network with a good percentage that has not fulfill the minimum road service standard> 60% (according to the Ministerial Regulation of Public Works and People's Housing No. 01/PRT/M/2014 is located in the district which is relative lagging based on the regional typology analysis that has been done before in Table 5.

Table 5. Road infrastructure network condition in Palopo City

District	Regional Typology	Type of Road Surface (%)		Good Road Network Condition (%)	Minimum Standards of Outcomes (%)	Category
		Asphalt Case / Concrete	Gravel/ Soil			
South Wara	Relatively backward	36,55	63,45	51,36	> 60	Not fulfilled
Sendana	Relatively backward	35,55	64,45	48,26	> 60	Not fulfilled
Wara	Advanced	79,74	20,53	71,49	> 60	Fulfilled
East Wara	Advanced	73,71	26,29	69,19	> 60	Fulfilled
Mungkajang	Relatively backward	68,42	31,58	63,65	> 60	Fulfilled
North Wara	Advanced	86,59	13,41	73,36	> 60	Fulfilled
Bara	Advanced	68,66	31,34	65,97	> 60	Fulfilled
Telluwanua	Relatively backward	37,35	62,65	34,16	> 60	Not fulfilled
West Wara	Relatively backward	73,98	26,02	40,97	> 60	Not fulfilled

Source: Analysis Results, 2018

The only area with the typology of the area is relatively backward with the percentage of road network either has fulfilled Minimum Service Standards (> 60%) is a Mungkajang District (63.65%). While the other four areas with the typology of the area is relatively backward and the percentage of road network is <60% are South Wara District (51.36%), Sendana (48.26%), Telluwanua (34.16%), and West Wara (40, 97%).

Accessibility

The condition of the road network affects the accessibility of the population of a region. The level of accessibility is high if the two areas are close together and the conditions of transport relations are good, on the other hand, if the two areas are far apart with bad transport links, the accessibility level is low [9].

Minimum Service Standards (MSS) of roads according to the Ministry of Public Works Decision Number 534/KPTS/M/2001 for areas with high population density (> 1000 soul/km^2) condition of accessibility index value is > 1,50 while for area with low population density (> 100 soul/km^2), the accessibility index value is required>> 0.15. Based on the analysis, accessibility index in the South Wara District, Sendana District, Mungkajang District, Telluwanua District, and West Wara District ranged from 0.89 to 4.94. This indicates that the level of accessibility has exceeded the minimum required standard in Table 6.

Table 6. Value of road accessibility index at District of Agricultural, Plantation, Forestry, and Fishery Production Center

Production Center	**Long Road (km)**	**Region (km^2)**	**Accessibility Index Value**	**Minimum Standards of Accessibility**	**Category**
South Wara	43,78	10,66	4,11	> 1,50	Fulfilled
Sendana	33,13	37,09	0,89	> 0,15	Fulfilled
Mungkajang	37,15	21,74	1,71	> 0,15	Fulfilled
Telluwanua	68,51	13,87	4,94	> 0,15	Fulfilled
West Wara	29,24	21,87	1,34	> 0,15	Fulfilled

Source : Analysis Results, 2018

Mobility

Average GRDP data per capita at constant price of 2016 in Palopo City is IDR 25.616.057,22 per capita (BPS 2017), which means it belongs to the very highest category (> IDR 10.000.000,00/capita), so minimum standard value of mobility index that must be reached by Palopo City is > 5.00 [10].

It's reviewed from the mobility index value in the five districts of agriculture, plantation, forestry, and fishery production centers in Palopo City, the road network in Sendana and Telluwanua Districts has met the minimum service standards, while the South Wara District, Mungkajang District and the District West Wara has not fulfill the Minimum Service Standards in Table 7.

Table 7. The value of road mobility index at District of Agricultural, Plantation, Forestry, and Fishery Production Center

Production Center	Long Road (Km)	Value of Mobility Index	Minimum Standard of Mobility	**Category**
South Wara	43,78	3,86	> 5,00	Not fulfilled
Sendana	33,13	5,17	> 5,00	Fulfilled
Mungkajang	37,15	4,79	> 5,00	Not fulfilled
Telluwanua	68,51	5,26	> 5,00	Fulfilled
West Wara	29,24	2,73	> 5,00	Not fulfilled

Source: Analysis Results, 2018

Priority of road infrastructure network development

The priority arrangement of the districts for the development of the road network in Palopo city based on the results of the criteria on priority data on the district and the analysis of the condition and availability of the previous road network can be calculated using the Process Hierarchy Analysis (PHA) method. In the calculation of PHA used Expert Choice software assistance version 11.

The results of the analysis placed the Sendana District with a weight of 0.274 as the first priority, followed by the Telluwanua District with a weight of 0.236. The next priority is in West Wara District with weight 0,195 then Mungkajang District with weight 0,174 and South Wara District with weight 0,122 (Figure 5).

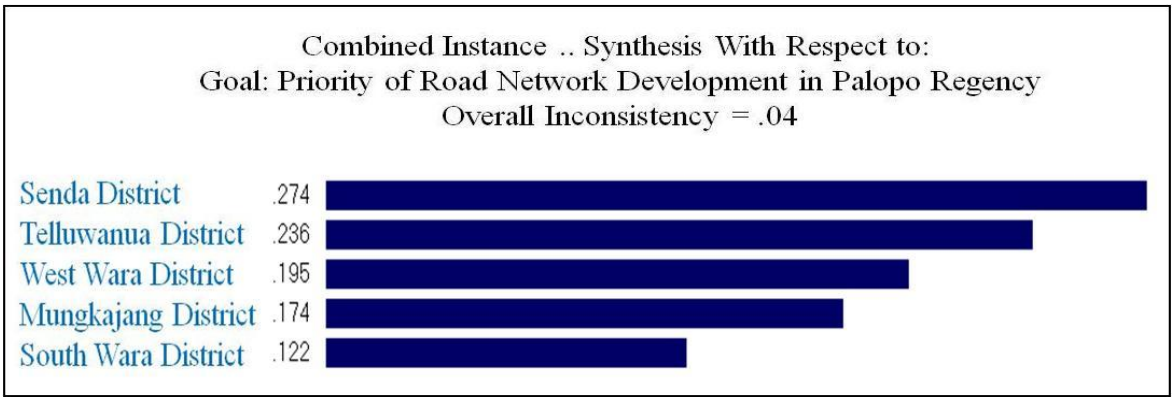

Figure 5. The composition of priority areas of road network development

The priority arrangement of road network development that can be done at production centers in 5 priority district based on PHA analysis from interviews with local communities, the first is the improvement of the road from the structural aspect, especially on the local road connecting between districts of distribution node (weight 0.602), second is routine and routine maintenance of road network in the form of rework and repair of road surface condition (weight 0.260), and the third is the development of road network (weight 0.138) in Figure 6.

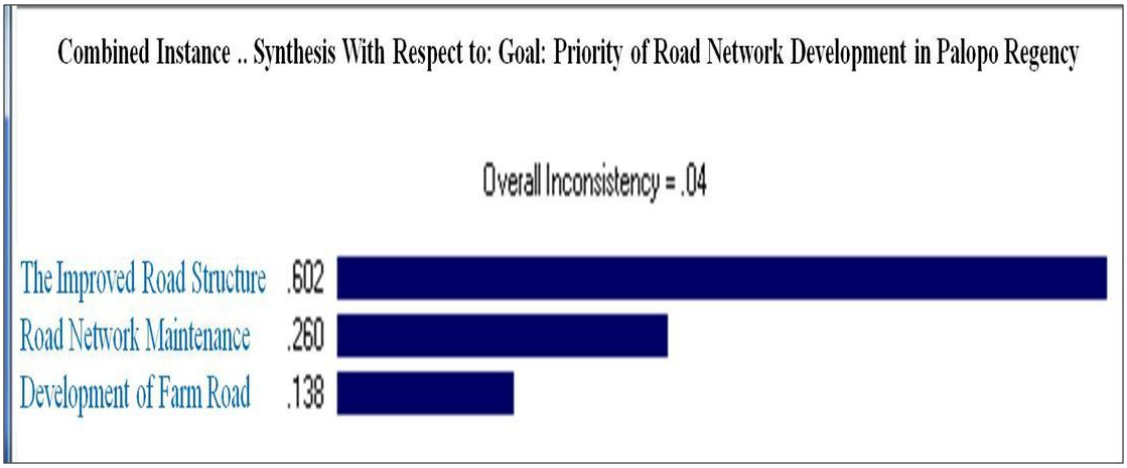

Figure 6. Alternative priority arrangement of road network development

III. Conclusion

The production base of natural resources in Palopo City is agriculture, forestry, and fishery. The production potential of these natural resources is found in 5 districts with disparities (South Wara District, Sendana, Mungkajang, Telluwanua, and West Wara). The road network in the five districts when viewed from the aspect of accessibility has been adequate. However, from the mobility aspect of the logistics, transportation from the production center of the distribution node is still not well served because there are 49.63% of pebble/ground surface and with damaged condition 47,68% in 5 districts. Therefore, the priority arrangement of road network development that is done in the first 5 areas experiencing disparity is the structural improvement of the road network, second is the maintenance of the road network, and the third is the development of the farm road.

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