

# DEVELOPMENT STRATEGY FOR RURAL TRANSPORTATION CASE STUDY PROVINCE OF WEST PAPUA

Maria Goretti Oktaviana\*, Harnen Sulistio, Achmad Wicaksono

Department of Civil Engineering, University of Brawijaya, Malang

---

## ABSTRACT

This paper is intended to know about the characteristic of rural transportation and the accessibility index. The location of study is in West Papua Province of Indonesia. The methodology of this research is consisted of descriptive analysis, IRAP, SWOT analysis, and IFAS-EFAS. The result will have to be used as the consideration on the integrating of transportation sector policy, district and economy development, optimization of the transportation infrastructure, and transportation policy due to the strategy of life environment.

**KEY WORDS:** Rural transportation, West Papua, descriptive, IRAP, SWOT.

---

## INTRODUCTION

West Papua Province is the youngest province of Indonesia, expanded of Papua Province (before was Irian Jaya Province). It consisted of 10 regencies and 1 city. Most of the district area is mountainous with a depth slope, many islands and swamped. Due to the physical characteristic, the area parts mostly are wet lands and depth slopes, and have a high possibility of sliding and erosion. The tectonic earthquake and tsunami have high possibilities too because of the interaction between the Eurasia tectonic and Indo-Australia and Pacific slab. The population of West Papua is 702,202 people and the distribution has not flattened with density of 4-12 person/ km<sup>2</sup>. Some people live in solitary mountainous and very difficult to reach it [1].

The main constraint of building development in West Papua is due to the district characteristic and solitary distribution of the population. The basic infrastructure development and basic demand services has much kind of constraints because of the minimum transportations. These minimum transportations would impact to the process of building development. It need high costs for transportation and good tranmissing. Air and sea transportation did not support the transportation need much. Nowadays, the development strategy of mainland transportation that carried out by the government, had some constraints because of the conflict of space system, it costs high operation to build three transportation modas that cannot be connected. That why in some locations did not get the service of the transportation. The development of transportation inter district is highly needed in West Papua. So it is very important to make a good strategy of developing transportation that based on the area characteristic.

## MATERIALS AND METHODS

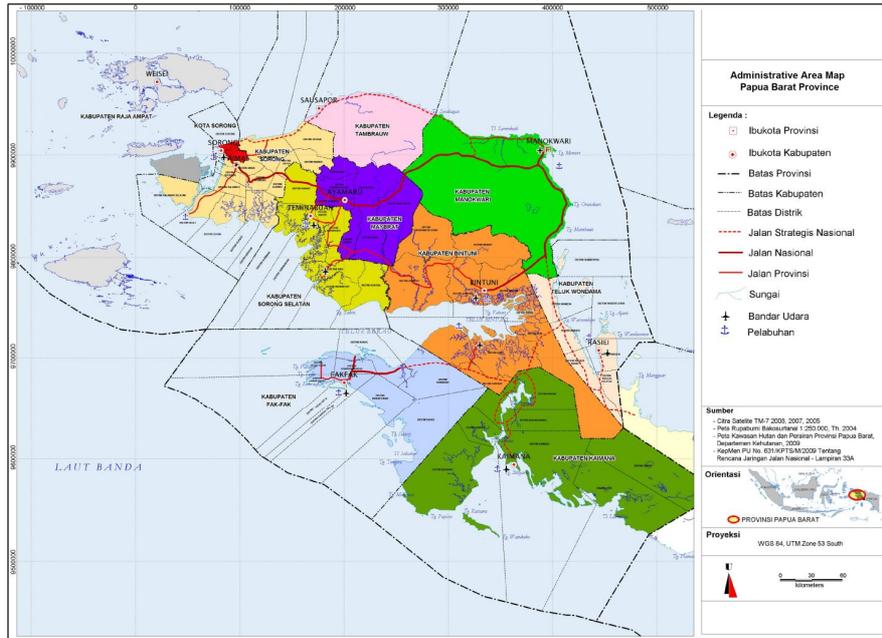
The location of study is in West Papua Province, included 9 regencies and 1 city. Meybrat Regency and Tarnbrauw Regency is not included because they are still expanding the regency. It has inter district transportation and the center of regency growth.

District transportation supported by an available transportation network and service that gave positive contributions to the development of sectoral activitis in the regional development. Potential condition, and characteristic of the districts are needed to support the development. These data were taken by identifying the population growths, some sectoral activities, spatial distribution, and from space system especially by the using due to the transportation network [2] Map of location as in Figure 1.

The design of the transportation is generally involved by many aspects. it has different characteristic from other field design and it marked by multi-moda. The design of the transportation is always involved more than one transportation moda. It included: 1) multi-discipline, it began from moving characteristic, service user and the system of the transportation itself; 2) multi-sectoral, it related to many institutions that interested to the study of transportation design; and 3) multi-problem, it is based on multi-moda, multi-discipline, and multi-sectoral, it will make a multi-problem [3].

---

\*Corresponding Author: Maria Goretti Oktaviana, Department of Civil Engineering, University of Brawijaya, Malang  
E-mail : oki\_mkw@yahoo.co.id



**Figure 1** Location of study

### Analysis of Integrated Rural Accessibility Planning (IRAP)

The accessibility is the easiness or difficulties on reaching the facilities or service of social, economy, transport or any other kind of demands. IRAP is a method which integrated multi-sectors included human, transport system, and existing journey pattern. It is used in identification of process design priority in developing rurality, due to the capacity of village population in reaching easiest access to the base demands and other facility of economy service. IRAP is used to get to know accessibility index of services in designing district, number of available services, number of population being in serviced, and the frequency of the function of district [4]. Higher accessibility index of a district was known that the accessibility was so bad [5]

### Analysis of SWOT

Analysis of SWOT is an systematic identification of many factors in formulating the company strategy. This analysis is based on the logic that maximize the strengths and opportunities, but in the same time it also minimize the weakness and threats. The process of strategic decision based on the mission, purpose, strategy, and policy of the company. Therefore, strategic planner has to analyze strategic factors of the company that included of existing strengths, weakness, opportunities, and threats. The description above called as an analysis of situation. The most populer model of situation analysis is SWOT [6].

### Identifikasi of Variable

The identification of variable is carried out for determining research variables. Selection of variable is due to the existing condition of research object and used as the base of quetionare making. The selection of indicator is based on the previous research and assumed by the influenced sectors. It is included 1) the sector of mobility/transportation; 2) the sector of health; 3) the sector of education; and 4) the sector of trading. The indicators of each sector are included by the number of populations, the distance to destinations, time of travels, and travel costs.

## RESULTS AND DISCUSSION

### Characteristic of Rural Transportation at West Papua Province

The purpose of rural traveling is about 45% carried out related to the job (office duty, job location in another district, government administration, etc). It based on the demand of economy and life. There are not much rural transportation for trading. Each regency could relatively supply the demand from its own district or they prefer go out of West Papua. Travel of education is not too much because the population prefer go outside. Figure 2 described the purpose of rural transportation at West Papua.

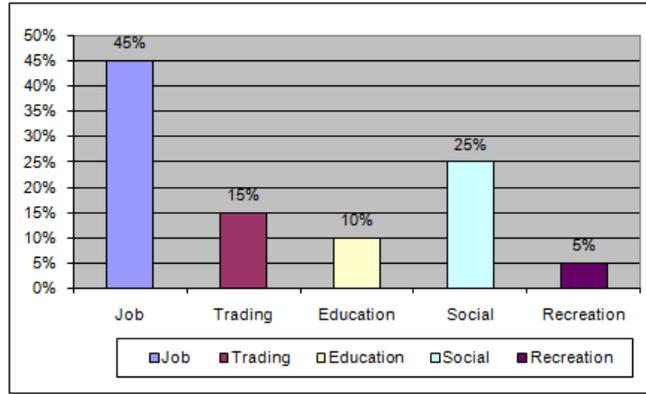


Figure 2 The purpose of rural transportation West Papua

The average of time travel needed in one way travel inter district that follows: air transportation is around 1.5 hours; sea transportation is around 6.5-19.5 hours; and land transportation is 3.5-9.5 hours. The shortest distance needed for one way travel like: 616 km (Manokwari Regency to Kaiman Regency). Air transportation for job travel is 56%, sea transportation for trading travel is 67%, and land transportation for social travel is 20%. Figure 3 described moda selection of transportation.

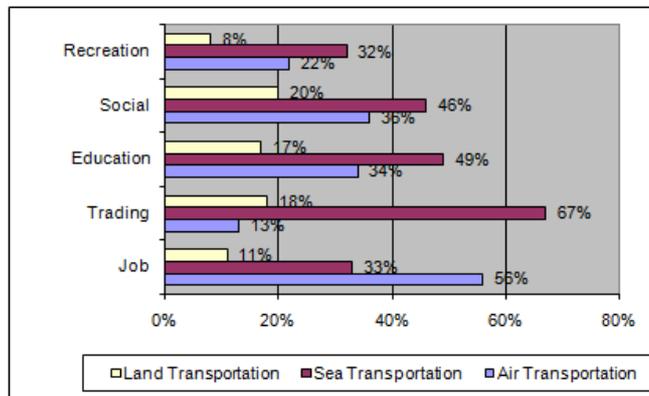


Figure 3 Moda selection of transportation

The reasons of moda selection that's been taken: 1) air transportation is 89%, because its is fast and has a permanent schedule, 54% is because it's more efficient; 2) sea transportation is 49%, it has a big capacity, 47% because it is an easy access; and 3) land transportation is 33%, because it is a cheap cost, 30% because it is an easy access. Air transportation is 58% with high cost level, sea level is 50% with middle cost level, and land transportation is 30% with low cost level. Figure 4 described social level of travelling

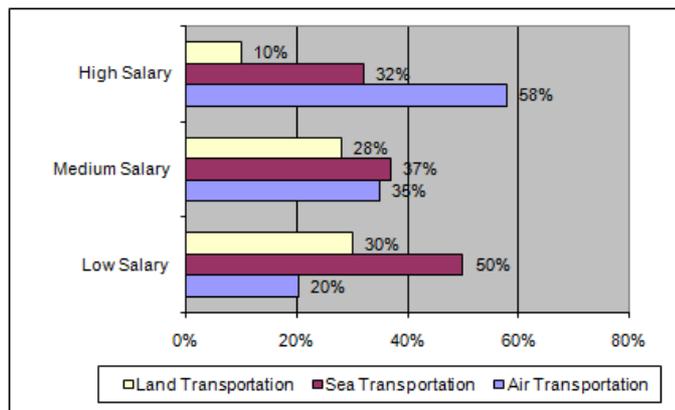


Figure 4 Social Level of Travelling

**Characteristic of transportation facility**

The waiting time for air transportation is around 30 minutes to 1 hour, sea transportation is around 3 to 5 hours, and land transportation is 1 to 2 hours. Time for access in to another moda of main transportation is between 10 to 24 hours. It is caused by almost all of main moda which related the district of West Papua is not

connected and well integrated. Therefore, to change main moda has been needed afor long time. The average cost for air transportation is between Rp. 913.000 and Rp.1.180.000,-, for sea transportation is between Rp. 139.000 to Rp. 480.000,-, and for land transportation is between Rp. 200.000 to Rp.250.000,-.

Air transportation is selected because of its fitness (43%). Sea transportation is selected because of its savety (41%) and credance (48%). The three factors mentioned above are not affected enough for the land transportation because the conditions of land transportations are so poor and limited. Figure 5 described the characteristic of transportation facilities.

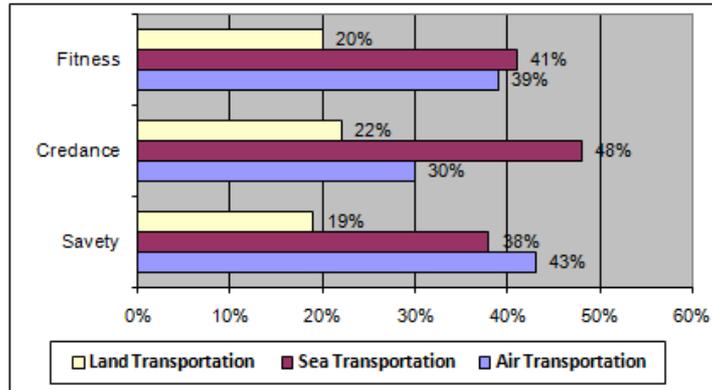


Figure 5 Characteristic of transportation facility

### Accessibility index of District and Sector

The result of accessibility index of district and sector :

1. Analysis of accessibility index (AI) used analysis of IRAP. It is analysed by multiplying indicator value due to percentage of aerge indicator. Indicator value is based on the existing survey condition and percentage of indicator that based on the interesting level of each indicator.
2. The highest AI is 7.08 and the lowest is 5.24. It described that there is an accessibility gap inter district in West Papua due to AI value
3. The highest accessibility index is at Raja Ampat Regency (AI-7.08), Sorong Selatan Regency (IA-7.04), and Teluk Bintuni Regency (IA-7.08). It showed that these districts have bad accessibilities. Characteristic of Raja Ampat can only reached by sea transportation with limited frequency, capacity, and structure. Main access of Sorong Selatan Regency is reached through land transportation with poor condition, and limited sea transportation and air transportation. Main access of Teluk Bintuni Regency is reached through land transportation with poor condition, and limited air transportation and sea transportation with a high cost.
4. The highest sector of accessibility index is a mobility (IA-6.82) and the lowest is a health sector (IA-5.56). The highest sector accessibility is a general transportation of air moda (IA-7.52), sea moda (IA-6.86) and access to the province (IA-6.74)
5. Main priority for handling accessibility is Raja Ampat, Sorong Selatan, and Teluk Bintuni. The main priority sector is mobility/ transportation with sub-sector air transportation and sea transportation

Table 1 described the recapitulation of accessibility index per-regency at West Papua Province and Table 2 described described the recapitulation of accessibility index per-sector at West Papua Province

Table 1 The recapitulation of accessibility index per-regency at West Papua Province

No.	Regency/City	Mobility					Health	Education	Trading	Accessibility Index (IA)	Note
		Nearest Regency	City center of province	Moda of air	Moda of sea	Moda of land					
1.	Manokwari	6,57	4,94	5,26	5,51	5,98	3,89	6,33	4,77	5,41	8
2.	Teluk Wondama	6,80	6,52	7,83	7,50	6,31	5,79	6,51	6,14	6,67	6
3.	Kota Sorong	5,25	5,03	5,38	5,66	5,88	4,21	5,83	4,64	5,24	9
4.	Kab. Sorong	5,93	5,88	8,65	7,16	6,28	5,47	7,02	5,80	6,53	7
5.	Sorong Selatan	6,45	7,55	7,24	7,80	7,62	6,20	7,07	6,36	7,04	2
6.	Teluk Bintuni	7,03	7,51	7,25	7,65	7,35	5,97	7,20	6,09	7,01	3
7.	Raja Ampat	6,80	8,58	10,99	6,09	6,52	5,77	6,38	5,55	7,08	1
8.	Fak-Fak	6,99	7,00	7,46	7,43	6,47	6,59	6,91	5,71	6,82	5
9.	Kaimana	7,15	7,69	7,59	7,04	6,75	6,17	6,70	5,71	6,85	4

Table 2 Recapitulation of accessibility index per-sector at West Papua Province

No.	Sector & Sub Sector	Accessibility Index (IA)	Note
1.	Sector of mobility/ transportation	6,82	<i>The highest: 1</i>
	• Access to the nearest city center of regency	6,55	
	• Access to city center of province	6,74	<i>The highest sub-sector: 3</i>
	• Public transportation (air moda)	7,52	<i>The highest sub-sector: 1</i>
	• Public transportation(sea moda )	6,86	<i>The highest sub-sector: 2</i>
	• Public transportation (land moda)	6,57	
2.	Sector of health	5,56	<i>The highest: 4</i>
3.	Sector of education	6,66	<i>The highest: 2</i>
4.	Sector of trading	5,64	<i>The highest: 3</i>

**Strategy of rural transportation development at West Papua**

The strategy of transportation development for this research is using SWOT analysis. Estimation of SWOT use the analysis of IFAS-EFAS. Internal and external factor will described as in Table 3.

Table 3 Internal and External Factor

Factor	Value	Rate	Value x Rate
<b>Strength</b>			
Potency of district development	0,41	3	1,23
Increasing the number of transportation demand inter district	0,2	2	0,4
Being good climate of infestation	0,155	2	0,31
Planning of middle period development (RPJMD) West Papua Province (2006-2011)	0,235	2	0,47
	1		2,41
<b>Weakness</b>			
Characteristic of West Papua that relatively be difficult.	0,365	3	1,095
Conflict of interest of district space.	0,19	2	0,38
Gap of accessibility inter district	0,305	3	0,915
There were many non technical problems	0,14	2	0,28
	1		2,67
<b>Opportunity</b>			
Planning of long period development of Traffic Department (2005-2025)	0,54	3	1,62
Masterplan of acceleration and expansion of economy development in Indonesia	0,46	3	1,38
	1		3
<b>Threat</b>			
Minimum airways that is interesting in service	0,385	3	1,155
Nnot so many navigation companies	0,37	3	1,11
Inconsistency policies of district development	0,245	2	0,49
	1		2,755

$$\begin{aligned}
 X &= \text{Strength} + \text{Weakness} & Y &= \text{Opportunity} + \text{Threat} \\
 &= 2,41 + (-2,67) & &= 3 + (-2,755) \\
 &= (-0,26) & &= 0,245
 \end{aligned}$$

Based on the analysis above, it is known that the rural transportation development at West Province is in the second quadrant. It remarked that the sector of transportation inter district is really weak. It caused by big challenges but it has a high opportunity to be developed. There are 8 strategic developments as in Table 5. Table 5 described the strategy priority using Quantitative Strategies Planning Matrix (QSPM). Each priority strategy is given an Attractive Score (AS) with range scores of 1 – 4 and then it is analyzed by the average value. Total Attractive Score (TAS) is described as in Table 5 below.

**Table 5 Priority of Strategy**

No	Strategy	Total Attractive Score	Priority
1.	To optimize transportation infra structure for supplying transportation demand inter district and supporting district development	5,5930	3
2.	To make suitable the policy of transportation sector on district development and economic development.	5,9900	2
3.	To establish the policy of district transportation that created the opportunity and infestation interest on transportation sector.	4,6225	5
4.	To develop district and to manage natural resources that suitable with district supported power.	5,1770	4
5.	To plan transportation inter district for decreasing the accessibility gap integrated and to be suitable with district characteristic	6,1430	1
6.	To establish the policy of transportation by considering the study of strategic life environment.	5,5930	3
7.	To increase the quality of human resources and to socialize the level of society understanding about the development of transportation sector.	4,0980	6
8.	To minimize conflict of interest on space by re-regulating district due to condition, supporting power, and district characteristic.	3,9815	7

## Conclusion

1. Characteristic of rural transportation at West Papua is due to the traveling characteristic, the purpose of travelling is for job, the shortest distance inter district is 24 km and the longest is 616 km. Characteristic of traveling user, moda selection, air transportation for job traveling, sea transportation for trading traveling, land transportation for social traveling are due to the air transportation that faster, sea transportation and land transportation with low prices. Characteristic transportation facility quantitatively is included by waiting time, air transportation in the range of 30 minutes to 1 hour, sea transportation in the range of 3-5 hours, land transportation in the range of 1-2 hours, time to access to main other transportation moda in the range of 10-24 hours. Qualitative characteristic is safety, credance, and fitness is very influenced the selection of sea transportation.
2. There is a gap of accessibility inter district in West Province with the difference of IA values. The higher IA would cause a worse accessibility in a district. A district with high IA is as main priority handling such as Raja Ampat Regency. The sector with highest IA is mobility/ transportation and the sub sector with highest IA is public transportation of air moda.
3. Rural transportation development in West Papua is in the second quadrant with recommendation of Stabilization Strategy. Strategy could be carried out in the first time is the rural transportation planning for decreasing gap of accessibility intergratedly and that is suitable with district characteristic.

## REFERENCES

1. Badan Perencanaan Pembangunan Daerah. 2009. *Rencana Tata Ruang Wilayah Propinsi Papua Barat*. Manokwari.
2. Adisasmita, S.A. 2010. *Perencanaan Infrastruktur Transportasi Wilayah*. Edisi pertama. Jurusan Teknik Perkapalan, Universitas Hasanuddin. Makassar.
3. Tamim, Ofyar. Z. 2000. *Perencanaan dan Pemodelan Transportasi*. Edisi kedua. Penerbit ITB. Bandung
4. Sarkar, A.K., 2002. *Application of IRAP in Rajasthan-India*. ASIST Asia Pacific Mainstreaming Poverty Reduction Strategies, Integrated Rural Accessibility Planning (IRAP) Third Expert Group Meeting, ILO, Bangkok. Report. p. 126-159.  
<http://www.ilo.org/public/english/employment/recon/eiip/download/ratp/ratp09.pdf>. 2003.
5. Hadingham, Tim. 2003. *Decentralisation and Development Planning : Some Practical Considerations*. Development Planner, Scott Wilson. Paper. 2003.
6. Rangkuti, F. 2009. *Analisis SWOT Teknik Membedah Kasus Bisnis (Reorientasi Konsep Perencanaan Strategis untuk Menghadapi Abad 21)*. Edisi kesembilan. PT. Gramedia Pustaka Utama. Jakarta.