The study of road network and environment in Indonesia

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Abstract. Bekasi Regency is a district that borders directly with Jakarta, Road Network is a strategic infrastructure as a link between the nodes of activity. Large administrative areas, sporadic centers of activity become a common problem in the area of regency. As a result, the integration of the road network and authority matter become a problem in the development of the regency. The urban area in Bekasi Regency covers seven subdistricts, namely: Central Cikarang, South Cikarang, North Cikarang, West Cikarang, East Cikarang, South Tambun, and Cibitung. Within those urban areas, the integration and authority of the road network become a problem. The aim of this research is to make an inventory of road network condition in the urban area of Bekasi. The method of approach used is by conducting field observations, doing institutional surveys to gather the secondary data, in institution such as subdistricts, the Public Works Office, and Binamarga Office, then doing descriptive analysis and overlaying maps using ArcGis linked to the policy of Regional Spatial Planning in Bekasi Regency. The results of the findings are input for policies on road network development in urban areas of Bekasi Regency.

1. Introduction

Bekasi regency is a regency that borders directly with the capital city of Indonesia, Jakarta. As a result, there is a growth spreading to the area around Bekasi regency. Quality of road network will accelerate the growth. In accordance with reference: "Transportation infrastructure can have a substantial impact on the distribution of firm and employment locations across space by changing the level of accessibility (often measured by travel time) among location shows that the surrounding area grows because of infrastructure conditions, including Road Network [1]. Based on that condition and the theory, thus this study aims to conduct inventory road network conditions and environment in 7 districts in Bekasi regency, namely Central Cikarang, South Cikarang, North Cikarang, West Cikarang, East Cikarang, South Tambun and Cibitung. The 7 districts are the district that belong to the urban area of Bekasi Regency. Road network conditions later be studied with area structure that has been set in Rencana Tata Ruang wilayah (RTRW) Bekasi regency year 2011-2031, to see whether the area structure is appropriate according to the RTRW. The observed road network is a village road that included in the urban area, village road is a responsibility of village government (headman of the village) while the urban area is the authority of the headman ( lurah). The provision is based on the rule that is prevailing in Indonesia due to the presence of rules and regulations regarding village authority [2]. As a consequence, there will be difference in road quality although the location lies in the same urban area. The result of this study will become a suggestion for local government in managing the road network.
2. Methods
This research uses deductive rationalistic methods, where data collections are done by surveying to the 7 district locations namely Central Cikarang, South Cikarang, North Cikarang, West Cikarang, East Cikarang, South Tambun and Cibitung with inventory of road network, its function and quality. Approach method used is field observation, institutional survey to collect secondary data, in the institute such district governance, Public Works Agency, Binamarga Agency, the data is being analyzed descriptively and overlaying maps by ArchGIS. Then conduct analysis with the policy of spatial planning (RTRW) and theory study regarding road network.

3. Result and discussion

3.1. Road network phenomenon in urban area
Village road in Central Cikarang district seen from the existing conditions has function as road link in the residential areas with higher hierarchy, for instance regency road. Almost every road configuration is ½ UD typed (one-line road, 2 lines road with undivided road) with fine condition also majority of pavements are made from concrete. Besides, the traffic condition is light intensity without any side obstacles. Village road in Central Cikarang district seen from the existing conditions has function as road link in the residential areas with higher hierarchy, for instance regency road. Almost every road configuration is ½ UD typed (one-line road, 2 lines road with undivided road) with fine condition also majority of pavements are made from concrete. There are some points on the road with bad conditions located in Serang Village. The average width of village road in South Cikarang District is 2.5-3 m. Besides, the traffic condition is light intensity without any side obstacles. Some main road that serves movements of local people, movements that being used by people for heading to social facilities such health facility, education facility, and government office, and any other activities. The following is the data related to village road located in South Cikarang district. The condition of existing village road in South Cikarang is shown in the following figure 1.

![Figure 1. Village road and environment condition in South Cikarang district.](image)

The majority of village road condition in North Cikarang district is in good condition with almost every road configuration is ½ UD typed (one-line road, 2 lines road with undivided road) is fine also most of the pavements are made from concrete. Moreover, the traffic condition is light without any obstacles on the side. The width of village road in North Cikarang is around 2.5-4 meters and located in village residential area. For instance, village road with 4 meters wide in KH. Fudholi Street and 2.213 meters long in Karangasih, North Cikarang. Meanwhile, there is road with 2.5 meters wide located in Karangharja namely Pinggir Kali Irigasi Street with the length of 350 meters. For further explanation regarding village road conditions in North Cikarang shown in the following figure 2.
Village road located in East Cikarang has function as link road between residential area and the higher hierarchy road. The condition of the road itself is mostly fine and the pavements are made from concrete. Type of village road in residential area has one line and two lanes. There is road with bad condition located in Labansari has 5 road points with potholes. Traffic condition is light without any side obstacles. For more explanation regarding the condition of village road in East Cikarang shown in figure 3.

As seen from the existing village road in West Cikarang district, the pavements are made from concrete and the road has good condition. Traffic condition itself assumes as light intensity and not crowded. The road length is varying from hundreds of meters to thousands of meters, for instance Kampung Wngkal Street that located in Kaltijaya West Cikarang is 1.662,79 meters long and 3,56 meters wide. Type of road in West Cikarang is one line with two lines unseparated. The following figures 4 shown the condition of existing village road in West Cikarang district.

Cibitung district is one of the districts in Bekasi Regency that included in urban area. In terms of infrastructure, the village road in Cibitung has good condition with the pavements made from concrete. One of the village roads in Cibitung district is Haji Saimun Street with the length of 1800 meters and width 3,3 meters. Type of road is one line with two lines without any divider, see figure 5.
Figure 5. Village road and environment condition in Cibitung.

Roads have important role in scope of village administrations that is as link between residential area with the central of activities both in village scale or district scale. The road condition in South Tambun is good with pavements made from concrete. The traffic condition has no side obstacles. One of the roads that located in South Tambun is Waru Doyong street has length around 330 meters and width 4 meters. The following figures 6 show the conditions of village road in South Tambun district.

Figure 6. Village road and environment condition in South Tambun district.

3.2. Discussion

Village road network means that the road network is the village government authority to do the repair or control. This provision is in accordance with the rule that has been enforced by the rural government in Indonesia. The survey result shows that road network in seven districts that included in urban area has 80% good condition, although the drainage in the road network is not complete, so it will cause the rainwater to be overflowed and covers the road. The difference in authority has an impact on the distinction in management and service quality specified in spatial planning documents, namely RTRW. Regional land use change is the outcome of many small-scale drivers and changes, with decisions made at an individual or property scale influenced by regional, national and global norms, environmental change, policy and market forces [3].

If it refers to Kebijakan Rencana Tata Ruang Wilayah (RTRW) Bekasi Regency year 2011-2031, road network scattered in the 7 districts above show that there is not strengthening for Pusat Kegiatan Nasional (PKN) in South Tambun and Central Cikarang. Pusat Kegiatan Lokal (PKL) in Cibitung District dan Penguatan Pusat Kegiatan Lokal Promosi di Kecamatan (PKLp) in North Cikarang, South Cikarang, West Cikarang dan East Cikarang districts. It makes central of growth is not only concentrated in South Tambun district and Central Cikarang but also has been spread to other 5 districts. This means functional of urban is broadened, road network plays big role in connecting the knots and giving growth propagation to the other 7 districts. Bekasi Regency has relatively high accessibility with Jakarta, also the biggest industrial area in southeast Asia that leads to rapid land-use change [4]. Village road network gives access to seven district area as well as increasingly widespread land use change in the region. The improvement of road condition will grow built up area [5], this growth is also happened in the urban area of Bekasi. Therefore, road management needs the coordination in local government level that is district government. Village government must coordinate with Binamarga and Bappeda Districts in order to make the road quality follows the service standard of urban area as well as the service quality that specified in RTRW.
4. Conclusion

According to the explanation above, we can conclude that the 7 districts in Bekasi Regency have formed urban areas which the function is beyond its administrative limits. Knots that are formed both in RTRW and the hierarchy have gone beyond the plans. This means that growth of knots has spread to outside area of the knots. As consequences, urban area will occur and land-use change will happen evenly in the 7 districts, particularly the spread of road network that accelerates the growth. The construction of the village road must be conducted coordination at district government level particularly with Binamarga and Bappeda that have coordination function.

References

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