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MODEL OF MOTORCYLCE OWNERSHIP AND ITS IMPACT TO URBANIZATION IN RURAL AREA: A CASE OF KUDUS REGENCY, INDONESIA

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Abstract: *This paper aims to convey the fact that the use of motorcycles can have an impact on the urbanization process of rural communities. the study was conducted in Kudus by taking three villages namely Wonosoco, Padurenan, and Rahtawu. the data was processed using the average nierest neighborhood technique and hot spot analysis using GIS. The results show that motorcycle ownership forms a cusltered pattern with high intersection in all villages. These results show that motorcycles are the main drivers in rural economies. These findings reinforce the theory that motorcycles have a positive impact on rural growth, especially in developing countries.*

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1. INTRODUCTION

Recent study define urbanization as a process of changing lives and a place for the realization of urban society (Firman, 2009; Hareedy & Deguchi, 2011; Hersperger & Burgi, 2007; Makinde, 2012; Setyono et al., 2016; Soetomo, 2009; Webster & Muller, 2009). In other words, urbanization is not only a physical change but also an economic, social, and community mentality (Deng et al., 2015; Tian et al., 2016). Urbanization Delineation in developing countries is divided into three aspects, namely: demographic, economic and social aspects (Reissman, 1964). Urbanization in Asia develops on the basis of regional development as presented by T G McGee & Greenberg (1992). The urbanization process changes the structure of the region through the extended metropolitan region (EMR). Urbanization in Indonesia does not only occur in big cities, but also in small cities (Firman, 2003; T. McGee, 2009; T. McGee et al., 1971; T. McGee, 1989, 1991). This condition shows that the cities of small and medium cities in Indonesia have grown. This growth is marked by an increase in the number of urban populations which increases the number of housing needs.

Urbanization raises rural-urban interactions. The development of rural-urban areas did not escape from the movement. Transportation connects urban and rural areas and facilitates interaction. This interaction is manifested in the flow of goods and services in the regional scale. In this case, rural have a function as a supplier of natural and human resources to urban areas. Instead, cities provide streams of income, processed goods and income. Furthermore, transportation also provides a convenience access and flow of agricultural goods. Accessibility refers to the facility of reaching goods, services, activities and goals that generally refer to physical access (Litman, 2015). With this facility, the output price of agricultural products can be reduced. However, to maintain the stability of transportation, it is necessary to improve the quality of rural roads and provide appropriate transportation modes (Chakwizira et al., 2010).

One of vehicle used in the rural is motorcycle. Like other developing countries, Indonesia uses motorcycles to reach areas that do not have good means of transportation system. Motorcycle are a mode

of transportation that is growing rapidly in several countries. Indonesia became one of the countries with the third largest motorcycle use after China and India. The contribution was 78.3% of the total modes of transportation in 2007 (Lubis, 2009). The growth in the number of motorcycles has been increased significantly. In Central Java, in 2010 there were 9,480,791 motorized vehicles, while 8,290,689 units were motorcycles.

Previous research of motorcycle in European countries provides a negative view of motorcycle such as driver health problems, high accident rates, vulnerability to crime, bad weather, social problems (Hagen et al., 2016) and congestion (Lubis, 2009). However, this research provides another view on motorcycle, especially in developing countries that have limited access to several remote area. With this case, this research raises the phenomenon of motorcycle ownership towards urbanization in rural-urban areas.

In developing countries, motorcycles actually provide benefits in the movement of society because they are more flexible than other vehicles. Motorcycles have the ability to travel fast with low costs (Small et al., 2007) and are able to provide a feeling of freedom and excitement for their users (Hagen et al., 2016). Furthermore, motorcycles also bring out the identity of social groups (Granovetter, 1985). This vehicle is very helpful for daily mobility, especially in areas that are difficult to reach (Marquet & Miralles-Guasch, 2016). The development of commercial motorcycle use has also emerged largely in response to transportation demand in unplanned settlement (Daramola, 2018). Based on the importance of studying this phenomenon, the purpose of this research is to map the spread of motorcycle ownership and its contribution to the urbanization process in rural-urban areas. This Study uses Kudus Regency as one of the study areas. Kudus as one of the fast-growing cities in Indonesia has unfavorable access especially to rural areas so that many motorists use it. The novelty of this research is changing the view that motorcycles are not negative but actually it can provide convenience so that they can stimulate the urbanization process in rural-urban areas.

2. DATA AND METHODS

2.1. Study area

This study takes Kudus Regency as an observation area. Kudus is one of the urban areas that experience the phenomenon of urban sprawl. This phenomenon illustrates the pattern of built-up distribution and population in each sub-district (Buchori et al., 2017). The rural-urban areas of Kudus Regency which were studied were Rahtawu, Padurenan, and Wonosoco Villages (Figure 1). These locations are the location of the urbanization process due to the motorcycle as a stimulant. Rahtawu is located north of Kudus Regency. It has the physical characteristics of steep stature and difficult accessibility. Steep topographic conditions have an impact on public vehicle access so that community movements are limited. In the last eight years, the movement of the community has been greatly helped by motorcycles. With this facility, Rahtawu can develop as a natural and religious tourism destination.

Furthermore, Padurenan is a flat topography village, it is also one of the centers of Convection and Embroidery in Kudus Regency. These micro business activities require movement in the supply of raw materials and marketing. The lack of public transportation to access this area, influences the movement of community. Convection and Embroidery activities are progressing after motorcycle growth as a marketing tool. It's different with Wonosoco Village. Wonosoco is one of the centers of agriculture in Kudus Regency. This village is difficult to reach because there are no public transport vehicles. The potential of this village includes natural and artificial tourism. This tourism activity can only develop since the development of motorcycle use began.

2.2. Methods

This research uses a spatial statistical approach using GIS. Analysis using Average Nearest Neighbor techniques, Calculate Distance Bands, Incremental Spatial Autocorrelation, and Hotspot Analysis. Average Nearest Neighbor to see patterns of distribution of dots based on the number of respondent motorcycle ownership points. Calculate Distance Band to get the distance between observation points. Incremental

Spatial Autocorrelation to determine the recommended band distance for hotspot analysis process, and Hotspot Analysis to assess the intensity and concentration of an activity in a space.

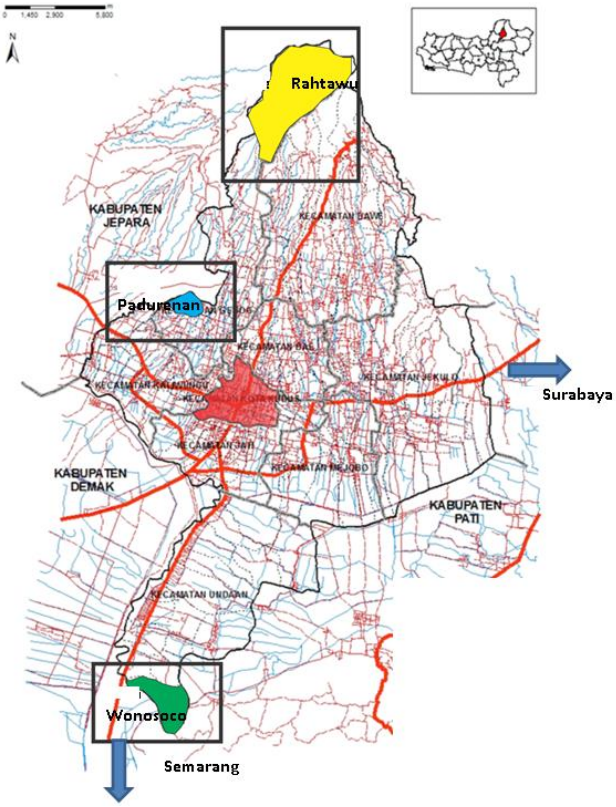

Figure 1. Kudus Regency as Case study

3. RESULTS AND DISCUSSION

3.1 Characteristic of Motorcycle Ownership

Figure 2 shows the percentage of movement towards a workplace using a motorcycle. Assessment motorcycle characteristics use the basic movement of the people in Wonosoco, Padurenan, and Rahtawu. From the results of the questionnaire that uses the workplace approach, it can be seen that the local movement dominates the percentage of movement. The fact noted that the local movement in Wonosoco was 92%, Padurenan 67%, and Rahtawu 91%. This shows the dominance of the use of motorcycle by residents for local activities.

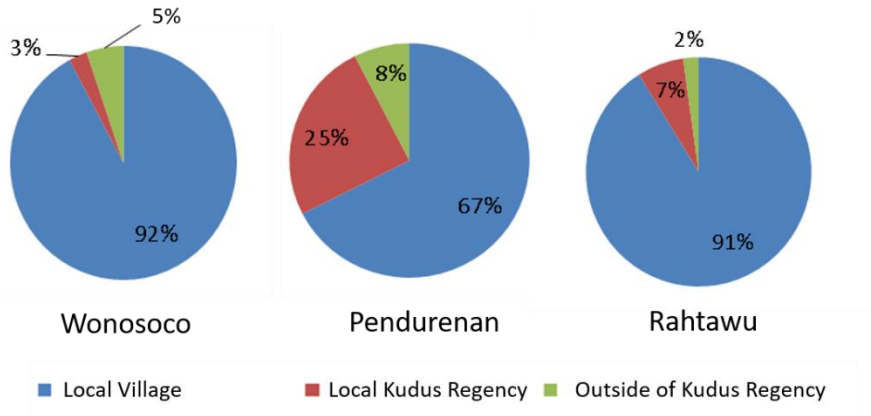

Figure 2. Percentage of movement to workplace

Clusters of motorcycle usage patterns are very important. This can provide an overview of the impact on land use activities and changes on a local scale. Directly, the presence of motorcycles affects agricultural activities. With the presence of motorcycles, farmers can transport agricultural produce and improve mobilization in agricultural areas. This condition affects the economy of the community. With the efficiency of time, cost, and energy, making community productivity increase.

Furthermore, the existence of motorcycles also has an impact on non-agricultural activities. The existence of a motorcycle is able to create new land use activities. This is evidenced by the development of tourist areas in Wonosoco, Padurenan, and Rahtawu. The development of new land uses can open the opportunities for economic activities, resulting in diversification of livelihoods that affect people's income. These findings complement the theory presented by Tamin (2000) where each land use is able to generate movement in the process of meeting needs. The discovery in the Village-Town Area of Kudus Regency proves that the existence of motorcycles as a means of transportation actually evokes new land use activities. Cluster The ownership of motorcycles in the three villages shows the dominance of certain activities. Identification in Wonosoco Village resulted in the fact that motorcycle ownership dominates the region's main access. Whereas in Padurenan, the highest concentration of clustered embroidery and convection household industries. Similar with Rahtawu Village, most of the cluster members are residential areas and tourism activities.

This fact shows that urbanization affect to changes in rural activities that are influenced by motorcycle ownership. Gonghao and Ma (1999) explained that "Urbanization from the Bottom" is a form of rural urbanization conceptualization based on rural urbanization driven by certain businesses. The theory shows the transformation of labor activities in rural areas. With the high number of motorcycle ownership in rural-urban areas it can triggered the development of economic activities.

3.2 Average Nearest Neighbor

This analysis serves to explain the pattern of dots based on the number of respondent motorcycle ownership points, the distance between points, and the area (Figure 3). Results show Z scores and p values that show cluster, random, or scattered patterns. The calculation results show extensive information area for Wonosoco 5.63 Km^2, Padurenan 1.84 Km^2, and Rahtawu 2.07 Km^2 respectively.

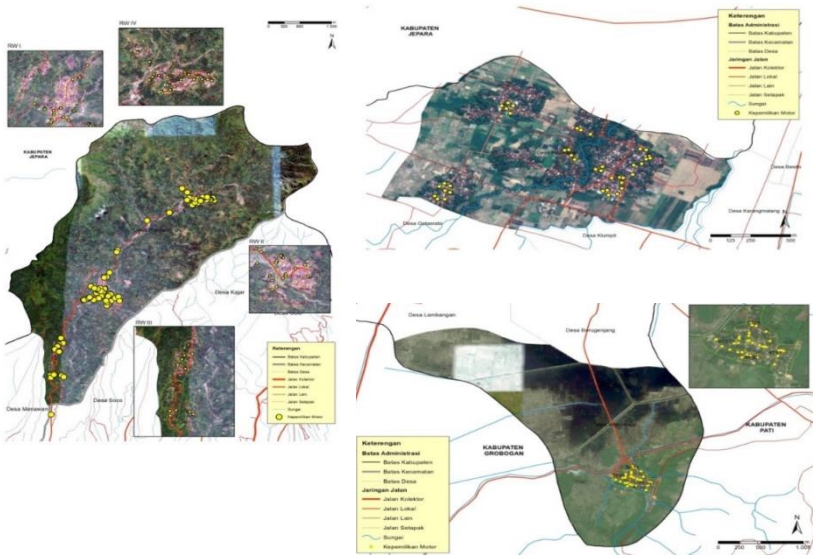

Figure 3. Distribution of Observed Spot in Wonosoco, Padurenan, and Rahtawu Village, Kudus District

Furthermore, the calculation result with average nearest neighbor obtained the results of distance observation from one point to another in Wonosoco Village was 31 meters, Padurenan 23.5 meters, and Rahtawu 287 meters. While the expectation of the distance between one respondent point and another point is 187 meters in Wonosoco Village, 45 meters in Padurenan Village, and 145 meters in Rahtawu Village (Table 1). These results indicate that in the three villages, the nearest neighbor ratio is more than -1.65 and z-score is less than 1%. This indicates that the respondent points in the three study areas formed a cluster pattern (Figure 4). After getting the results of the z score and p value from the previous analysis, the output of calculate distance band is the distance between the observation points. The results explain that the minimum distance of neighbors in Wonosoco is 12 meters, Padurenan 7 meters, and Rahtawu 9 meters. While the maximum distance in 1 observation cluster in Wonosoco is 97 meters, Padurenan is 73 meters and Rahtawu is 127 meters (Table 2).

Table 1. Calculation Results of Average Nearest Neighbor Analysis

Information	Wonosoco	Padurenan	Rahtawu
Observed Mean Distance	31.23 Meter	23.52 meter	287.41 meters
Expected Mean Distance	187.53 Meter	45.62 meter	145.60 meters
Nearest Neighbor Ratio	0.167	0.515538	0.197401
z-score	-10.08	-13.778013	-23.934945
p-value	0.000000	0.000000	0.000000

Table 2. Result of Calculate Distance Band

Information	Wonosoco	Padurenan	Rahtawu
Minimum 1 Neighbor Distance	11.83	7.1	8.62
Average 1 Neighbor Distance	31.23	23.52	28.74
Maximum 1 Neighbor Distance	96.77	73.06	127.44

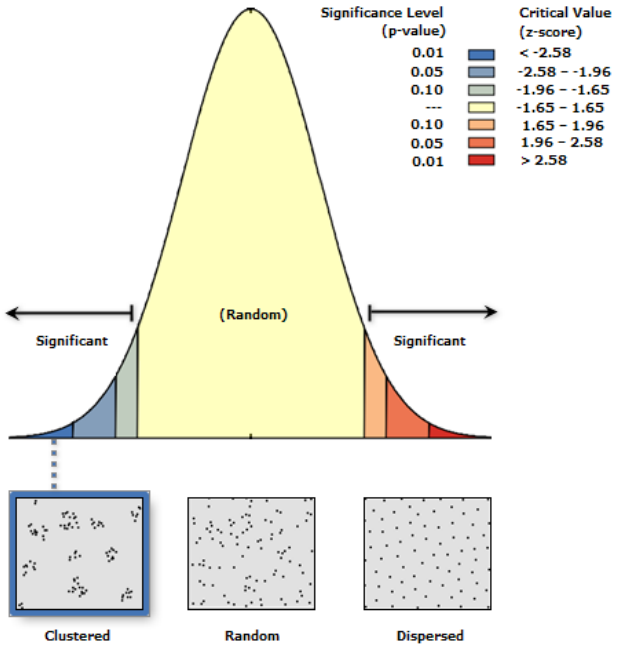

Figure 4. Result Diagram of Average Nearest Neighbor Analysis in Wonosoco, Padurenan and Rahtawu

After knowing the distance between observation points, the next step is to use an incremental spatial autocorrelation tool. This stage is carried out to determine the recommended band distance for hotspot analysis process. The results obtained, the recommended band distance for hotspot analysis is Wonosoco

27 meters, Padurenan 165 meters and Rahtawu 273 meters. The results were obtained from the culmination point which was then used as a recommendation for the analysis of hot spots. Hotspot analysis uses attributes of the number of family members, the number of motorcycles owned by each respondent and the ratio of both. In this analysis, the first thing to do is to prepare the ratio of attributes of the number of motorcycle owners to the number of family members and the maximum distance of households in 1 village. Hotspot analysis results can be seen in Figure 5, 6 and 7.

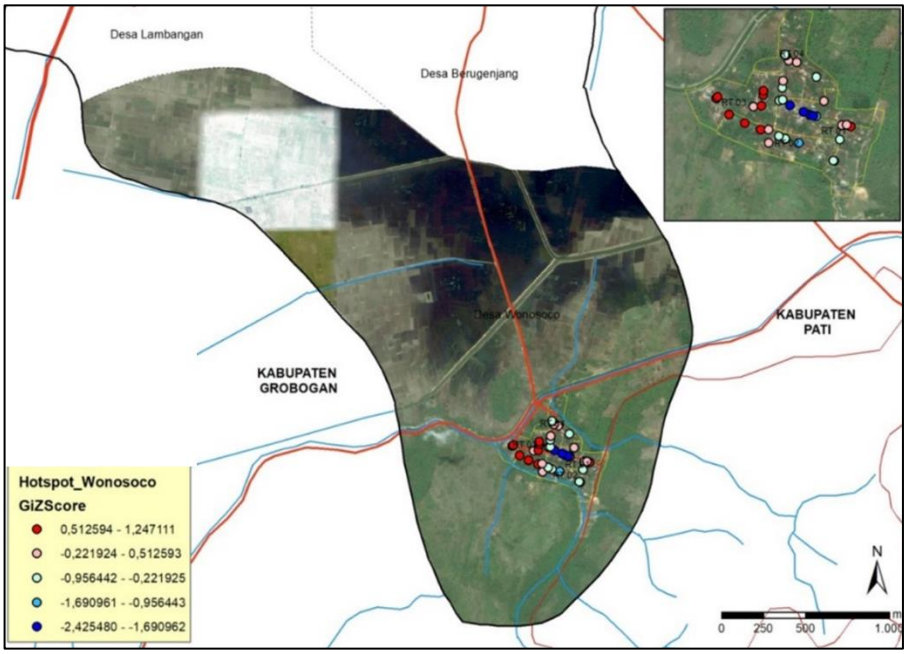

Figure 5. Result of Hotspot Analysis in Wonosoco Village, Kudus District

The results of this analysis show the ratio between the number of motorcycles owned and the number of members of each family in the household, as well as the distance of the band that has been recommended. Figure 5 shows the concentration of motorcycle ownership per household in Wonosoco. There are 2 main colors namely red and blue. The red color indicates the concentration of motorcycle ownership is high and the blue color shows the lower level. High concentrations are found in the main access areas, while for moderate to low concentrations are in the settlement environment.

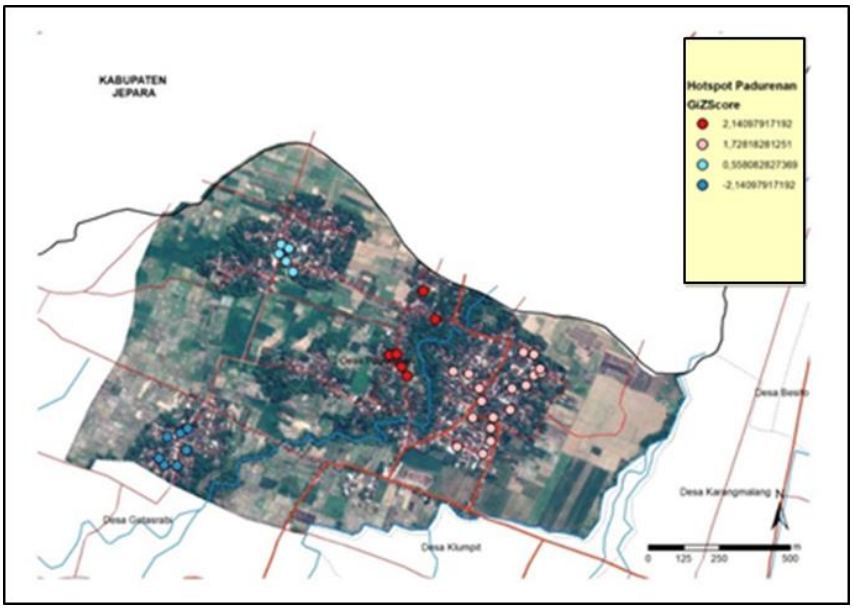

Figure 6. Result of Hotspot Analysis in Padurenan Village, Kudus District

Furthermore, Figure 6 shows the concentration of motorbike ownership for each Pendurenan household. Medium to high concentrations are found in the community of neighborhood (RW), namely RW 1.2, 3, and 6, while in RW 5 are classified as medium concentrations, and in RW 5 are low concentrations. If it is related spatially, the community RW 1,2,3 and 6 are part of the embroidery and convection industries. The high concentration of motorcycle ownership indicates that motorcycles affect the distribution of goods and services. Spatially, RW 1 and 3 people are mostly micro business entrepreneurs so that they have a higher level of income than RW 5 people who mostly work as laborers. Furthermore, Figure 7 shows the concentration of motorcycle ownership in Rahtawu. Moderate to moderately high concentrations are in RW 1 and RW 3. Different conditions are found in RW 4 which are classified as low concentrations, and RW 2 with moderate concentration.

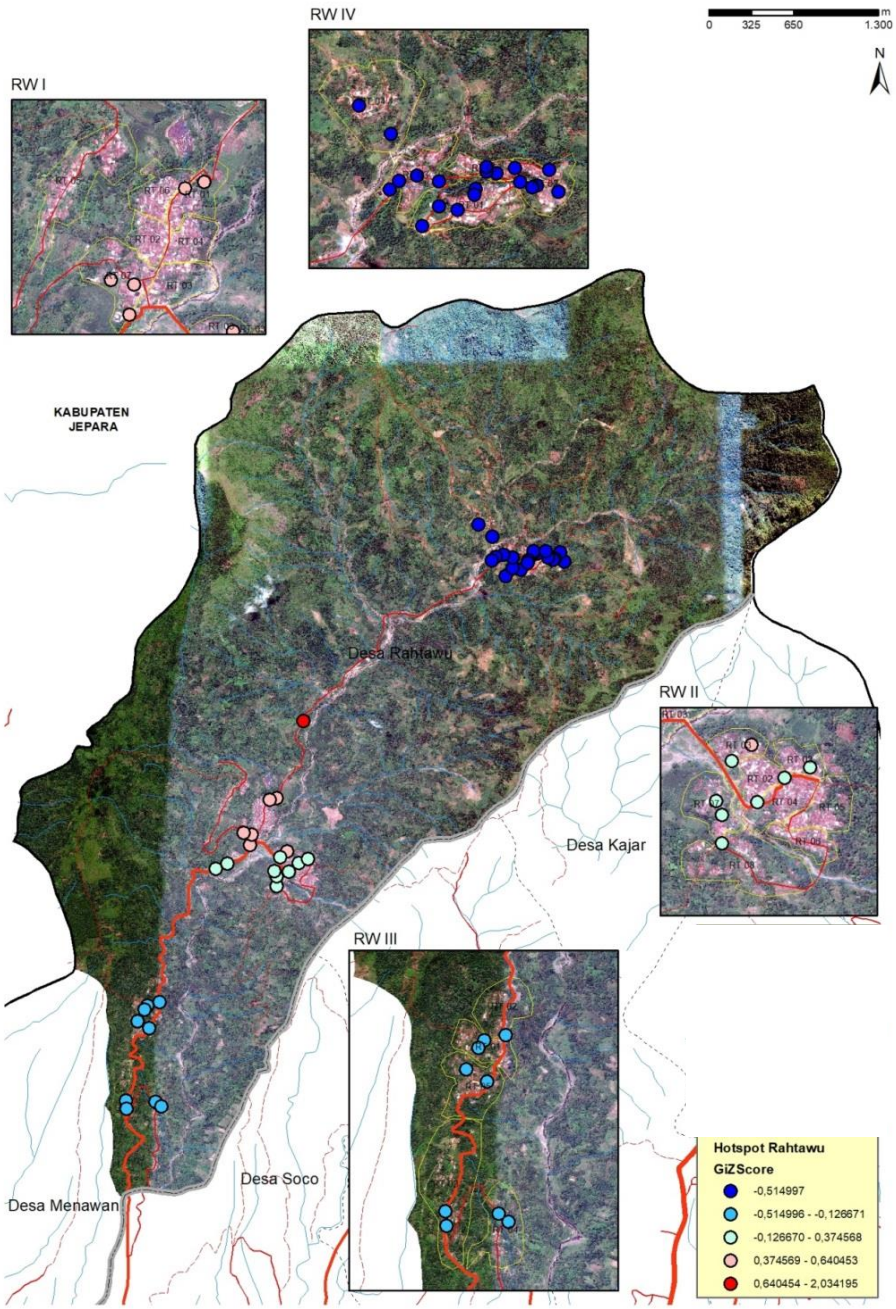

Figure 7. Result of Hotspot Analysis in Rahtawu Village, Kudus District

The results of the analysis of the three villages prove that the transformation of the area from rural to urban has an impact on the livelihoods of the rural community. The emergence of non-agricultural livelihoods, both as primary and secondary livelihoods, proves that urbanization causes a shift in livelihoods to non-agriculture. The collaboration with statistical data shows that there is a change in the percentage of non-agricultural livelihoods from 2012 to 2017. In Rahtawu Village there has been an increase from 15% to 40%. Padurenan Village, an increase from 86% to 95%. Wonosoco Village increased from 36% to 53%. This condition strengthens the theory presented by Potter et al. (2008) that social, economic and ecological transformations indicate urbanization that has an impact on the mindset of the people.

Urbanization occurring in the rural-urban Area of Kudus Regency is identical with urbanization in China. Residents in the countryside are urbanizing with changes in livelihoods just migrating to big cities (Wang & Hu, 1999). However, there are some fundamental differences. if urbanization in China occurs because of population pressure and reform policies in post-Mao that result in rural development, then urbanization in Kudus Regency is more influenced by the use of motorcycle.

Furthermore, when compared with the results of a study on urbanization in Shaanxi, China, where science and technology are the first productive forces as a driving factor for new type of urbanization (Shang et al., 2018). These findings contribute to the development the theory that motorcycles can be a force that can drive urbanization in rural-urban areas. The existence of motorcycles as a driving force for urbanization cannot be separated from the public's preference for this mode of transportation in carrying out movements. Motorcycle ownership and household income are the main socio-economic factors that affect motorcycle use. The level of motorcycle use is influenced by low-income communities (Chen & Lai, 2011).

The use of motorcycles as a driver of urbanization in the rural area of Kudus Regency is also influenced by several external factors. The first factor is the high demand for embroidery and convection orders from both the surrounding area and areas outside the Kudus regency and International demand. With orders, the people of Padurenan Village use motorcycles as a means of transport in getting the raw materials and distribute goods. Secondly, the emergence of tourists to the tourist destination in Rahtawu and Wonosoco Village. This has an impact on the growth of motorcycles that are able to serve the movement of tourists. Third, public vehicles that cannot reach remote areas allow motorcycles to be the only vehicle capable of reaching the entire community. This reinforces the results of previous studies from Daramola (2018) that the development of motorbike use is due to the response to transportation demand in unplanned settlement.

4. CONCLUSION

This research has successfully revealed the empirical fact that motorcycles has an influence on urbanization in rural areas. Furthermore, motorcycle ownership is able to move and develop local economic activities. This is confirmed by the study findings that motorcycle ownership forms a cluster with high concentration. The use of motorcycles in rural areas is a stimulant in the urbanization process, considering that motorcycles are very flexible and easy to use compared to other modes of transportation. The results of hotspot analysis can map the area with motorcycle ownership concentration, so that it can facilitate the identification of accessibility and application needs.

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