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MAPPING THE CAPACITY OF THE MOSQUE IN SPATIAL REVIEW IN EAST BOGOR SUB-DISTRICT

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ABSTRACT

The increasing awareness of Muslims about Islam encourages them to participate in activities carried out by mosque administrators, this has an impact on the capacity of the mosque space. This study aims to determine the distribution of mosques and their capacities based on the population in East Bogor Sub-District. Data collection is done by using spatial data to support decision making to increase efficiency and time accuracy by using the buffering method. Where the buffer is to determine the optimal radius assuming distances of 100 m, 250 m, 500 m, and 1000 m. The results showed that in East Bogor District there were 73 mosques and the capacity of the mosques was 33.72% of the total population of 106,029 people.

Keywords: *East Bogor Sub-District; Mosque Capacity; GIS*

A. INTRODUCTION

A place of worship is an important religious facility for religious believers in a place. Apart from being a symbol of the "existence" of religious adherents, a place of worship is also a place for broadcasting religion and a place for worshiping. The mosque is a multi-functional place of worship. A mosque is not a place of worship that is devoted to worship alone, but all positive and beneficial activities for the people are often initiated by mosques. Prayers that are performed in congregation at a mosque in itself signify the mosque as an important institution in Islam as Muslims must attend and congregate at the mosque five times a day, day and night. The mosque also functions as a center for the formal teaching of religious education. In addition, the mosque also serves the commemoration of important religious events as well as an administrative center for mosque administrators (Fauzi & Abd, 2015). Mosques play an important role by serving comprehensive functions for society including education, culture and politics (Maimunah Abdul Aziz et al., 2016). The mosque is also a center of civilization that is not just a center of recitation because residents can gather and stay in touch so as to enlighten, prosper and unite the people. Moreover, mosques may play an important role in preparing children for academic success. Children who attend mosque school do better on tests than elsewhere (Burde et

al., 2015). East Bogor Subdistrict has up to now approximately 73 mosques, considering the population growth, especially those who are Muslims, always increase every year, especially the increase in mosque and prayer facilities which positively encourages Muslim tourists to enter or visit mosques (Battour et al., 2011), this will indirectly affect the increasing number congregation of the mosque. This resulted in the mosque's capacity not being able to accommodate the number of worshipers. Until now, the available information regarding mosque data in Bogor City is only limited to addresses, there is no spatial description of the information on the existence of mosques. Data collection systems, analysis and spatial data to support decisions to increase time efficiency and accuracy are used the Geographic Information System (GIS) method. With GIS, it is expected to be able and facilitate the decision making process and the resulting solution is the most optimal solution.

Based on government regulations No. 2 of 1995 and Inmendagri No. 30 of 1995 dated 24 August 1995 concerning Changes in the Territorial Boundary of the Regional Municipality of Tk. II Bogor and the Regional District Tk. II Bogor, East Bogor SubDistrict with an area of 1,015 hectares, consists of 6 sub-districts of 318 RT and 59 RW. The villages in East Bogor Sub-District can be seen in the table 1 below:

Table 1. Sub-District of East Bogor

No	Name of Village	Area
1	Baranangsiang Village	235 Ha
2	Sukasari Village	48 Ha
3	Katulampa Village	491 Ha
4	Tajur Village	45 Ha
5	Sindangsari Village	90 Ha
6	Sindangrasa Village	106 Ha

With the northern borders bordering Bogor District, in the east bordering Sukaraja District, Bogor Regency, in the west bordering South Bogor District and Central Bogor District, in the south bordering Ciawi District, Bogor Regency (Bapeda Kota Bogor, 2014). The total population of East Bogor District in 2017 was 106,029 people. The population growth rate in East Bogor District is 1.23% with a population density rate per km2 of 10,446 people. The population level based on gender was 53,471 male and 52,558 female. The percentage of 93% of the population of East Bogor Sub-District is Muslim. The number of population Village in East Bogor is as follows:

Table 2. Total Population Village

No	Village	Area (km^2)	Population 2016	Population 2017	Population Density (Km^2)	
					2016	2017
1	Sindangsari	0,9	10707	10817	11897	12019
2	Sindangrasa	1,06	15798	16172	14904	15257
3	Tajur	0,45	6608	6586	14684	14636
4	Katulampa	4,91	33484	34515	6820	7030
5	Baranangsiang	2,35	27324	27290	11627	11613
6	Sukasari	0,48	10816	10649	22533	22185
	Total	10,15	10816	106029	20319	10446

The establishment of places of worship is regulated in the Joint Regulation of the Minister of Religion and the Minister of Home Affairs No. 9 and No. 8 of 2006. Article 13 paragraph 1 states that the construction of houses of worship must be based on real considerations and needs based on the composition of the kelurahan / village area. The construction was 53,471 male and 52,558 female. The percentage of 93% of the population of East Bogor Sub-District is Muslim (Bapeda Kota Bogor, 2014). Houses of worship must also meet the administrative and technical requirements for buildings mentioned in Article 14 paragraph 1. Furthermore, in paragraph 2, some special requirements in the construction of places of worship are explained. First, the list of names and cards of users of places of worship must be at least 90 people, which is legalized by local officials. Second, the support of the local community must be at least 60 people authorized by the lurah or village head. Third, there must also be a written recommendation from the head of the district / city religious affairs department head. Finally, a written recommendation from the district / city FKUB (Forum for Religious Harmony) (Kementrian D, 2006). Worship facilities are a means of life to fill spiritual needs that need to be provided in a planned housing environment other than according to stipulated regulations, worship facilities are planned according to the wishes of the community itself with the number of residents who adhere to their respective religions. A regulated planning approach is to estimate the population and type of religion and belief and then plan the allocation of land and location for buildings of worship according to planological and religious demands (BSN, 2019).

GIS (Geographic information system) is a type of software that can be used for the input, storage, manipulation, display, and output of information and its

attributes related to the positions on the earth's surface and GIS is more scientific and efficient, in performing data analysis and spatial exploration functions (Qiong-Lin et al., 2020).It is being done through the capabilities of GIS on providing an ease monitor-ing, and detecting routes (Rezaei et al., 2020). GIS software allows users to view spatial data in a suitable format. the process of interpreting spatial data becomes easier and simpler (Luqun et al., 2002). Spatial correlation and autocorrelation play a significant rolein spatial modeling (Shariati et al., 2020). Geographical Information System(GIS) to map and visualize buildings and their occupants (Afnarius et al., 2020). By utilizing geographic information systems, in this study, the analysis of determining the shortest route for waste transportation is using Network Analysis and the Graph method.

B. MATERIALS AND METHODS

This research methodology uses hardware, namely a laptop, handheld gps Garmin 78s, camera. While the software used in this research is BaseCamp which is used for the process of downloading GPS data, the global mapper is used for the export and conversion process of GPS data, and ArcGis 10.1 is used for the process of editing, plotting attribute data, analyzing and making distribution maps of mosques located in the Sub-District East Bogor. Buffering functions to determine the optimal buffer radius to detect the distribution and capacity of mosques. In the next step, the detected mosques are combined into the map and corrected geometrically, topologically, and semantically (Liu et al., 2015). While the research steps can be seen in Figure 1 below:

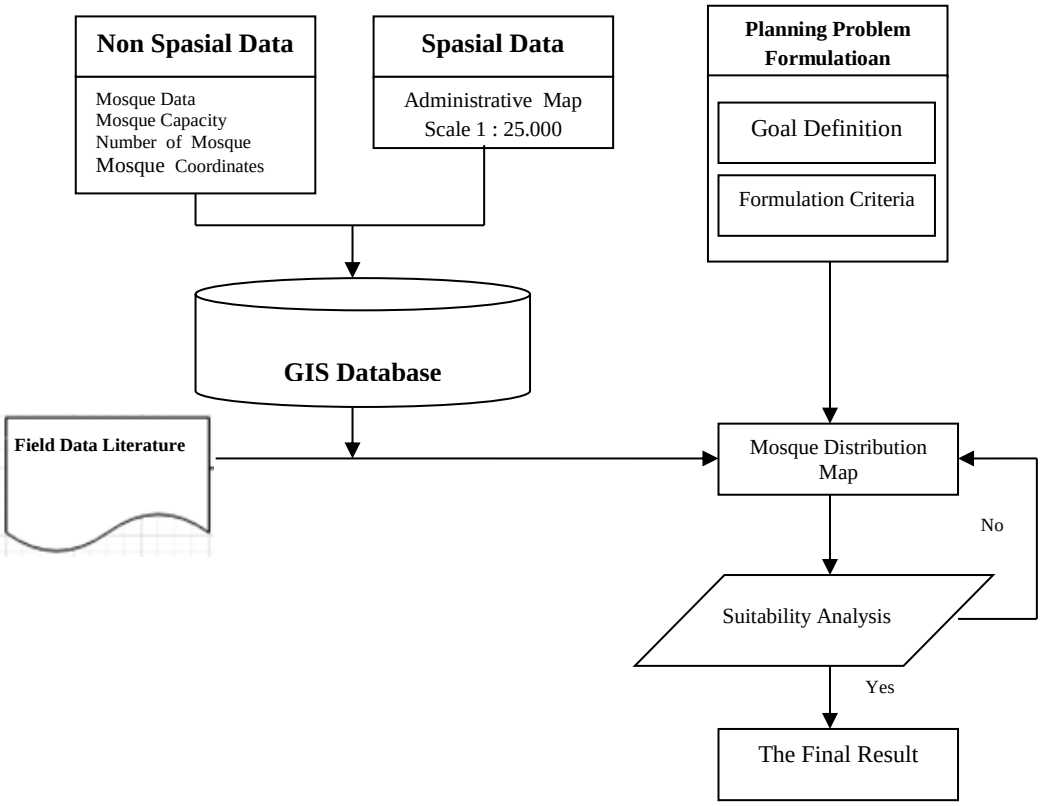

Figure 1. Framework Research

The process of implementing this research, apart from conducting a study of existing literature, also carried out field observations to determine the distribution conditions of the existing mosques. Data processing by downloading and exporting data from GPS using basecamp format (^ .gpx), in order to obtain the coordinates of the distribution of mosques in the format (^ .shp), buffering analysis is carried out to determine the reach of the community to access the mosque.

C. RESULTS AND DISCUSSION

Based on the survey results in the field, it was found that the distribution of mosques in each kelurahan has a total of 73 mosques. From the total data, the highest number of mosques is in Katulampa Village, as many as 27 mosques, while the least number is in Sukasari Village, there are only 3 mosques. The details can be seen in table 3. From the existing mosque data, it is processed using Arcgis 10.3 software. This process produces a map of the distribution of mosques in each sub-district in East Bogor Sub-District. The map of the distribution of mosques from each village can be seen in Figure 2.

Table 3. Distribution of Mosques in Each Village

No	Name of Village	Ammount of Mosque
1	Baranangsiang	18
2	Sukasari	3
3	Katulampa	27
4	Tajur	6
5	Sindangsari	8
6	Sindangrasa	11
	Total Number	73

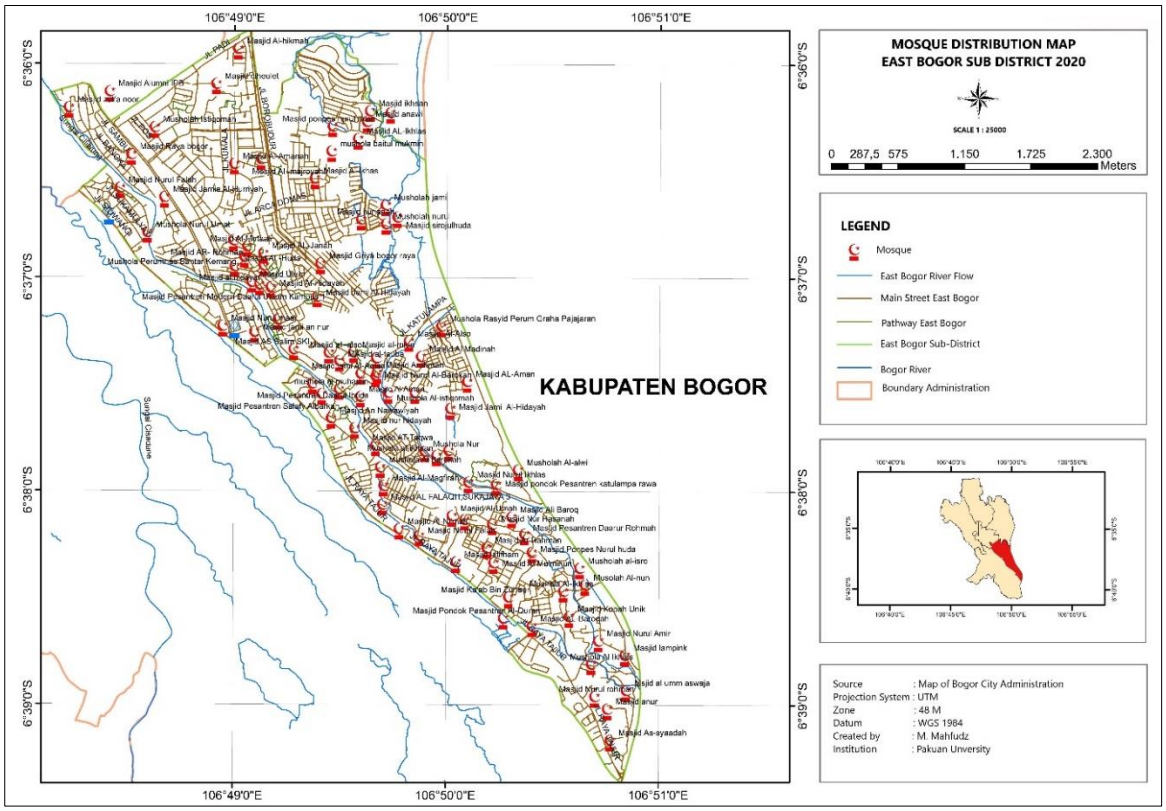

Figure 2. Distribution of Mosques in Each Village

Calculation of mosque capacity and radius of construction of mosques

The calculation of the capacity of mosques in each village is based on the equation:

KMi = JKM / JP x 100% ..... (1)
KMi: Capacity of the Mosque
JKM: Total Capacity of the Mosque
JP: Total Population

Based on the National Standardization Agency for SNI 03-1733-2004, the establishment of places of worship in urban areas where the radius of the farthest reaches of the community is 1,000 m2. In this study, it is assumed that the radius of the community to be able to access the

mosque is grouped into 4 categories, namely 100 m2, 250 m2, 500 m2, and the farthest is 1,000 m2. Based on these 4 categories, a buffering analysis was carried out of each mosque building in all villages in East Bogor Sub-District. The map of buffering results can be seen in the image below:

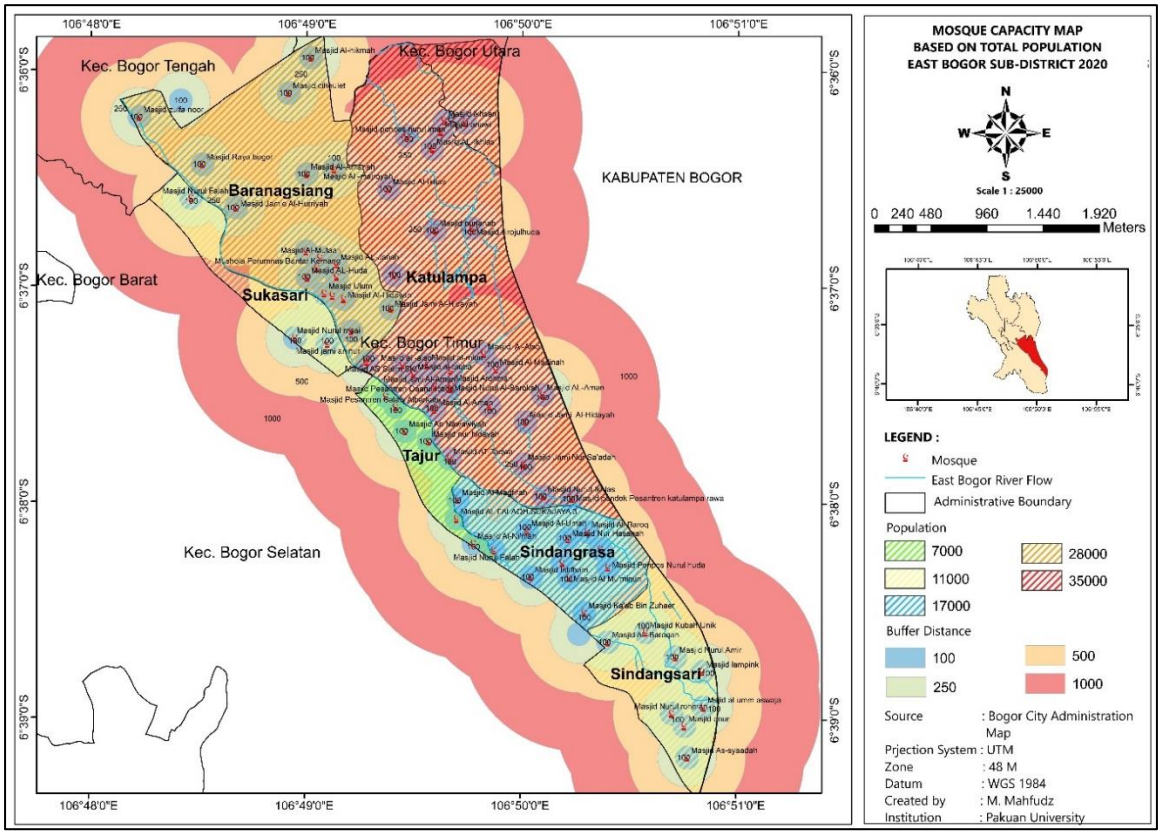

Figure 3. Mosque Capacity Map in East Bogor Sub-District

D. CONCLUSIONS

Based on the analysis in this study, it can be concluded that the geographic information system makes it easy to map and analyze the capacity of mosques. From the buffering analysis, all mosques in East Bogor District in terms of distance have met the criteria that have been set based on SNI 03-1733-2004 rules, namely 1000 m2 the farthest distance from each mosque. The capacity of all mosques in Barangsiang Kelurahan can accommodate 56.34% of worshipers, Kelurahan Katulampa can accommodate 33.50% of worshipers, Kelurahan Sindangrasa is able to accommodate 26.67% of worshipers, Kelurahan Sindangsari is able to accommodate 21.38% of worshipers. Kelurahan Sukasari is able to accommodate 21.72% of worshipers, while Kelurahan Tajur is

able to accommodate 42.70% of worshipers.

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