

## **MEGALITHIC STONE HERITAGE TRAIL MAPPING FOR RURAL TOURISM USING GEOGRAPHIC INFORMATION SYSTEM (GIS) IN TAMBUNAN, SABAH**

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### **ABSTRACT**

Heritage trail is an important part of rural tourism especially for community development, community participation, for discovering community heritage, and for involvement by community in developing trails to promote the history, natural and the cultural heritage of the area. One of the cultural heritages that are increasingly extinct is the megalithic stone ritual which was a daily practice in the lives of the people in the past. Megalithic stone can be found scattered in rural area of Sabah such as Penampang, Keningau, Kota Belud, Tuaran, Papar, Tenom and Tambunan. The megalithic stone or Menhir was usually used for worshipping the ancestral spirit. The megalithic stone is unique as it has many shapes such as flat, horn, triangle and round. However, this was not practice anymore and the stone is disappearing or broken one by one. Since the numbers of megalithic stones in Sabah are many, it is not feasible for all location of the stones to be gazetted for the preservation of the stones. Therefore, heritage trails is the best solutions that can be used to protect the stones and at the same time get the local community involved. However, in order to make it as one of the rural tourism in the area, several criteria need to be met to attract tourists to participate the heritage trails. These criteria include; accessibility to the megalithic site, near to accommodation, closer to other side attraction, transportation availability and support services around the area. Thus, GIS mapping is needed to assists this as it can show the suitability of the heritage trails location by identifying whether all the criteria can be found near the area. The purpose of this study is to show the effectiveness of GIS in analyse the suitability of the heritage trail route and its location for the tourists. In this case, the area of Tobilung village in Tambunan was used as a study area in this paper. Having known all the location for each criteria in the study area using google map, the proximity analysis was then conducted to identify the suitability of the heritage trail location. Based on the result, the heritage trail that features the megalithic stone in Tobilung, Tambunan is suitable for rural tourism as it has most of the criteria required for a tourist especially in terms of accommodation, transportation, places of attraction and services such as food and beverages, accessibility and utilities. This paper presents the significant role that GIS can play in rural tourism development in Tobilung, Tambunan and subsequently enhance the local economy of the village.

**Keywords:** Rural tourism, heritage trail, megalithic stone, GIS

### **1.0 INTRODUCTION**

Heritage trails are walking trails and driving routes in urban and rural settings that are identified in most cases by signage and guidebooks as relating to cultural heritage. The heritage might be built, or it can also be cultural heritage narrative. In most cases it is in public space. In many countries heritage trails are self-guided. However for the

interpretation of features and items of historical note, tour guides are required (Lai, 2009). In Malaysia, several heritage trails have been produced by local authorities or organization such as Kuala Lumpur Heritage Trails by Malaysia Trust of Heritage, Penang Heritage Trail and Melaka Heritage Trail sponsored by American Express Foundation, and Taiping Heritage Trail by Taiping Municipal Council (Lai, 2009). Heritage trail also can become part of the rural tourism as it can be used to promote the history, natural and the cultural heritage of the rural area to the tourists.

Megalithic stone is one of the cultural heritages that can be designated as heritage trail. The megalithic stone or menhir was usually used for worshipping the ancestral spirit. Menhir is a stone that is planted vertically or vertically and it is unique as it has many shapes such as flat, horn, triangle and round (Majid, 1993). It is also stated as a tall, unworked, large-sized stone block which often reached large sizes - up to 20 m and 300 tons. The name comes from the Celtic words: mean, men – stone and hir – long, high (Sudyka J., 2011). For larger or unstable rocks, some pebbles will be planted next to it to support it from collapsing. The weight of the menhir can reach up to hundreds of tons and is about 70 feet high. Menhir can be divided into several types: single menhir, paired menhir, clustered menhir, rounded menhir and carved menhir (Adnan et al., 2018). However, this was not practice anymore and the stone is disappearing or broken one by one. Since the numbers of megalithic stones in Sabah are many, it is not feasible for all location of the stones to be gazetted for the preservation of the stones. Thus, heritage trails is the best solutions that can be used to protect the stones and at the same time get the local community involved.

Therefore, in order to make it as one of the rural tourism in the area, the tourist demands and needs required to be given greater attention for the formation of heritage trail. These criteria include; accessibility to the megalithic site, near to accommodation, closer to other side attraction, transportation availability and support services around the area (Akukwe and Odum, 2014). This is also supported by Krzemińska (2018) which stated that adequate infrastructure, the accessibility of the area, catering and transport infrastructure, as well as frequent events and a properly designed website are factors that could help the development of archaeological tourism for the megalithic stone.

As the usage of Geographic Information System (GIS) provide specific capabilities for spatially referenced data as well as a set of operations for working (analysis) with the data (Wheatley et al. 2002), hence, the use of GIS for heritage trail mapping is essentially important to identify the suitability of the heritage trail site location.

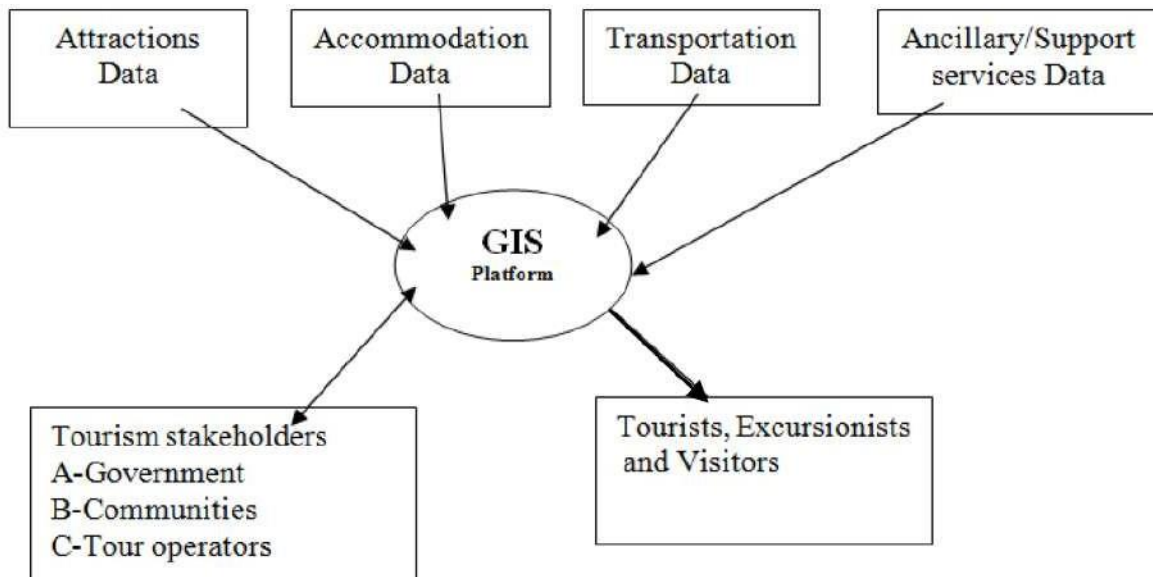
Having mentioned that, this paper would like to show the process of GIS that need to be conducted to identify whether the site location of the megalithic stone, as in this case in Tobilung, Tambunan, is suitable to become a heritage trail and have all or most of the criteria needed for tourists to go there.

## **2.0 THE ROLE OF GIS IN TOURISM**

Geographic Information Systems (GIS) is now becoming an important technology innovation in tourism planning and decision making (Akukwe and Odum, 2014). As stated by Avdimiotis and Christou (2002), "both GIS and tourism share a common characteristic, that is, both cross the boundaries of disciplines and application areas. GIS has been applied in many fields including geography, forestry, urban development and planning, and environmental studies. Similarly, tourism has been a subject of interest to geographers, economists,

business, environmental planners, anthropologists, and archaeologists". Thus, makes the applications of GIS in tourism potentially significant.

As shown in figure 1, based on Akukwe and Odum (2014), GIS can assist the tourists and the tourism stakeholders to obtain the information regarding the attractions data, accommodation data, transportation data and the ancillary/support services data. The ancillary/support services include food and beverages, toilets, utilities and accessibility (near main roads or pathways). Most of this information can be extract from the google map.



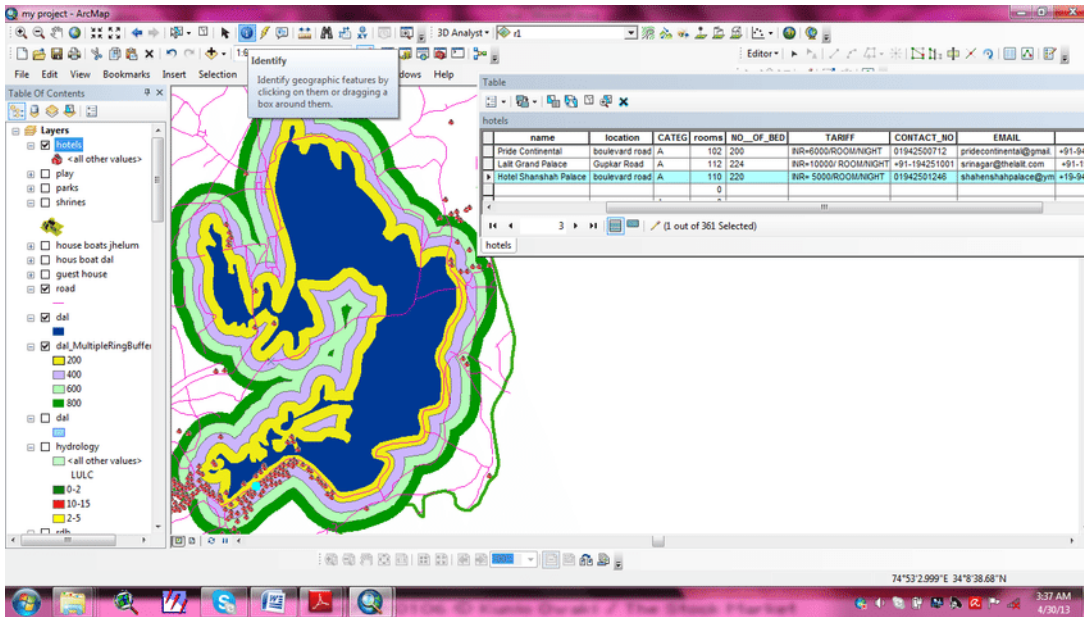
Source: Akukwe and Odum (2014)

**Figure 1: Role of GIS in Tourism**

In addition to the above, GIS can also perform queries and analysis (such as proximity) on large number of spatial and non-spatial data. At the same time, it is much more accurate and faster than manual analysis (Fadahunsi, 2011). The types of queries that can be done in GIS are such as following (Shamim Ahmad Shah and Muzafar Ahmad Wani, 2015);

- Where is the tourist destinations located?
- What is the shortest route to reach a particular destination?
- How is the geophysical environment of the destination?
- What is the best time of year to visit?
- What are types and class of accommodation available?
- What are distributional pattern of amenities and tourist products?
- Where are important shopping centers, ATM, parks etc. located?

An example of buffer analysis is shown in figure 2 in which 800 meter buffer has been developed around the lake with interval of 200 meters, as an option for the tourist to identify accommodation at suitable distance from the lake.

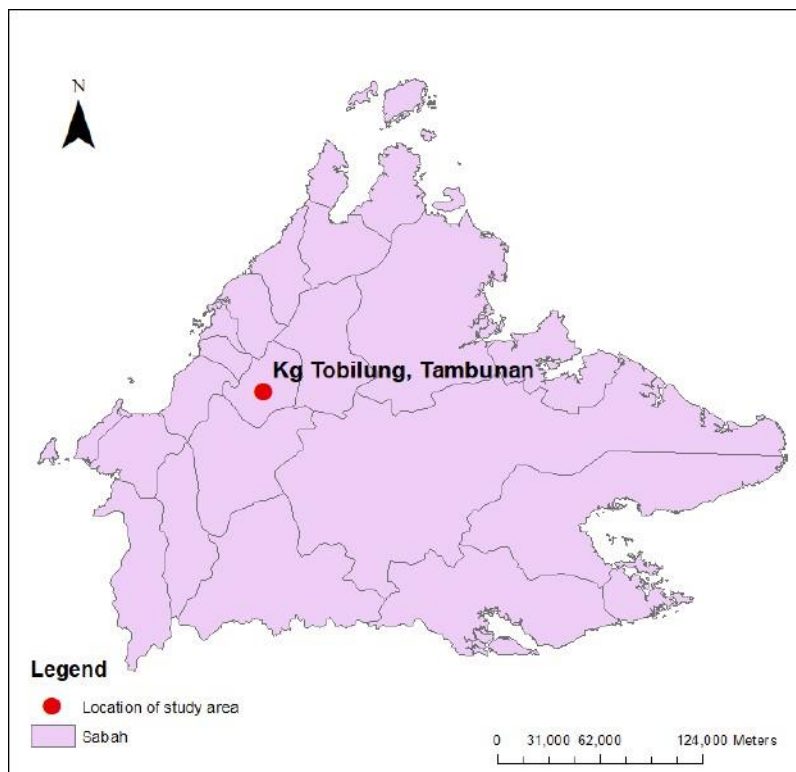


Source: Shamim Ahmad Shah and Muzafar Ahmad Wani (2015)

**Figure 2: Buffer analysis using GIS around the lake for**

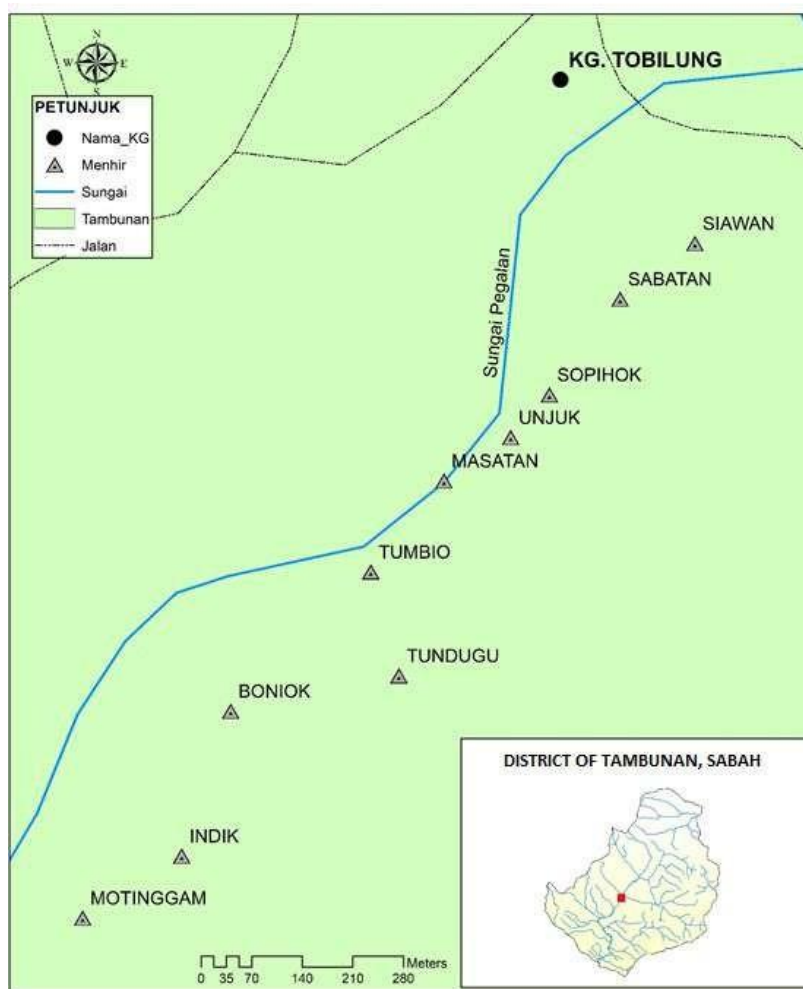
### 3.0 THE DATA AND STUDY AREA

The data from this study was collected from the Tambunan district of Sabah, Malaysia. In which the village of Tobilung was selected for this paper. Figure 3 shows the location of Tobilung village in Tambunan district of Sabah as the study area for this paper.



**Figure 3: Location of Tobilung, Tambunan in Sabah as study area**

In Tobilung, there are ten megalithic stones namely, Siawan, Sabatan, Sopiok, Indik, Masatan, Tumbio, Tundugu, Boniok, Unjuk and Motinggam. The location for each stone is shown in figure 4.













**Figure 4: Megalithic stone location in Tobilung, Tambunan**

Nine of the ten megalithic stones located at the paddy farm, while the other one, which is Siawan located under the coconut tree at the side of the villager's house. The function for all the megalithic stones in Tobilung is as the border stone for the paddy field area (Hill, 2003). The name and photo for each stone is shown in Table 1.



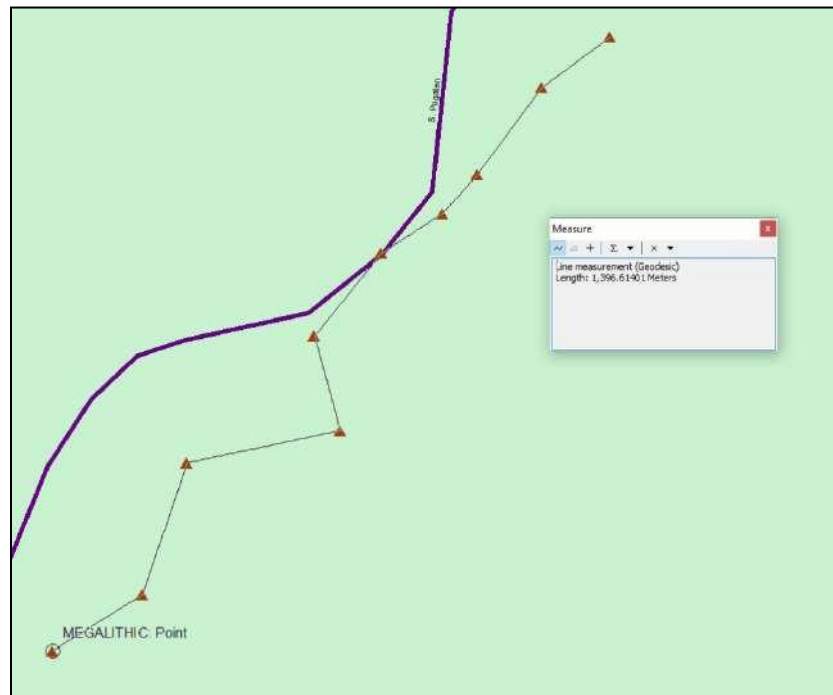
**Table 1: Megalithic stone description in Tobilung, Tambunan**

 <p>Siawan</p>	 <p>Sabatan</p>	 <p>Sopiok</p>
 <p>Masatan</p>	 <p>Unjuk</p>	 <p>Tumbio</p>
 <p>Tundugu</p>	 <p>Boniok</p>	 <p>Indik</p>
	 <p>Motinggam</p>	

**Source: Kong (2019)**

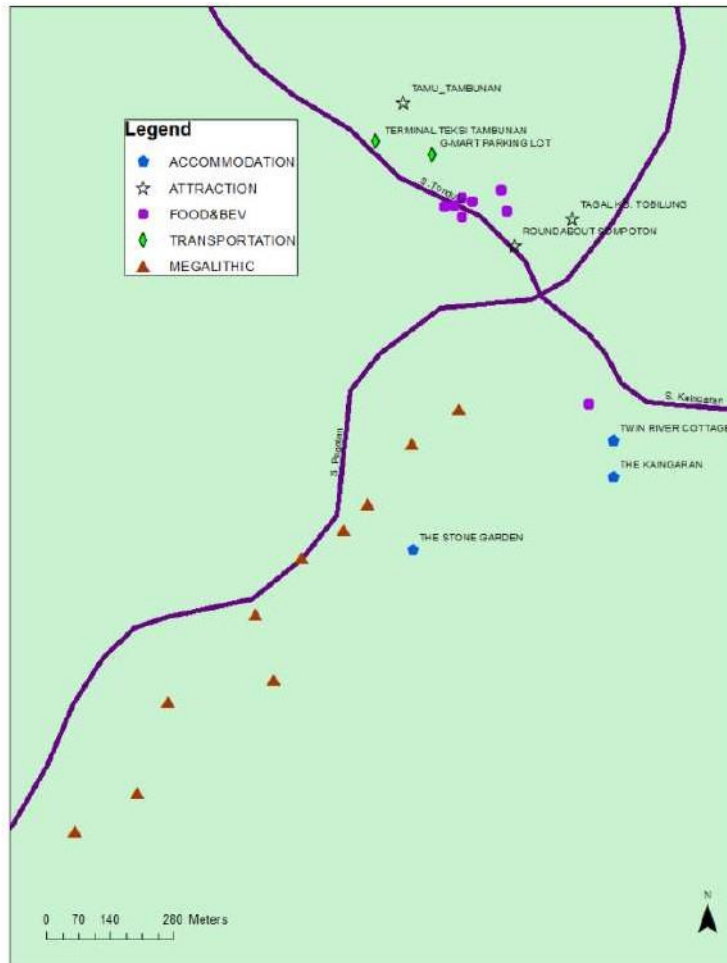
#### 4.0 GIS PROCESS AND RESULTS

By using GIS to calculate distance between the megalithic stones involved in Tobilung, it can be said that all the stones is near to each other within walking distance. Figure 5 shows the distance conducted by using GIS measurement tools. The distance between each stone is between 79 meters to 239 meters and the overall total of the distance is 1,396 meters or 1.4 km. This shows that the tobilung's megalithic stone heritage trail is suitable as it does not require tourist to do long walking distance. The tourists can walk easily to each of the stone in which they can enjoy the paddy field scenery while admiring the story or function of the stone.



**Figure 5: Megalithic stone location in Tobilung, Tambunan**

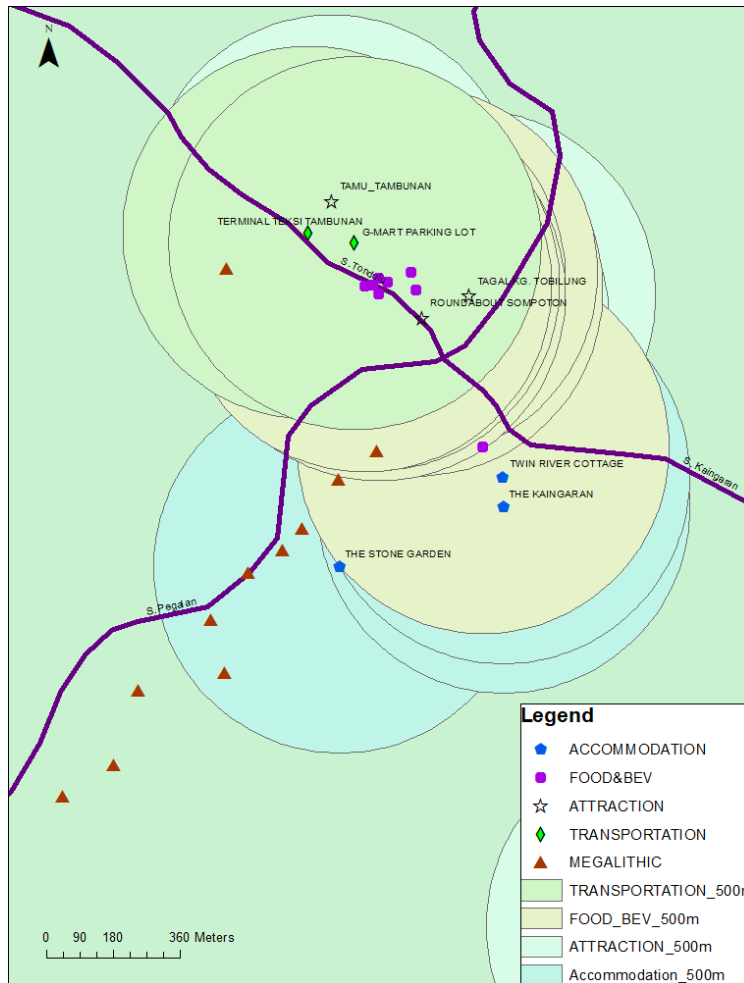
As mentioned by Akukwe and Odum (2014), the criteria needed for tourists in a tourism area, must consists of the places of attractions, accommodation, transportation and the ancillary/support services. All this criteria was collected in Google map and converted into points in GIS Map. Figure 6 shows the location of each of the criteria near the tobilung megalithic stones.



**Figure 6: Tourist criteria location near the site of the megalithic stones**

The location for each of the criteria will be analysed using proximity tools in ArcGIS to determine whether it is near to the location of the heritage trail. Figure 7 shows the output of the proximity analysis for each criteria within 500 meter. Based on the output, most of the criteria is within 500 meter walking distance to the nearest megalithic stone. This shows that the Tobilung megalithic area is suitable to be a rural tourism area as all the criteria that needed for tourists can be found there. Therefore, the suggested heritage trail site in Tobilung is suitable to be developed for rural tourism in the area.





**Figure 7: Proximity distance of 500m of the tourist criteria**

## 5.0 CONCLUSION & DISCUSSION

Based on the results, the heritage trails not only suitable for tourists from all ages as the trail are not far away and easily accessible, but the paddy field scenery will also surely provide an invaluable experience for the tourists and at the same time it showcase the villagers way of life.

The arrival of tourists can also boost the economy in Tobilung as the villagers can gain benefits from this by providing the food and beverage and services such as transportation and accommodation to the tourists. The places of attraction available in Tobilung can also generate income to the villagers from the entrance fees and the selling of handicrafts. These are also the criteria needed by the tourists to come to Tobilung to experience the megalithic stone trail. This will enhance the rural tourism in Tobilung, Tambunan.

This paper shows the capabilities of GIS in determining the suitability of heritage trail in the area and at the same time identifying the nearby criteria for tourist to the heritage trail site. This was conducted using the measurement tools from GIS that can estimate the distance of the heritage trail to determine its suitability for tourists in all ages. Subsequently, the proximity analysis with 500m radius can determine the nearby criteria to help the

tourists to obtain accommodation, transportation services, food & beverage and side attraction. Therefore, the objectives of this has achieved and this will help the tourism stake holders and tourist in planning and decision-making with less cost, save time and less manpower needed.

Finally, there are many other megalithic stones in Tambunan in different location with challenging routes. This might be suitable for those who like long distance walking or hiking. GIS can help identify suitable route for this using different method such as viewshed and Least Cost Path Analysis (LCPA). This can be conducted for future study.

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