

Assessment the accessibility of poverty distribution to infrastructure and facilities in Perlis Malaysia

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Abstract. The poverty eradication program was introduced and planned since 1970 in Malaysia and has successfully reduced the incidence of poverty from 49.3% in 1970 to 8.7% in 1995 and further reduced to 0.4% in 2016. Although the overall figure shows a reduction, the reality of relative poverty and the poverty gap is increasing. There are many of the efforts undertaken by the government are more focused on job opportunities and income of the household. Furthermore, poverty eradication programs that focus on basic needs are difficult to identify the infrastructure and facilities capable of providing maximum service for all levels of society. For example, facilities and infrastructure are more concentrated in the urban areas that make it difficult for poor people to access. This study focuses on infrastructure and facilities such as road access, education and health. In addition, this study will also analyze elements for the distribution of poor households for access to the facilities and infrastructure provided. The study was conducted by using network analysis OD Cost Matrix and Buffer Analysis infrastructure using geospatial data including land use, e-kasih data and facilities and infrastructure offered. The results show that there is a significant relationship between the distribution of poor households and the facilities & infrastructure provided. The findings of this study will provide spatial guiding guidance to the authorities to implement the national transformation of physical development and improvement in the national poverty eradication program so that people can enjoy a better life

1. Introduction

Poverty has become a country agenda that has long been drafted by most countries in the world. This is because poverty is a synonym issue in all developing and developed countries. The Millennium Development Goals (MDGs), officially introduced in 2000, outline some objectives to achieve. Two of the key objectives of the poverty issue are eradicating hardcore poverty and famine, and achieving a universal educational foundation. In the objective of eradicating hardcore poverty and starvation, it is to achieve the goal of reducing half of the ratings for people earning a dollar a day.

While achieving universal policy goals is to ensure that all boys and girls complete the basic or elementary schooling. In Malaysia in particular, the New Economic Policy (DEB) introduced in 1971-1990 outlines two main objectives of eradicating poverty and restructuring the society. Its continuity,



the National Development Policy (1990-2000) and so on. (2001-2010), all of which have been planned to build and plan for people to enjoy a better life.

Overall, the incidence of poverty in Malaysia has been declining since the introduction of the New Economic Policy in 1971. In 1971, the incidence of poverty in Malaysia was 49.3% and declined to 12.4% in 1992 and further down to 0.4% in 2016. However, indicating that incidence of rural poverty was higher than that of the City where in 1970 the incidence of urban poverty was 58.7% compared to the urban of 21.3% and decreased to 1% for rural areas in 2016 and 0.4% of urban. Poverty in Perlis shows a reduction every year. According to the poverty incidence report released by the Economic Planning Unit of the Prime Minister's Department, in 1970, Perlis recorded a poverty incidence of 73.9%, down to 21.3% in 1992. In 2016, Perlis recorded a poverty incidence of 0.1%. Although the numbers are declining, in reality the total household income does not reflect the overall level of household poverty due to many other factors such as shelter, crop yields for rural communities, basic cost requirements, and utility.

At present, there are about 2.7 million B40 households with an average monthly income of RM2,537. In the wake of Malaysia's continued development and prosperity, the B40 household should not be left out of enjoying the opportunities resulting from the country's prosperity. If B40 households continue to be in their current socioeconomic position, this will cause social costs to the country by reducing the number of skilled workforce needed and impacting the country's output growth. Reports from the Economic Planning Unit of 2014 show that Perlis recorded the lowest nominal GDP rate in Malaysia for 2014 and remained unchanged from 2012 while the nominal GDP per population was the fourth lowest figure after Kelantan, Kedah and Sabah. In addition, nearly 767,000 households are in income below RM2,000. Perlis showed a high percentage, especially in revenue below RM6,000 at 80.3%, the third highest after Kelantan and Perak. Therefore, in this study, geospatial technology will be used to assess the access of poor households to gain access to secondary schools and health facilities

2. Background study

The results of the Household Income and Basic Income Survey Report 2016 show that the Poverty Line Income 2016 (PGK) amounted to RM 3,000 for under 40 (B40). In the definition set forth by this World Bank, it can be divided into two main aspects. First is the basic requirement while the second is the standard of living. In addition, poverty is defined as a lack of physiological needs such as food, beverages, shelter and so on. Each researcher gives an idea of poverty based on different perspectives according to their views. [1] for example defining poverty as a situation where individuals or families can not enjoy basic necessities in life such as food, shelter, clothing and non-physical needs such as health, education, community engagement and so on.

Another problem that often arises is when to define the level of poverty measurement. Many of the efforts previously undertaken include international agencies especially the United Nations (UN) and the World Bank to define the diversity of poverty dimensions as it is too subjective to be explained directly to the situation. [2] has developed a model for analyzing the nearest distance and convenience for each distribution. But in that study [3] has used factors such as car speed limits to pass the route. [4] in a study in Kelantan has analyzed patients' access to treatment for nearby health facilities where the findings show that patient access to health facilities is within a low range of health facilities locations.

One of the method and dimension used to measure poverty is by using a combination of data between census data and survey data and several other indicators to measure poverty more efficiently. [5] outlining other factors such as hunger, lack of nutrition, access to clean water, illiteracy, lack of health access and social isolation need to be considered. A study in Indonesia relating to infrastructure utilizing research areas in rural areas are districts (kotamadya/kabupaten) has shown the results of the study that the supply of road facilities has provided significant results to the improvement of the poverty level in the area [6]. [7] for example have used proximity analysis to analyze the planning of building a new construction area for the shop. B40 is the poorest group in the bottom 40 income group

[8]. According to reports by the Economic Planning Unit in 2014, the B40 household income was at RM 2848 and subsequently increased to RM 3000 by 2016 [9].

3. Methodology

This study aims to evaluate the distribution of poverty to obtain basic education and health facilities available in the State of Perlis. The location and position of the school and its health facilities are important for analyzing poor household access to the basic amenities. The location of each poor household and facilities has been mapped to analyze access spaces for each poor household distribution. A total of 603 poor households have been mapped in this study as well as 29 secondary schools as well as 32 health clinics have been mapped to assess each access. Each sample of poor household distribution was obtained from the Economic Planning Unit, Prime Minister's Department of Malaysia. While the sample data for school and clinic facilities was obtained from the Perlis Town and Country Planning Department. In this study, each sample of poor household distribution will be measured double the level of availability for each facility provided by OD Matrix Cost method with ArcGIS 10.3. The buffer analysis method is also conducted to analyze the distance of the poor housing environment to the facilities offered.

4. Study area and data

Perlis is a state located north of the peninsular Malaysia was chosen as a study area. It is bordered by Thailand State, Malaysia-Thailand international border distance and is estimated to be 99.57 km and neighboring with the State of Kedah with a distance of 47.43 km while the coastal size of up to 20.91 km. Perlis is a less developed country and there are about 30,900 people categorized as the B40 class of 16,800 in the City and 14,100 in the City according to data by the Economic Planning Unit of the Prime Minister's Department in 2014. Meanwhile, the census in 2015 shows the State Perlis has 246,000 population. In 2020, the population of Perlis is expected to be 260,800 according to population projection figures released by the Perlis State Economic Planning Unit and is expected to increase to 321,900 in 2040.

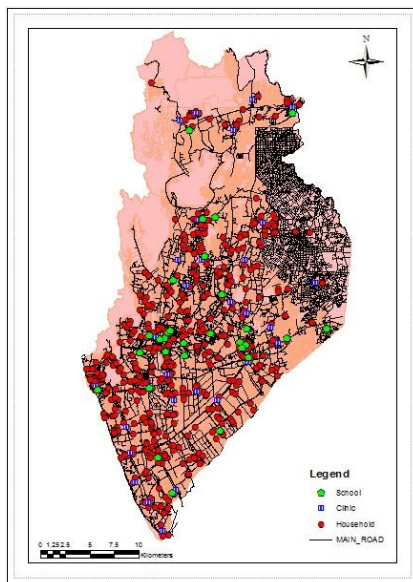


Figure 1. Poverty household and facilities distribution

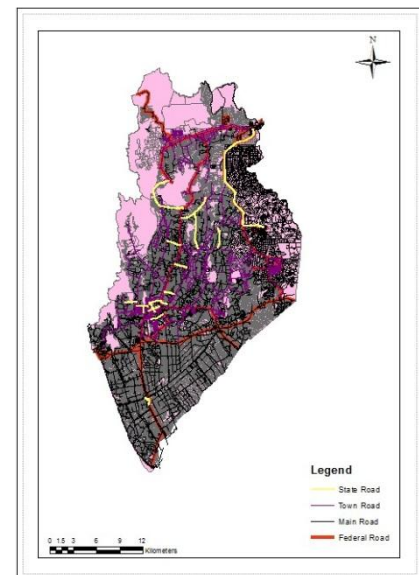


Figure 2. Roads used in this study

In this study, poor household distribution data is derived from the E-Kasih system from the Economic Planning Unit of the Prime Minister's Department of Malaysia involving the mapping of 603 low-income households. Subsequently, land use data was also obtained from Perlis Town and Country Planning Department for the latest updated year June 2016. The distribution of poor

households, secondary and clinic facilities has been mapped (refer to Figure 1) using the Global Positioning System (GPS). All this data has been developed in ArcGIS 10.3 software. The department involved in the preparation for this study is the Town and Country Planning Department for data on the list of facilities and land use data, while the Economic Planning Unit of the Prime Minister's Department and the Economic Planning Unit of the State of Perlis.

In the data view, road data was also shown in Figure 2 which includes road data such as state roads, town roads, main roads and highway roads obtained from the Perlis Town and Country Planning Department.

5. Result and discussions

In this study, focusing on the calculation of the distance for each poor household to gain access to secondary education and health clinic facilities. This is because, poor households have limitations in moving because of low income making it difficult for them to have a basic vehicle. Figure 3 (i) shows poor households on secondary school facilities. A total of 17 poor households, about 0.3%, are within 1.6 km of the school as outlined by the Town and Country Planning Department of Peninsular Malaysia, Ministry of Urban Wellbeing, Housing and Local Government for the year of 2013 [10]. For poor households next within 1.6 km up to 3 km is a total of 25 poor households which is a reasonable rate for poor walking households ranging from 0.8 km up to 3 km [11]. The rest of the poor households are within 3 km up to 10 km. For poor households with motorists, they probably do not have a problem as at because assume that at least the basic vehicle for poor household at least has a motorcycle.

Figure 3 (ii) shows poor households to gain access to health clinics facilities. Guidelines by the Town and Country Planning Department of Peninsular Malaysia, Ministry of Urban Wellbeing, Housing and Local Government for the 2013 update year have set construction for each health clinic facility for an estimated 1000-4000 population capacity for a rural clinic and type 1 health clinic with approximate approx 800-1000 people. At an estimated population estimate, 390 poor households were below 10 km distance to the clinic, which is about 64%.

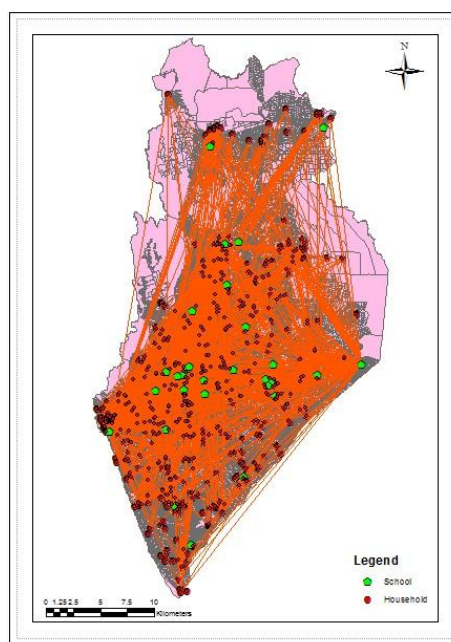


Figure 3 (i). OD Cost Matrix poor households to secondary school

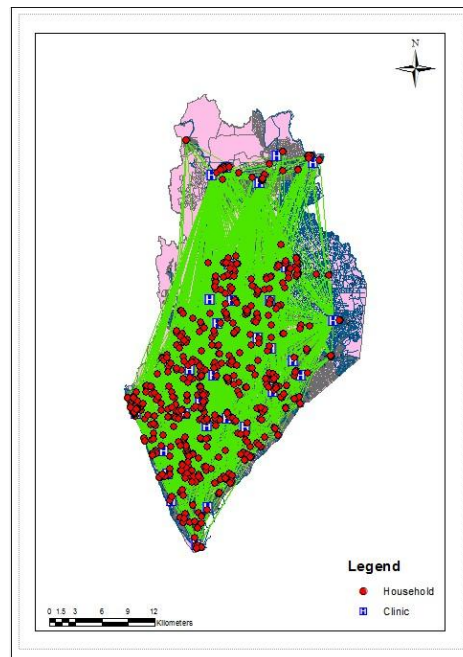


Figure 3 (ii). OD Cost Matrix poor households to health facilities

In this study, the buffer analysis method was also used to analyze the area services offered by the secondary school facilities and clinic health facilities. For school buffer analysis conducted at a distance of 1.6 km at a rate set by the community facility guidance guide, 393 of 603 are within a reasonable distance to walk to school. While for buffer analysis for health clinic facilities, 469 poor households were within 2 km of the area facility [12]. Of the total, 101 poor households have diseases such as gout, diabetes, asthma, kidneys, heart and cancer. Refer to figure 4 (i) and (ii)

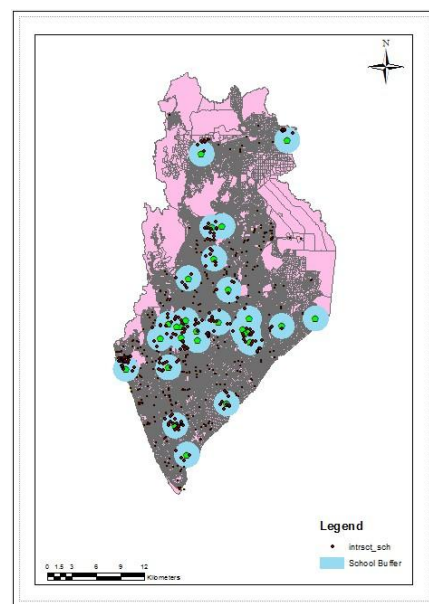


Figure 4 (i). Secondary School Buffer

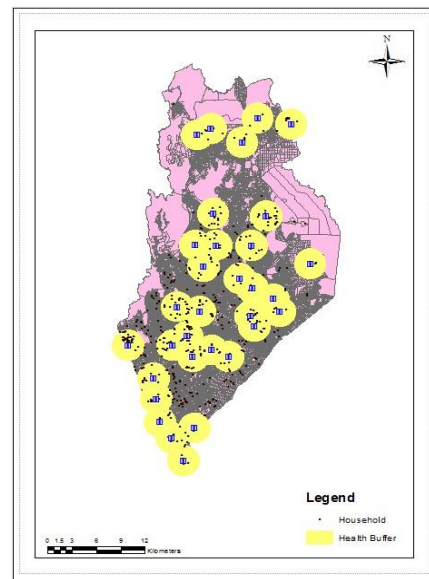


Figure 4 (ii). Health Facilities Buffer

6. Limitations of the study

This study is limited to the use of OD Cost Matrix method to analyze the distance of poor households to gain access to secondary school facilities and health clinic facilities by looking at some of the nearest multiple facilities. Research is limited and unable to analyze other factors such as traffic congestion, population density, unofficial roads on data constraints in this study. This study also looks at the ease of secondary school as all poor households have elementary primary education. The study is also limited to the health clinic facilities and does not include hospitals because in the State of Perlis there is only one hospital offered. In addition, this study is also limited to buffer analysis that covers the distance directly without obstacles as opposed to by road because the buffer analysis looks at the facility position to poor household placement.

7. Conclusion

This study has emphasized the distribution of poor households to gain access to secondary education as well as access to basic health facilities offered by the government through road access. The results of the study will also help the authorities to plan and develop facilities and access to community facilities and infrastructure to poor households using the Geographic Information System (GIS) method. Although infrastructure access tends to be built in the city center, most households face access problems in terms of distance. This study has the potential to contribute location analysis and structural changes to poor households in Perlis State. In addition, this study also has the potential to be modeled and applied for other unpredictable areas such as access to food security.

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