Spatial Analysis: Ageing Population of Multi-ethnic in Rural Area, Malaysia

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Abstract:

Malaysia is expecting to reach aged nation status within the next decades, which will provide significant challenges in social and economic development. Malaysia's population is unique, which comprise multiple ethnicities. This paper focused on three major ethnic groups; Malays, Chinese, and Indians. These multi-ethnic population have undergone different pace of demographic transitions amidst rapid social and economic changes. This article will examine the situation of population ageing in Malaysia's rural area from an ethnic perspective as well as the spatial distribution of the rural regions in Malaysia. The Department of Statistics Malaysia (DOSM) estimated that the number of older generation age 60 and above is expected to reach 5.8 million in 2030, making up about 15 per cent of the total population. Out of 2.2 million Malaysians elderly recorded during the 2010 census, the data propose the different rate of ageing among Malays, Chinese and Indians. Multi-ethnic has its challenge, and there is an urgent need to promote active and productive ageing together with family and community care for older people, as well as to improve health services. This study could provide valuable lessons to other developing countries that will experience the ageing population soon.

Keywords: *Spatial distribution; Population Ageing; Ethnic groups; Rural Ageing; Geographic Information System.*

Introduction:

Ageing population or senior citizens is defined as a demographic process in which the proportion of persons aged 60 years and above in a country increase. The latest world population ageing report indicates that population ageing is a worldwide phenomenon and has been recognized as one of the four global demographic "megatrends" (United Nation, 2019). Malaysia was also experiencing growth in the size and proportion of older persons in their population. Forecast by the Department of Statistics Malaysia (DOSM) revealed that Malaysia would be an ageing nation by 2030 when 15 per cent of the population (5.8 million) are classified as senior citizens. According to Chai & Hamid (2015), developed countries such as France and Sweden took 115 years and 85 years respectively to double their population aged 65 years and above from 7 per cent to 14 per cent while developing countries such as Thailand and Malaysia will take about 20 years to reach this level. Multi-ethnic and multi-cultural society in Malaysia was created from the massive influx of immigration process of foreign migrants from China and India (Karim, 1997). Malaysia provides a unique insight of divergence in population ageing of different sociocultural subgroups within a country in Asia. Thus, the main ethnic groups in Malaysia are the Bumiputras (which consists of Malays and other indigenous groups), Chinese and Indians. The ageing effect is also more pronounced in rural areas than urban locations due to migration, loss of the younger population to the cities (Hamid and Yahaya, 2008) and trend for people to retire in rural areas (Karim, 1997). The statistics on rural areas in the past has been referred to as the boundaries related by DOSM. Rural population refers to areas with a population less than 10,000 people, economics activities based on agriculture and natural resources in which its population either clustered, linear or scattered. Therefore, this study will attempt to identify the situation population ageing in Malaysia's rural area from an ethnic perspective as well as the spatial distribution of the rural regions in Malaysia. The 2000 and 2010 period were made as the base year to look at this phenomenon. Geographic Information System (GIS) was used to analyse the existing spatial distribution pattern related to population density and rural area throughout Malaysia for the years 2000 and 2010.

Methodology:

Malaysia is separated into two regions, Peninsular Malaysia and Borneo's East Malaysia and consist of thirteen states and three federal territories. The study areas include all states and districts in Malaysia. The primary source of data was from Population and Housing Census (Census) data and population projection by DOSM from years 1970 till 2040. Two levels of data were used and analysed, which is population data by age group and senior citizens data by ethnicity group in the rural area. Population data by three main age groups such as children and young adolescents (0-14 years old), the working-age population (15-59 years old) and the elderly population or senior citizens (60 years and older) were used.

Meanwhile, data on ethnic groups only focus on three major ethnic groups in Malaysia which is Malay and Bumiputera, Chinese and Indians. The spatial distribution of the Malaysia multi-ethnic senior citizens will be analysed for rural areas. Therefore, data on elderly population from the 2000 and 2010 census will be selected for further analysis. Analysis of the spatial distribution mapping was based on the application of GIS by using ArcGIS 10.5.1 software. From the result, the states with the most senior citizens population will be identified and analysed.
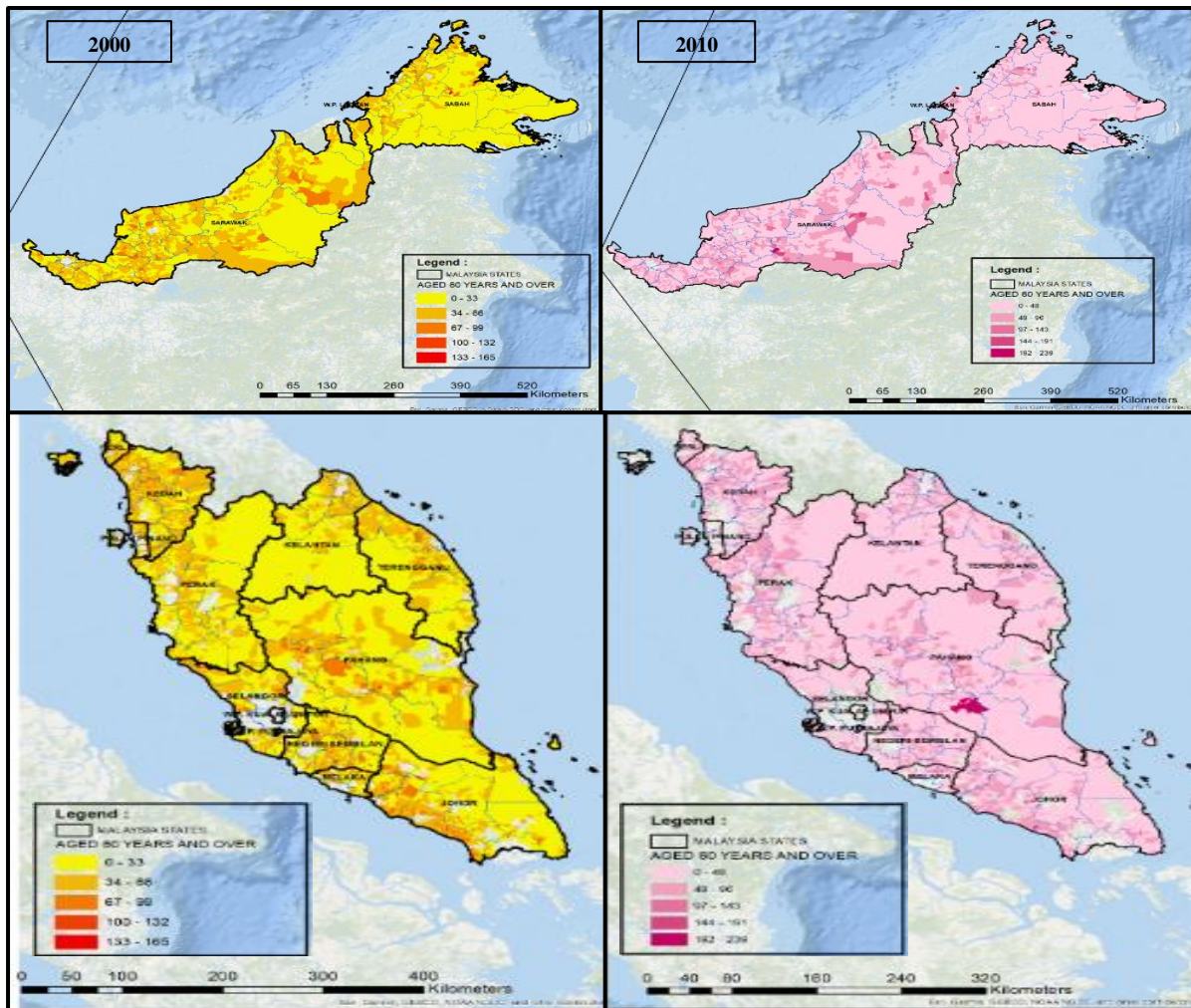
Result:

Figure 1 Spatial Distribution of Senior Citizens in Rural Area, Borneo's East Malaysia (above) and Peninsular Malaysia (below) in 2000 and 2010 (Sources: Population and Housing Census 2010, DOSM)
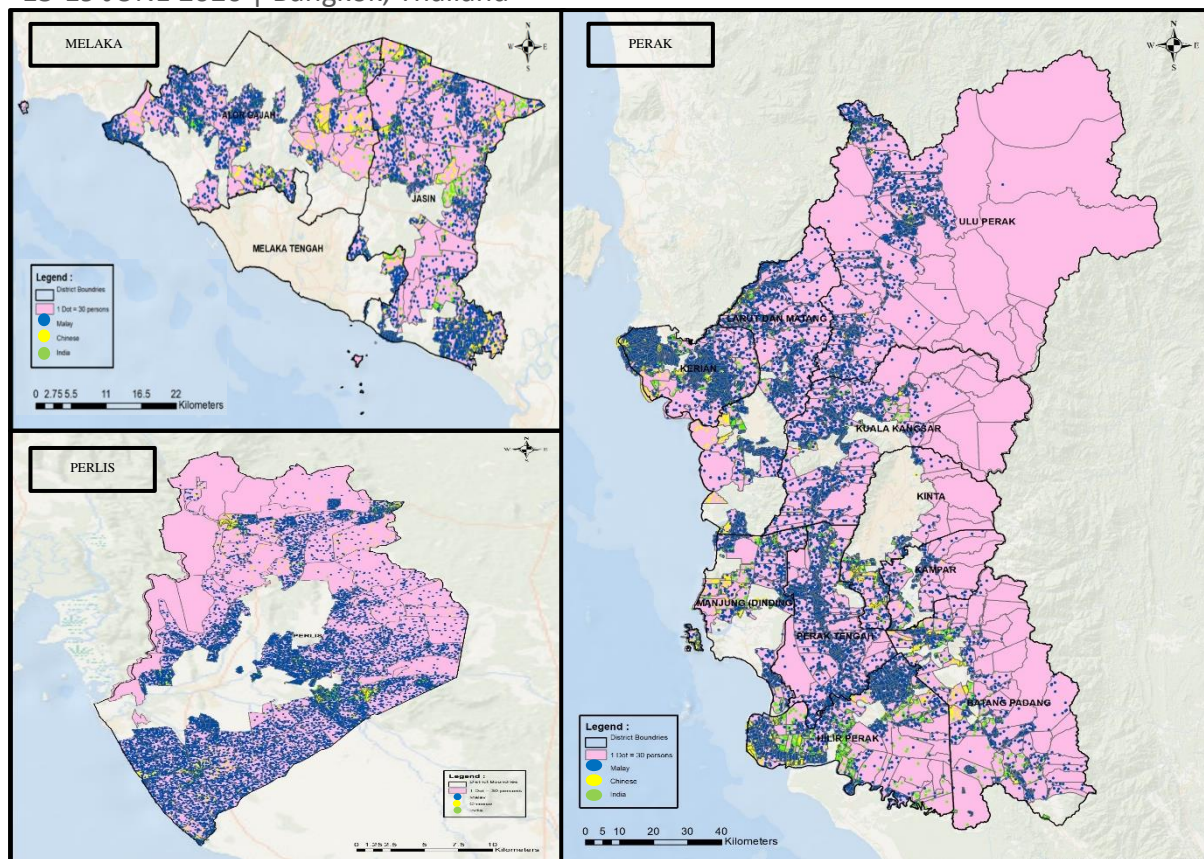
Figure 2 Spatial Distribution of Senior Citizens by Ethnic in Melaka, Perlis and Perak, 2010 (Sources: Population and Housing Census 2010, DOSM)

Table 1 Population and Projected Population of Malaysia by Age-Group 1970 - 2040

Year	0-14 years		15-59 years		60 & above years		Total
	No. ('000)	%	No. ('000)	%	No. ('000)	%	No. ('000)
1970	4847.4	44.5	5442.8	50.0	591.6	5.4	10881.8
1980	5542.5	39.9	7577.3	54.6	759.6	5.5	13879.4
1990	6774.9	37.4	10312.0	57.0	1015.6	5.6	18102.5
2000	8003.1	34.1	14040.7	59.8	1451.2	6.2	23495.0
2010	7822.1	27.4	18518.1	64.8	2248.6	7.9	28588.8
2020	7911.8	23.4	22121.4	65.5	3749.0	11.1	33782.2
2030	8082.3	21.2	24161.4	63.5	5818.4	15.3	38062.1
2035	7917.8	19.9	25005.0	62.7	6956.6	17.4	39879.4
2040	7726.2	18.6	25546.3	61.6	8230.7	19.8	41503.2

Source: Department of Statistics Malaysia

Table 2 Distribution of Older Persons by Stratum 2000 – 2010

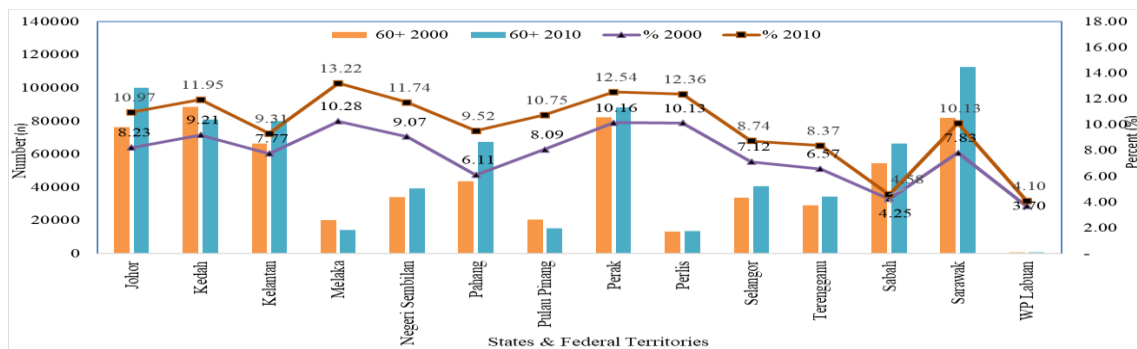| Year	Urban		Rural	
	(`000)	% in stratum	(`000)	% in stratum
2000	733.72	5.35	629.29	7.42
2010	1,471.00	7.25	777.70	9.37

Source: Department of Statistics Malaysia

Figure 3 Senior Citizens Population in Malaysia's Rural Area 2000 and 2010
Source: Department of Statistics Malaysia

Discussion:

According to Pala (1998), from the time when the United Nations World Assembly on Ageing in 1982 at Vienna, Malaysia has been using the "60 years and over" borderline as the cut-off point in deliberating ageing trends. The 2010 Census recorded a total of 2.2 million older persons in the country, which means that 1 out of every 13 persons in Malaysia today is 60 years old or older. The proportion of older persons in Malaysia has risen from 5.4 per cent in 1970 to 7.9 per cent in 2010. When compared with the number of older persons in the 1990 and 2000 Census, the elderly population has clearly shown a significant percentage increase. Table 1 shows the rise of the ageing population in Malaysia since 1970. Older person composition in Malaysia is expected to grow more than twofold from 1970 to 2020, which is 5.4 per cent to 11.1 per cent and expected to reach 19.8 per cent by 2040. By this, Malaysia is assuming to become an ageing nation by the year 2030, that is consistent with UN medium variant projections, Malaysia will achieve full "aged" nation status in 2035.

Table 2 shows the distribution of older persons by stratum in the years 2000 and 2010. Based on the percentage in stratum, senior citizens in the rural area consistently has shown a slight rise in both years. There exist some exciting patterns by location and space when underwent analysis on spatial distribution in the rural area (Figure 1). From the figure, we can see the concentration of senior citizens in Malaysia's rural area through changes pattern in monochromatic colour scheme in the map. In Malaysia, based on projection 2020, the percentage of senior citizens is 11.1 % as it shows that in one country there are many older people. However, it appears that Malaysia has 16 states, but only 14 states have urban and rural areas. Out of the 14 states, more than half of the states have reached the 'ageing state' based on its high percentage of senior citizens. Tey *et al*. (2019) indicated in 2010, two districts and 98 mukim were already classified as having an ageing population, and the number of districts and mukim with an ageing population has probably increased to about 12 and more than 200 respectively today. Sarawak has the largest population of older persons aged 60 years or above in 2010, but it is still a relatively young state. Compared to Perak, the state with the highest percentage of older persons (12.54%) (Figure 3). States that have small populations might remain aged as it attracts elderly rural population from other states such as Melaka and Perlis.

According to Yaakob, Masron & Masami (2009), Perak showed the most senior citizens spatial variation in 1991, and 2000 census and the concentration of ageing population distribution in 1991 was in the districts in the west coast (Kedah, Perak and Selangor). The distribution pattern in 2000 also showed almost similar to the 1991 census. Figure 1 shows the comparison distribution of senior citizens population by states and districts in the year 2000 and 2010, and related distribution pattern also was found in the 2010 census. The findings of this study showed similarity with a model whereby rural areas have older populations than urban regions shared across the Global North (Philip *et al*. 2012). Coastal cities on the west coast will become an area of attraction and concentration area for senior citizens or pensioners with higher education and standard of living background as discussed previously (Yaakob, Masron & Masami, 2009). Philip and MacLeod's study (as cited in Currie & Philip, 2019) support that demographic ageing in rural areas is mostly the outcome of the long-term and out-migration of young adults. The in-migration of mid-life individuals who then aged at the new place, and the in-migration

of pre-retired and retired adults. The reasons midlife and later life adults are attracted to the proximity of the rural area to the attractive country side and the scenic regions, lower housing costs, a perception of increased security and peacefulness, and assumptions that rural areas support better social networks than those found in urban areas.

From the spatial distribution of senior citizens population in Malaysia's rural area 2010, there are three states with the highest percentage of senior citizens. The states were Melaka (13.22%), Perak (12.54%) and Perlis (12.36%). The spatial distribution for the ethnic groups in these three states is shown in Figures 2. The majority of the ethnic in these three states were Malays and Bumiputera ethnic, followed by Chinese and Indians ethnic. However, the distributions of the Chinese population were found to be higher in urban areas such as Pulau Pinang, Kuala Lumpur, Perak and Negeri Sembilan. Ethnic differentials in fertility and mortality caused the demographic transition to be experienced by different ethnic groups at different rates. This will ultimately lead to differences in population growth rates and population ageing among the ethnic groups (Karim, 1997). Leete said in their study "the dual fertility transition attributed to the main causes of ethnic differentials in population ageing. The value systems, including Islamic practices and cultural norms of the Bumiputera, are less supportive of the notion of birth control, as compared with the Chinese and Indians" (as cited in Tey *et al*., 2015). From the results of spatial distribution (Figure 2), we can see that senior citizens in Melaka were concentrated in two districts, namely Alor Gajah and Jasin. For Perak, the three districts that recorded the highest number of senior citizens were Hilir Perak, Kerian and Larut & Matang. Meanwhile, in Perlis, the population of their senior citizens was mostly distributed in sub-districts; Sanglang, Titi Tinggi, Kurong Anai and Arau.

Conclusion and Recommendations:

Analysis of senior citizens distribution showed that the GIS application was successful in producing a precise allocation of senior citizens mapping by states and district in Malaysia. Based on the above discussions, it is found that the distribution of senior citizens is unbalanced and dispersed, and this pattern will continue to expand in the future. Concentrations are towards the eight states (Perlis, Kedah, Pulau Pinang, Perak, Selangor, Negeri Sembilan, Melaka and Johor) on the west coast of Malaysia. If the estimation of the aged population number in 2030 is achieved, then the states with an ageing population of 7 per cent and above will be pressured in preparing the proper public amenities for them. The developing of the ageing population process will continue to increase and can only delay if the birth rate did not drop drastically. We can take Japan and Singapore as an example, who has to deal with senior citizens problems due to the reduction of the birth rate that is too low. Malaysia is blessed because the Malays still have a high fertility rate, and this can delay the ageing population process in a controlled manner and not too burdensome (Yaakob, Masron & Masami, 2009).

Changes in the size and composition of the population continue to occur in tandem with the changing times. Malaysia's population is rapidly changing in size, distribution and location. It is essential that these trends are assessed quickly and analysed clearly in relations with policy development and implementation. According to Tey, *et al*., (2019), spatial demographic studies are still lacking in Malaysia due to the lack of data. A comprehensive analysis of the spatial distribution of the target groups is required for the allocation of resources to meet the needs of specific target groups such as the elderly and ethnicity. There is a need for updating spatial demographic and social data, and the local leaders should be involved in the data collection, analysis and utilisation. The 2020 population census provides an opportunity for updating the relevant spatial information for policymaking and planning.

Hopefully, the population policy and other policies created by the government all this while will be able to sustain the process of the ageing population in Malaysia. Hence, population policies on the elderly need to segregate into short term and long-term development with consideration of the population dynamics in terms of size, distribution and location. Under the next Malaysia Plan, recommendation development programs need to focus on monitoring the specific needs of the aged, especially for citizens aged 60 years and above.

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