

A Geographical Study on Population Concentration of Patheingyi Township

Thandar Aung*

Abstract

The research title is “A Geographical Study on Population Concentration of Patheingyi Township”. Patheingyi Township is located in Aungmyaythazan District, Mandalay Region. The main aim of this research is to analyze the population concentration of Patheingyi Township. The objectives of this research paper are: to study relief and drainage, to analyze population distribution and population density, and to examine population concentration of the study area. The data related to population are collected from secondary sources. For the purpose of analyzing the population concentration, the scholar S.S. Bhatia’s method of location quotient and overlay method in GIS technology are applied here. The result shows that the high and medium concentration of population has been found in western part of the township due to the favorable economic activity for agriculture and transportation facilities. Subsequently, low concentration of population is found in the northern part and near reserved forest area of the study area. The study reveals that population concentration varies based on geographic advantages and potential socio- economic development.

Keywords: population distribution, population density and population concentration

Introduction

The census is the main source of one of the basic characteristics of population, namely its distribution by urban and rural residence. It is essential to differentiate between rural and urban population as the two differ much in terms of their economy, type of living, social outlook etc. The main factors determining population distribution is topography. Population distribution is based on location while density is a ratio. Population density is the ratio of people to physical space. The concepts of population distribution and density are so closely related to each other that it would be appropriate to discuss them together though the two concepts are different. The study of population concentration is crucial, especially in the event of a demographic transition. Population distribution is primarily observed in relation to the level of concentration.

Study Area

Patheingyi Township is situated in Aungmyaythazan District, Mandalay Region. It is located between North latitudes of 21° 50’ and 22° 09’ and between East longitudes 96° 01’ and 96° 22’. It has an area of 146,697 acres or 594.12 square kilometers. It is composed of Patheingyi Town Proper and 57 village tracts.

* Assistant Lecturer, Department of Geography, Yadanabon University

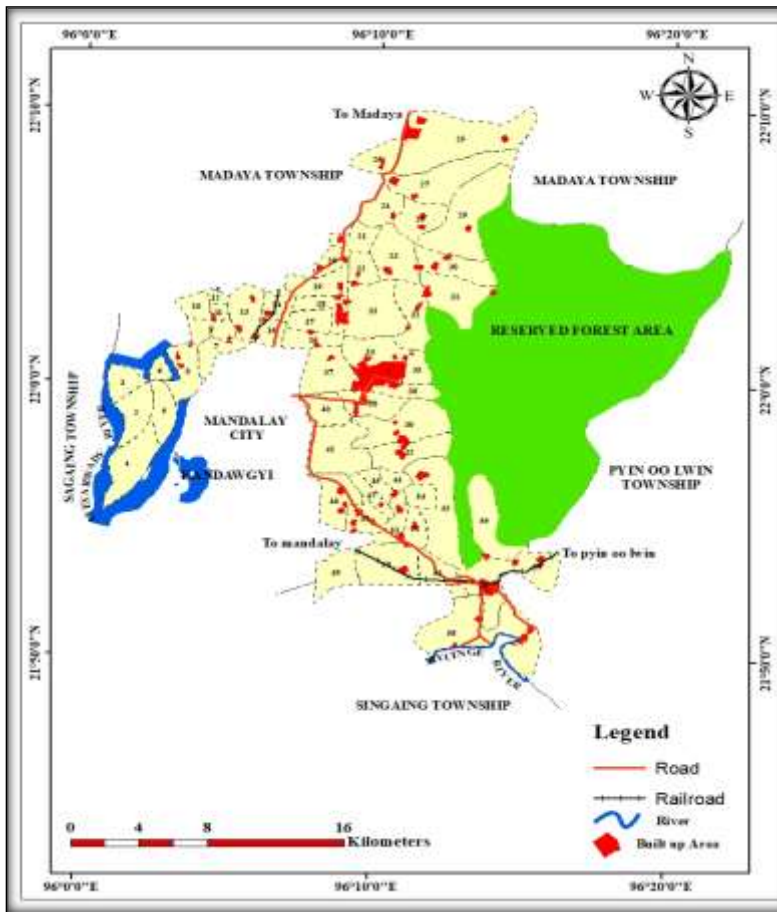


Figure -1 Location of Patheingyi Township

Source: UTM Map No. 1996_01, 1996_05, 2296_04, 2296_08.

Aim and Objectives

The main aim of the research paper is to analyze the population concentration of Patheingyi Township.

Objectives are

- to study relief and drainage of the study area
- to analyze population distribution and density and
- to examine population concentration of the study area

Methodology

The paper's general information was sourced from articles, thesis, internet, and library sources. The theoretical background was gathered through secondary data collection from offices and other sources and statistical methods were applied. The research paper is used qualitative and quantitative methods and GIS techniques.

The study area's population is analyzed quantitatively and investigated with regional characteristics of population distribution. In order to determine the concentration of population, an index of the location quotient by S.S. Bhatia is calculated.

$$\text{Location Quotient (L.Q)} = \frac{P_i \div P(\Sigma P_i)}{A_i \div A(\Sigma A_i)}$$

P_i = Population of the village tracts

ΣP_i = Total population of the township

A_i = Area of the village tracts

ΣA_i = Total area of the township

Relief and Drainage of Patheingyi Township

Relief

Generally, the relief of Patheingyi Township can be divided into two divisions as follows:

- (1) The Western Alluvial Plain and
- (2) The Eastern Highland

The Western Alluvial Plain

The western alluvial plain is found in the western and southern part of the study area. It has an area about two-third of Patheingyi Township. Its elevation is below 200 meters above sea level. The famous mountains are Yankin *Taung* (179 meters) and Thakhinma *Taung* (183 meters). Payangokto *Taung* (284 meters) is found in the northern part of the western alluvial plain. Mandalay *canal* is constructed across the western alluvial plain from north to south.

The Eastern Highland

The eastern highland is situated in the eastern part of the study area. It occurs in the western foothills of the Shan Highland. In eastern part of the eastern highland, the elevation is above 800 meters. These mountain ranges run from north to south. The prominent hills in this region are Natago *Taung* with an elevation of 1,056 meters. Other hills are Ngwe *Taung* (1,026 meters), Linno *Taung* (852 meters), Bok *Taung* (850 meters), and Bye *Taung* (Byeye *Taung*) (894 meters). In western part of the eastern highland, the elevation is between 600 meters and 800 meters such as Maukkaw *Taung* (626 meters), Bokhka *Taung* (608 meters), Htonbo *Taung* (238 meters), Seikthe *Taung* (399 meters), Oksaung *Taung* (313 meters), and Pansalaung *Taung* (303 meters) are found between 200 meters and 600 meters along the Sedaw *Chaung*. In this region, the eastern parts of the hills are steep and gradually slope down to the south.

Drainage

The major rivers of the study area are the Ayeyarwady and the Myitnge rivers. Streams, canals and lakes are also found in the study area.

The Ayeyarwady River flows from north to south about 12.87 kilometers along the western margin of the study area. It is still great importance for *Kaing-kyun* agriculture of the study area. Ayeyarwady River forms small flood plains caused by deposition of annual flood. Small islands are found along the Ayeyarwady River. Therefore, these inundated areas have fertile soils and are suitable for productive agriculture.

The Myitnge River flows between Patheingyi Township and Singaing Township for approximately 8.85 kilometers.

The permanent streams of the study area are the Shwelaung *Chaung*, Nadaung Kya *Chaung*, Kamaung *Chaung*, and Kyaukkwe *Chaung*. Shwelaung *Chaung* flows across Manawyama, Nayyinsaya, Sinywagyi, Nyeinchantharsan, and Kyweyegon villages in Patheingyi Township. Nadaungkya *Chaung* takes its sources from the Shan Highland and flows through the Sedawgalay Village and Ohnchaw Village.

There are many *ins* or lakes such as Kyudaw *In*, Kyankhin-Yekha *In*, Khusweh *In*, Gatkulin Dawpha *In*, Myaing *In*, Myitsut *In*, Yinbyin Out *In*, Wunbeku *In*, Myaung Myit Tain *In*, Semyaung No. 4 *In*, and Semyaung No. 5 *In* in Patheingyi Township.

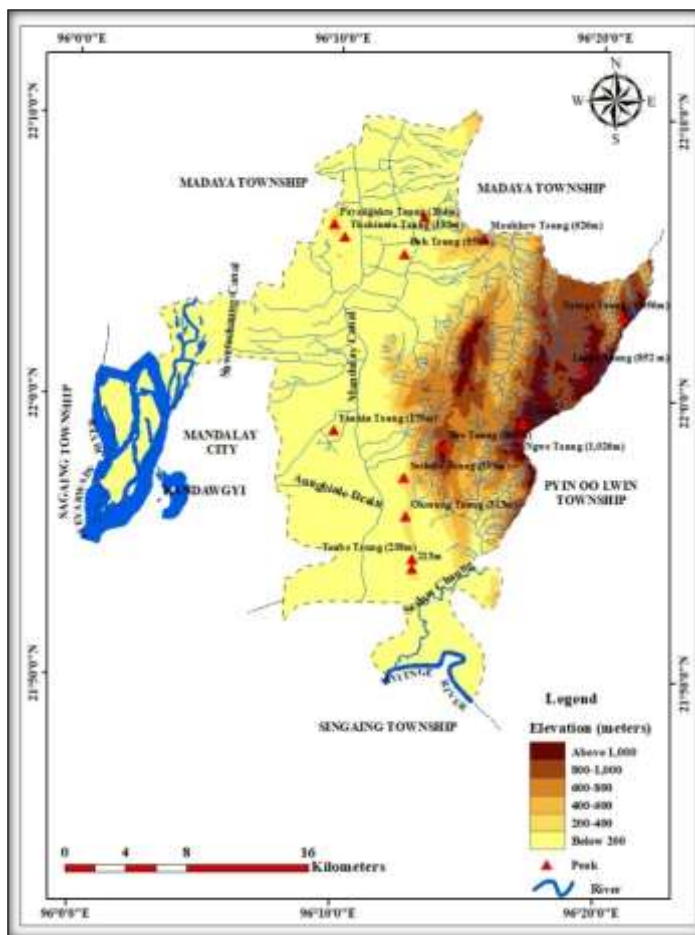


Figure -2 Relief and Drainage of Patheingyi Township

Source: Digital Elevation Model (DEM), SRTM, Map No.1996-01, 1996-05, 2296-04, 2296-08

Findings and Results

Analysis on Population Distribution, Population Density and Population Concentration of Patheingyi Township

Population Distribution

According to 2024 population data, the total population was 281,637 persons in Patheingyi Township. The number of total populations was 14,330 persons in Patheingyi Town Proper. The largest number of populations was 28,585 persons in Ohnchaw Village Tract. This village tract can be provided sustenance of area due to availability of fertile land which can produce more food for large number of people. In 2024, the smallest number of populations was 573 persons of Sukarkin Village Tract as this area occurs flooded in rainy season.

In general, the population distribution of Patheingyi Township in 2024 can be grouped into four as follow:

1. >10,000 persons
2. 6,001 - 10,000 persons
3. 2,001 - 6,000 persons
4. $\leq$ 2,000 persons

In 2024, population distribution more than 10,000 persons was found in Patheingyi Town Proper, Yegtwet, Mekingon, Nanoolwin, Thanmataw, Ohnchaw and Shwesayan village tracts. The total population of this group was 107,461 persons which amounted to 38.16 percent of the total population of Patheingyi Township. The main concentration of population in the study area occurs in plain region due to good agriculture.

There are nine village tracts having population between 6,001 and 10,000 persons. These village tracts are Thayettabin, Paukmyaing, Aungchantha, Dahattaw, Sinywagyi, Yankintaung, Shindawgon, Ngwedaung and Yekyi village tracts. The total population of this group was 70,351 persons which amounted to 24.98 percent of the total population of Patheingyi Township.

In the third group of population between 2,001 and 6,000 persons, there are 23 village tracts and the total population of these village tracts was 77,409 persons which constituted 27.49 percent of total population of the study area. Hpohlagon, Minyehla and Dangon village tracts are found along the Ayeyarwady River bank and western part of the study area. Nanda, Nyeinchantharsan, Nayyinsaya and Manawyama are located in the eastern part of Shwetachaung *canal*. There are eigh village such as Kyarnikan, Kanpyin, Bok, Mingan, Sinputgyi, Hmanpin, Zeechogon, and Hnumkye. These village tracts are located in the northern and eastern parts of Patheingyi Town Proper. Aainggyi, Botetkon, Thalekon, Tadaingshe (S), Tadaingshe (N), Kyaukme, Kyuwum, and Sedaw village tracts are located in the southern parts of the study area.

The group of population 2,000 and less than 2,000 persons was found in Gaintgyi, Kyunsin, Hinywesu, Pagantat, Winchan, Arr-laung, Sukarkin, Kyweyegon, Patheinlay, Ywathit, Ingyal, Kyaungmon, Gandama, Kangyi, Bauntkwe, Baunttin, Letkaung, Yelaung, and Letthit village tracts. The total population of these village tracts was 26,416 persons which accounted for 9.38 percent of the total population of the study area. These are found along the Ayeyarwady River and in the northern part of Patheingyi Township. The hilly and mountainous village tracts are characterized by sparse population. The population distribution of the study area in 2024 is represented in Figure 3 and Table 1.

Population Density

According to 2024 population data, the population density of the study area was 468 persons per square kilometer. The population density of the study area can be distinguished into three classes as follow:

- (1) population density more than 1,000 persons per square kilometer
- (2) population density between 500 and 1,000 persons per square kilometer and
- (3) population density less than 500 persons per square kilometer as shown in Map 2.3 and Table 2.2.

There are 17 village tracts which fall within population density more than 1,000 persons per square kilometer. Among these village tracts, Aungchantha Village Tract had the highest population density with 4,749 persons per square kilometer because of lying along Mandalay-Madaya Road.

In Patheingyi Township, Patehingyi Town Proper and 14 village tracts fall within the population density between 500 persons and 1,000 persons per square kilometer. Hpohlagon, Minyehla and Pagantat village tracts are situated on the small island with fertile alluvial soil in the Ayeyarwady River. Shwesayan Village Tract is located along the Myitnge River bank. The most of village tracts are located along the Mandalay-Pyin Oo Lwin Road. Therefore, these village tracts have moderate population density.

The population density less than 500 persons per square kilometer was found in 26 village tracts. These village tracts are located in the northern and southern parts of Patheingyi Township. Bok Village Tract has the lowest population density with 41 persons per square kilometer. This village tract is situated in the northwestern part of reserved forest area. The population density of Patheingyi Township in 2024 is presented in Figure-3 and Table -1.

Population Concentration

The index of population concentration in Patheingyi Township was analyzed by means of S.S. Bhatia's Location Quotient Method. It can be classified into three groups based on the L.Q index value of population concentration. (See Figure (3)). There are:

- (1) Level of high concentration group (more than 2.00)
- (2) Level of medium concentration group (between 2.00 and 1.00)
- (3) Level of low concentration group (less than 1.00)

Level of High Concentration Group

According to Figure-1 and Table-1, the high concentration of population is observed in Patheingyi Town Proper and 17 village tracts. These village tracts are located on the western flat plain area and near the town. These village tracts have high concentration of population due to good transportation and economic activity. The highest concentration of population in the study area was found in Aungchantha Village Tract. Nanoolwin Village Tract had the second largest concentration of population due to near the town. These factors make to have high concentration of population in these village tracts.

Level of Medium Concentration Group

In Patheingyi Township, 16 village tracts are included in the medium population concentration. Nayyinsaya, Kyarnikan, Ywatthit, Hmanpin, Sinywagyi, and Zeechogon village tracts are located in the northern part of the Patheingyi town proper. Some village tracts are located in the western and southern parts of Patheingyi Township because agriculture is productive and transportation is convenient in those areas. These factors make to have medium concentration of population in these village tracts.

Level of Low Concentration Group

There are 24 village tracts included in low concentration of population in the study area. Most of these village tracts are located in the northern part and near the reserved forest area of the study area. Gaintgyi, Kyunsin, and Hinywetsu village tracts are located in the Ayeyarwady River Island. These village tracts have low concentration of population due to poor condition of agriculture and communication.

Table-1 Population Distribution, Density and Concentration of Patheingyi Township (2024)

No.	Town Proper and Village Tracts	Area Sq.Kilometer	Total Population	Density (Person per Sq-Kilometer)	Population Concentration (L.Q)
1	Patheingyi	14.58	14,330	983	2.07
2	Gaintgyi	2.96	837	283	0.60
3	Kyunsin	2.52	715	284	0.60
4	Hinywetsu	4.18	1,474	353	0.74
5	Hpohlagon	4.46	2,834	635	1.34
6	Minyehla	5.76	3,510	609	1.29
7	Thayettabin	3.09	6,647	2,151	4.54
8	Pagantat	1.81	1,187	656	1.38
9	Dongon	1.14	3,205	2,811	5.93
10	Winchan	3.57	1,962	550	1.16
11	Arr-laung	2.41	920	382	0.81

12	Sukarkin	1.08	573	531	1.12
13	Paukmyaing	6.11	7,275	1,191	2.51
14	Nanda	4.35	5,479	1,260	2.66
15	Aungchantha	1.96	9,308	4,749	10.02
16	Kyweyegon	1.61	1,851	1,150	2.43
17	Nyeinchantharsan	5.46	2,451	449	0.95
18	Nayyinsaya	5.33	3,712	696	1.47
19	Manawyama	3.28	3,981	1,214	2.56
20	Patheinlay	1.23	1,813	1,474	3.11
21	Kyarnikan	4.16	2,559	615	1.30
22	Ywathit	3.63	1,799	496	1.05
23	Ingyal	11.86	1,829	154	0.33
24	Gandama	6.44	1,058	164	0.35
25	Dahattaw	30.84	9,948	323	0.68
26	Kyaungmon	4.06	1,871	461	0.97
27	Kangyi	12.70	1,706	134	0.28
28	Kanpyin	5.52	2,053	372	0.78
29	Bok	50.48	2,060	41	0.09
30	Mingan	35.94	3,627	101	0.21
31	Sinputgyi	42.43	2,407	57	0.12
32	Hmanpin	4.64	2,293	494	1.04
33	Sinywagyi	9.84	6,304	641	1.35
34	Zeechogon	5.01	3,278	654	1.38
35	Hnumkye	52.11	3,400	65	0.14
36	Yegtwet	7.65	10,399	1,359	2.87
37	Mekingon	5.63	12,373	2,198	4.64
38	Yankintaung	4.55	9,758	2,145	4.52
39	Shindawgon	38.46	7,868	205	0.43
40	Nanoolwin	4.96	19,307	3,893	8.21
41	Thanmataw	10.62	10,804	1,017	2.15
42	Aainggyi	21.01	4,428	211	0.44
43	Yekyi	41.53	7,188	173	0.37
44	Bauntkwe	2.00	1,627	814	1.72
45	Baunttin	1.85	766	414	0.87

46	Botetkon	2.69	4,402	1,636	3.45
47	Letkaung	1.84	1,333	724	1.53
48	Thalekon	4.27	3,478	815	1.72
49	Yelaung	4.66	1,979	425	0.90
50	Tadaingshe (S)	3.43	2,741	799	1.69
51	Tadaingshe (N)	10.96	3,726	340	0.72
52	Ngwedaung	4.75	6,055	1,275	2.69
53	Kyaukme	4.74	4,865	1,026	2.17
54	Letthit	3.24	1,116	344	0.73
55	Kyuwun	19.91	3,009	151	0.32
56	Ohnchaw	9.26	28,585	3,087	6.51
57	Sedaw	11.59	3,911	337	0.71
58	Shwesayan	18.00	11,663	648	1.37
Total		594.12	281,637	51,216	

Source: Department of Immigration and Population, Patheingyi Township
Calculated by researcher

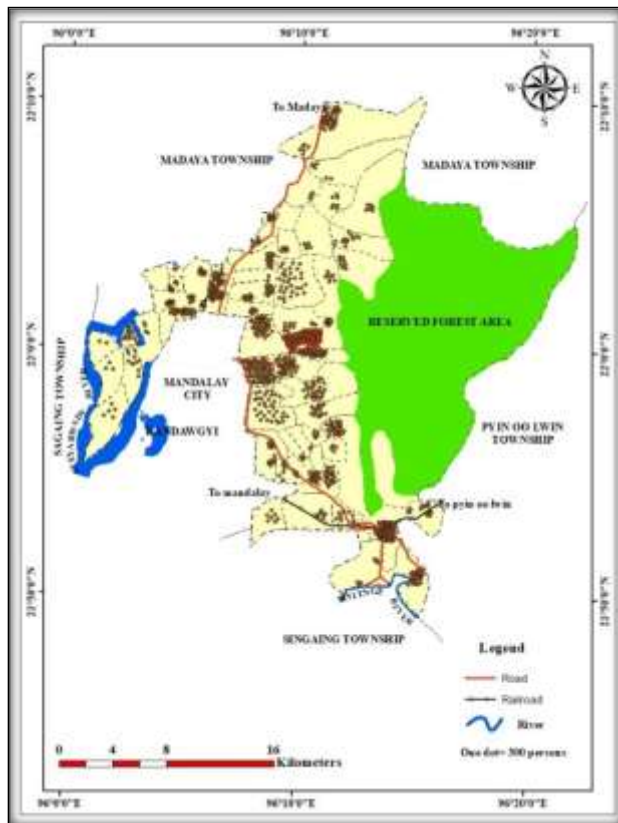


Figure- 3 Population Distribution of Patheingyi Township (2024)

Source: Based on table-1

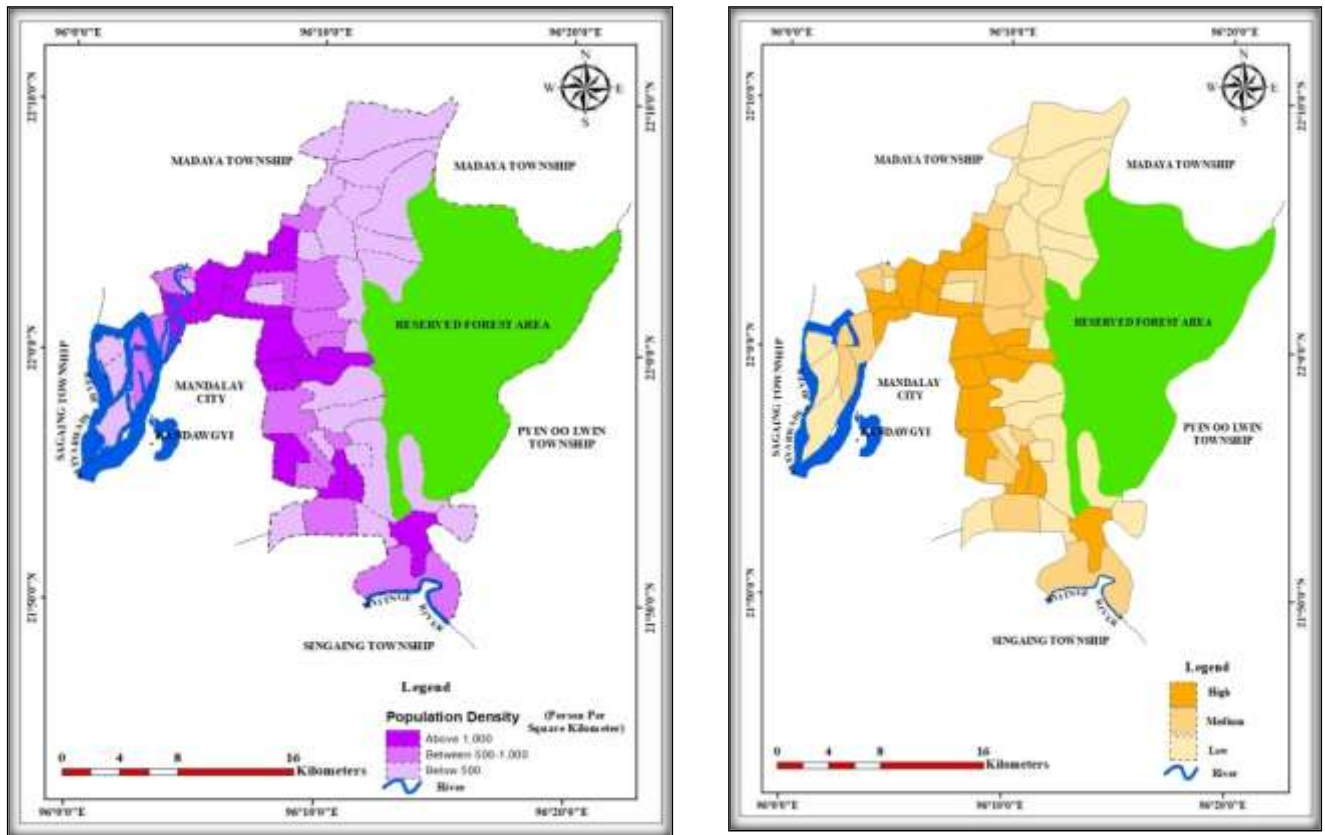


Figure- 4 Population Density and Population Concentration of Patheingyi Township (2024)

Source: Based on table - 1

Conclusion

The population of Population Township is unevenly distributed. According to 2024 population data, the number of total populations of Patheingyi Township is 281,637 persons. The highest concentration of population was found in Aungchantha Village Tract with 10.02. The high concentration of population had been observed in Patheingyi Town Proper and 17 village tracts located in the western flat plain area and near the town. Among the 16 village tracts having medium concentration of population, 6 village tracts are found in the northern part of Patheingyi town proper. Ten village tracts are found in the western and southern parts of Patheingyi Township. There are 24 village tracts with in low concentration of population in the study area. As a result, population concentration varies based on geographic advantages and potential socio- economic development.

Acknowledgements

First of all, I would like to express my special gratitude to Rector Dr. Tint Moe Thuzar, Pro-rector Dr. Thwe Lin Ko, Dr. Khin Maw Maw Soe, Dr. Win Naing, Dr Khin Win (Head/Processor), Department of Geography and Environmental Studies, and Dr Kan Htun, Professor, Department of Geography and Environmental Studies, Yadanabon University, for giving guidance, good advices and instruction thoroughly in my research work. Moreover, I would like to say thanks to all geography teachers and colleagues who have helped me with sincerity and patience.

References

- Harvey F. (2008). A primer of GIS: fundamental geographic and cartographic concepts. New York, NY: The Guilford Press.
- Maantay J. A, Maroko A. R, & Herrmann C. (2007). Mapping population distribution in the urban environment: the cadastral-based expert dasymetric system (CEDS). *Cartography & Geographic Information Science*, 34(2), 77-102.
- Wah Wah Htun, Dr (2020), Analysis on Population Concentration with Reference to the Topography in Salin Township, Magway Region, Department of Geography, University of Magway.