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Center-Periphery Migration in Malaysia: A Spatial Analysis of Non-Citizen Population Growth (1991–2020) Guided by World Systems and Social Network Theory

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Abstract

This study investigates the spatial dynamics of non-citizen labor migration in Peninsular Malaysia from 1991 to 2020, focusing on population growth patterns and structural migration drivers through the lens of World Systems Theory and Social Network Theory. Utilizing census data and spatial analysis in ArcGIS Pro 2.9.0, the study maps a 92 km southwestward shift in the mean center of non-citizen populations, with increasing spatial concentration in Selangor, Kuala Lumpur, and Penang. Hot Spot Analysis and rising Moran's I values confirm persistent and intensifying spatial clustering. The sharpest population increase occurred in Selangor (+481%), Penang (+365%), and Kuala Lumpur (+278%), underscoring center-periphery migration dynamics. These findings reveal critical regional disparities and the urban concentration of foreign labor, highlighting the urgency for targeted, inclusive policies aligned with SDG 8 and SDG 11. The study offers original insights into migration geography and urban sustainability in Malaysia's evolving labor landscape.

Keywords: *ArcGIS, Malaysia, Noncitizen Migration, Spatial Demography, Social Network Theory, World Systems Theory, Urban Concentration.*

Introduction

The movement of populations across borders has become a defining feature of globalization, driven by uneven economic development, labor market demands, and enduring social networks. As of 2022, the global population surpassed 8 billion, amplifying transnational migration as individuals seek improved livelihoods and security. In emerging economies like Malaysia, these dynamics are especially pronounced. Malaysia's rapid economic growth, rooted in export-oriented manufacturing, construction, and services, has depended significantly on foreign labor, particularly in sectors characterized as dirty, dangerous, and difficult. This dependency is in the increase of the non-citizen population from 4.3 percent in 1991 to 8.3 percent in 2020.

This study critically examines the long-term spatial dynamics of non-citizen migration in Peninsular Malaysia from 1991 to 2020, aligning with the title Center–Periphery Migration in Malaysia: A Spatial Analysis of Non-Citizen Population Growth (1991–2020) Guided by World Systems and Social Network Theory. The title underscores two key theoretical lenses: World Systems Theory, which explains migration in terms of global core–periphery economic relationships, and Social Network Theory, which accounts for the sustaining role of interpersonal and community ties in directing and reinforcing migration patterns.

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Malaysia serves as a regional migration hub, attracting workers from Indonesia, Bangladesh, Nepal, and Myanmar. These migrants are concentrated in rapidly urbanizing and industrialized regions, most notably Selangor, Penang, and Kuala Lumpur, reflecting broader center periphery shifts. As labor migrants continue to settle in economically dominant states, Malaysia faces growing challenges related to urban congestion, service delivery, and integration of non-citizen populations. Yet, despite the clear spatial clustering of these migrants, research has rarely examined the long-term patterns of their movement or the structural forces that shape them.

Existing studies often adopt a policy or economic lens, overlooking the spatial-temporal dimension that is crucial to understanding urban migration dynamics. Migration, however, is not random, it is shaped by persistent global inequalities, geopolitical relationships, and established social networks. By incorporating Migration Systems Theory in addition to World Systems and Social Network Theory, this research provides a multi-scalar and historically grounded analysis of how and why non-citizen populations have shifted spatially over three decades.

Utilizing spatial statistical techniques in ArcGIS Pro and Malaysian Population and Housing Census data from 1991, 2000, 2010, and 2020, this study aims to:

1. Map the spatial distribution and density of non-citizen populations across time;
2. Identify the economic and geopolitical drivers behind these migration flows;
3. Theorize how global economic structures and migrant networks interact to sustain and reproduce center–periphery migration patterns in Malaysia.

In doing so, the study contributes to ongoing discussions around Sustainable Development Goals, particularly SDG 8 (Decent Work and Economic Growth) and SDG 11 (Sustainable Cities and Communities), by offering policy-relevant insights for managing urban migration and labor dynamics in a spatially equitable manner.

Research Question

How have center–periphery dynamics and migrant network effects influenced the spatial concentration and southwestward shift of the noncitizen population in Peninsular Malaysia from 1991 to 2020?

Hypothesis

The spatial concentration and centroid shift of the noncitizen population in Peninsular Malaysia between 1991 and 2020 are primarily driven by core–periphery economic structures and reinforced by migrant social networks, leading to increasing settlement in urbanized, economically dominant states such as Selangor, Penang, and Kuala Lumpur.

In doing so, the study contributes to a deeper understanding of how global and local forces interact to shape population mobility in Southeast Asia. The findings have direct implications for labor policy, urban planning, social cohesion, and Malaysia's commitment to the Sustainable Development Goals (SDGs), particularly those related to reduced inequalities (SDG 10), sustainable cities (SDG 11), and decent work (SDG 8).

Theoretical Framework

This study is rooted in three key theories that offer a comprehensive understanding of non-citizen migration patterns and their socio-economic implications in Malaysia: World Systems Theory, Migration Systems Theory, and Social Network Theory. Each of these frameworks provides

adistinct lens through which the migration of foreign workers, particularly in urban areas, can be analyzed. By integrating these theories, this research aims to explain the complex dynamics of migration in Malaysia and its impact on urban development and sustainability.

World Systems Theory (WST), developed by Immanuel Wallerstein, is a key theoretical framework for understanding global migration patterns. WST asserts that migration is a result of structural inequalities in the global economic system, with more developed regions acting as "core" areas, while less developed regions serve as "peripheral" or "semi-peripheral" areas (Wallerstein, 1974; Wallerstein, 2021; Schaeffer, & Lau, 2023; Gómez, & Ruiz, 2023; Martinez, & Singh, 2022; Khan, & Ali, 2021; Chavez, & Fernandez, 2022). Malaysia, as a rapidly industrializing nation in Southeast Asia, functions as a semi-periphery within the global economic system. As Malaysia's economy grows, it creates a demand for labor, particularly in sectors such as construction, manufacturing, and agriculture, which are often filled by non-citizens (Abdullah et al., 2021; Jie & Jamaludin 2024).

The growing non-citizen population in Malaysia can be explained through WST, as the demand for labor in these sectors in the core urban regions attracts migrants from neighboring countries and beyond. The economic integration of Malaysia into the global economy, especially after joining the ASEAN Economic Community (AEC) in 2015, has heightened this influx (OECD, 2023). These migration flows are shaped by the global division of labor, where non-citizens from peripheral countries, such as Indonesia, Nepal, and Bangladesh, migrate to Malaysia for job opportunities that are often unappealing to citizens.

Recent studies have further emphasized the relevance of WST in explaining the migration of non-citizens in Southeast Asia, where economic globalization has created a demand for cheap, low-skilled labor (Lee & Lee, 2022). This is particularly true for Malaysia's "3D" sectors (dirty, difficult, and dangerous jobs) filled primarily by foreign workers. The demand for foreign labor in these sectors continues to rise in line with Malaysia's ambitious economic growth plans, as outlined in its Shared Prosperity Vision 2030 (Padu et al., 2023).

Migration Systems Theory (MST), introduced by Ravenstein (1889) and later expanded by scholars such as Elias & O'Brien (2017), posits that migration flows are not random but are shaped by systematic relationships between sending and receiving countries. These systems of migration involve continuous and reciprocal exchanges, where migration patterns evolve due to historical, cultural, economic, and political ties between origin and destination areas. In the context of Malaysia, the Migration Systems Theory provides critical insights into the forces shaping labor migration, particularly from neighboring countries like Indonesia, Bangladesh, Myanmar, and Nepal. These flows are deeply influenced by Malaysia's trade and economic relations with these countries and the historical presence of foreign workers in the country.

For example, Malaysia's geographic proximity to Indonesia has fostered a strong migration system, with many Indonesian workers filling the demand in Malaysia's construction, plantation, and domestic service sectors (Musa, 2021). Additionally, Migration Systems Theory helps explain the increasing migration of non-citizens from Bangladesh and Nepal to Malaysia, a trend that has intensified with labor recruitment agreements and organized recruitment channels established between Malaysia and these countries. In 2020, the Bangladeshi population in Malaysia was estimated to be over 500,000, largely due to bilateral agreements between the two countries to address labor shortages in Malaysia's manufacturing and plantation sectors (Ministry of Human Resources Malaysia, 2022).

Recent literature has reinforced that migration systems are not solely driven by economic factors but are also shaped by government policies, labor market demand, and social networks (Spooner et

al., 2022; Ahmad et al. 2023). The Malaysian government's policies regarding the recruitment of foreign workers, such as the Foreign Worker Employment Policy (2021), have been pivotal in structuring the migration flows from specific countries, thus reinforcing the systemic nature of these movements.

Social Network Theory offers another valuable lens to understand non-citizen migration patterns. This theory, which focuses on the role of personal relationships and social connections in facilitating migration, suggests that migrants rely on established social networks of family, friends, and co-workers when making decisions about migration (Massey et al., 1993). Social networks serve as important conduits for migration, providing information, emotional support, and even job opportunities to new migrants.

In Malaysia, the role of social networks in the migration process is particularly significant. Many non-citizens rely on networks that have already established themselves in the country, particularly in urban centers like Kuala Lumpur, Penang, and Selangor. These networks facilitate the settlement and integration of new migrants by connecting them with employment opportunities in key sectors, such as construction and domestic work (Kassim et al., 2021). Additionally, the strong social ties within communities of non-citizens help migrants overcome barriers to entry into the labor market, such as language, legal status, and cultural differences.

A notable example is the large Indonesian community in Malaysia, where family members or acquaintances often provide initial employment opportunities for new migrants, which then leads to further migration in a chain-like process. Recent research by Chandran et al. (2023) also highlighted how these social networks not only facilitate migration but also influence the concentration of migrants in specific geographical areas. For instance, certain urban districts in Kuala Lumpur are heavily populated with non-citizens from Bangladesh, creating ethnic enclaves that are self-sustaining due to the established social and economic networks.

By integrating these three theoretical frameworks, World Systems Theory, Migration Systems Theory, and Social Network Theory; this study provides a comprehensive view of the socio-economic dynamics of non-citizen migration in Malaysia. The World Systems Theory situates Malaysia's role within the global economic system, highlighting the structural forces that drive migration, while Migration Systems Theory explains the bilateral and multilateral connections that shape the migration flows to Malaysia. Social Network Theory further enhances our understanding by focusing on the micro-level factors such as personal relationships and community networks that influence migration decisions and settlement patterns.

Together, these theories provide a holistic framework for understanding the complexities of non-citizen migration, offering valuable insights for policymakers and urban planners. The integration of these perspectives is particularly relevant for managing the growing non-citizen population in urban centers, ensuring sustainable urban growth (Wan Zakaria et al. 2024), and promoting the inclusive development required to meet Malaysia's SDG 8 (Decent Work and Economic Growth) and SDG 11 (Sustainable Cities and Communities).

Geographic Concentration and Migration Patterns

Non-citizen groups generally concentrate in financially thriving urban locations featuring substantial industrial and service industries. For example, in nations such as the U.S., statistics reveal how the non-citizen demographic has moved throughout different states, with regions like California and New York traditionally experiencing high numbers due to their robust employment opportunities (World Migration Report, 2024). Likewise, Malaysia's non-citizen demographic is

concentrated in urban states such as Selangor, Kuala Lumpur, and Johor, fueled by swift industrial growth and urban development.

With the ongoing growth of urban areas, a noticeable pattern of non-citizens congregating in large cities and metropolitan regions is evident. Research conducted by Khan et al. (2019) indicates that in Malaysia, non-citizens are mainly found in economically vibrant regions such as Kuala Lumpur and Selangor, which serve as key centers for industry and trade. Likewise, Castles and Miller (2018) contend that urbanization attracts not only international migrants but also influences their demographic characteristics, leading to greater diversity in cities due to the arrival of non-citizen residents.

According to research conducted by Sassen (2015) and Massey et al. (2017), economic elements, including job opportunities in industries such as construction, agriculture, and domestic services, continue to be key motivators of migration, particularly in areas such as the Gulf Cooperation Council (GCC) nations, where non-citizens make up a large portion of the workforce. Likewise, in Southeast Asia, non-citizens frequently cluster in areas dominated by labor-intensive sectors. In Malaysia, substantial numbers of migrant workers from nearby nations, including Indonesia and Bangladesh, are involved in industries such as palm oil plantations and construction (Tani & Grubb, 2019).

Economic and Social Factors

Economic growth continues to be a crucial factor in the increase of non-citizen populations. The presence of job opportunities, particularly in areas needing low to medium-skilled workers, draws significant numbers of migrants. Research indicates that non-citizen groups are becoming more concentrated in labor-intensive sectors, including manufacturing and construction (Brown et al., 2023). For example, in Malaysia, non-citizens are prevalent in sectors such as construction and services, with regions like Selangor and Penang exhibiting greater growth rates of foreign populations.

Grasping the exact distribution and effects of non-citizens is difficult because of the frequently dynamic and unofficial characteristics of migration. Anderson's research (2016) emphasizes the challenges of effectively monitoring non-citizen populations, especially in nations where migrants exist in undocumented or semi-documented statuses. Moreover, the inconsistency of data among countries complicates comparative analysis. However, the development and geographical distribution of non-citizens can be examined through proxy data, including work permits, labor statistics, and census information, as shown in OECD reports concerning migration trends (OECD, 2017).

Urbanization and Changing Demographics

There is a notable change in the distribution of the non-citizen population towards urban regions. This trend is evident not only in affluent nations but also in developing economies where urbanization propels migration from countryside regions. In Malaysia, the share of non-citizens in cities has steadily increased, particularly since the year 2000. This change aligns with global patterns where non-citizens are more frequently incorporated into the urban workforce, especially in major cities (World Migration Report, 2024).

The increasing population and urban density of non-citizens carry important social, economic, and political consequences. Policy measures, like labor regulations and immigration restrictions, play a vital role in influencing the integration and treatment of non-citizens in receiving countries. As noted by Miller (2019), regions with substantial non-citizen populations need to reconcile the

demand for economic labor with the rights and well-being of migrants. In numerous instances, the increasing population of non-citizens, particularly in cities, requires enhanced integration policies and infrastructure development to avoid social exclusion and guarantee fair access to services.

Impact of International Boarders and Regional Differences

Proximity to international borders also affects the growth of non-citizen populations. For example, in Southeast Asia, nations like Malaysia and Thailand experience greater inflows of migrants from nearby countries such as Indonesia and Myanmar. This regional movement has led to considerable non-citizen populations in bordering states (Brown et al., 2023). Additionally, in areas such as the Middle East, the non-citizen demographic makes up a significant segment of the labor force because of the labor needs in construction and other industries, with nations like Qatar and the UAE accommodating large expatriate communities.

Non-citizen groups are likewise affected by geopolitical influences. Nations with permeable borders or those situated between affluent and less affluent areas frequently experience greater flows of non-citizens. For example, the closeness of Southeast Asian nations to China and India has resulted in elevated non-citizen demographics in countries such as Thailand and Malaysia, where migrants relocate for improved economic opportunities (Goh, 2018). This trend is reflected in the Middle East, where the surge of non-citizens from Asia, Africa, and Eastern Europe stems from both labor needs and political turmoil in the migrants' countries of origin (Shah, 2017).

Methodology

To ensure comprehensive results at the smallest administrative level, this study utilized micro and spatial data from the Malaysian Population and Housing Census (1991, 2000, 2010, and 2020) and administrative spatial boundary data from the Geospatial Centre of Malaysia. International data sources such as the United Nations (UN), the United Nations Department of Economic and Social Affairs (UNDESA), and the World Migration Report were also incorporated. Micro-level census data is essential for analyzing population distribution patterns and provides critical input for national spatial planning (Hu, 2021; Smith & Blizard, 2021).

Spatial statistical analysis, conducted using ArcGIS Pro 2.9.0, was a key element in efficiently analyzing and presenting the study's findings (Aroge et al., 2023; Manfred M. Fischer, 2019). Temporal analysis of the mean center of the non-citizen population was performed to evaluate trends, determining whether the population gravitated toward urban centers or dispersed into specific regions or districts. The mean center of population represents the average location of the population, calculated by weighting the x and y coordinates based on population values.

Spatial autocorrelation analysis, a critical spatial statistical function, was conducted for the 1991–2020 period to measure the distribution patterns of the BWN population at the administrative district level. This analysis assessed whether the population distribution was clustered, random, or dispersed (Cressie & Moores, 2021).

Additionally, a temporal dot density analysis was employed to visualize the distribution and concentration of the BWN population across urban and rural strata. This analysis utilized micro-level block zone data, which provided a statistical classification of urban and rural areas (Balk et al., 2018).

Result and Discussions

According to the examination of the Malaysian Population and Housing Census from 1991, 2000, 2010, and 2020, the non-citizen demographic has seen a notable rise, particularly in the 2000-2010 timeframe, where it expanded by 6.1%, contributing an additional 1.03 million individuals, in contrast to the 5.5% increase observed from 1991 to 2000. Despite a decline in the growth rate to 1.8% from 2010 to 2020, the BWN population still experienced a rise of 437,000 people (Figure 1). This graphic depicts the overall number and growth rate of the non-citizen population in Malaysia between 1991 and 2020. It emphasizes the notable rise in the non-citizen population, especially from 2000 to 2010, and the ongoing growth despite a reduced pace from 2010 to 2020. Figure 2 illustrates the proportion of the non-citizen demographic within Malaysia's overall population from 1991 to 2020, depicting a consistent growth over the years, with a significant jump from 4.3% in 1991 to more than 8% in the years post-2000.

In this same timeframe, the share of the BWN population as a proportion of Malaysia's overall population consistently increased, moving from 4.3% in 1991 to 5.5% in 2000, and surpassing 8% in the following years (Figure 2). As per the World Bank's official data from 2015, Malaysia was ranked 96th worldwide regarding the proportion of its non-citizen population compared to the overall population. The three countries with the largest proportions of non-citizens were the United Arab Emirates (UAE) at 88%, Qatar at 75% and Kuwait at 73%.

Additionally, in 2020, Malaysia was placed 17th worldwide as a migrant destination, while the leading three countries were the United States, Germany, and Saudi Arabia (World Migration Report 2020, n.d.).

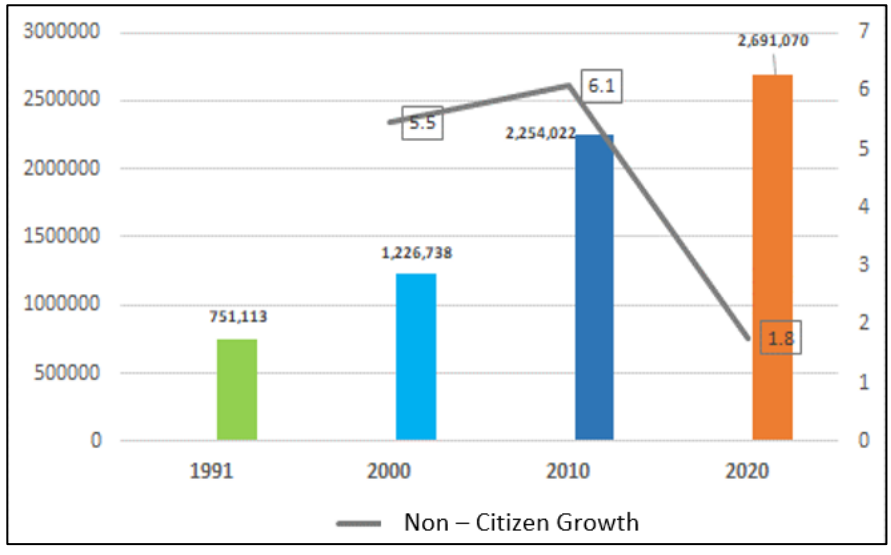


Figure 1.Total and Growth of the Non-Citizen Population, 1991-2020.

Source: Adapted from Adapted from DOSM Malaysia 2025

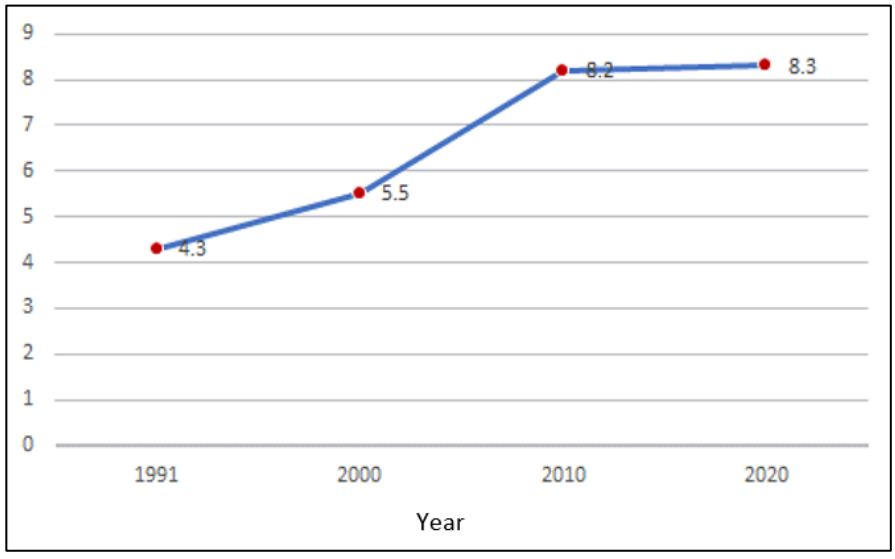


Figure 2.Percentage of Non-Citizen Population, 1991-2020.

Source: Adapted from Adapted from DOSM Malaysia 2025

State Level

An examination of the Malaysian Population and Housing Census spanning from 1991 to 2020 shows that Sabah had the largest non-citizen (BWN) population in the nation. In 1991, 56.6% (425,175) of the non-citizen population in Malaysia resided in Sabah. Selangor demonstrated steady growth from 68,549 in 1991 to 563,988 in 2020, reflecting a rise of 722% (Table 1). In 2020, five states showed a significant proportion of BWN, as over 8% of their overall population consisted of non-citizens: Sabah (23.7%), WP Labuan (11.4%), WP Kuala Lumpur (10.5%), Selangor, and Penang (8.1%) (Figure 3). This chart shows the proportion of the non-citizen (BWN) population across various states in Malaysia from 1991 to 2020. It emphasizes the states with the largest shares of non-citizens, including Sabah, WP Labuan, WP Kuala Lumpur, Selangor, and Penang, while contrasting them with states that have smaller proportions, such as WP Putrajaya, Terengganu, Perlis, and Kelantan.

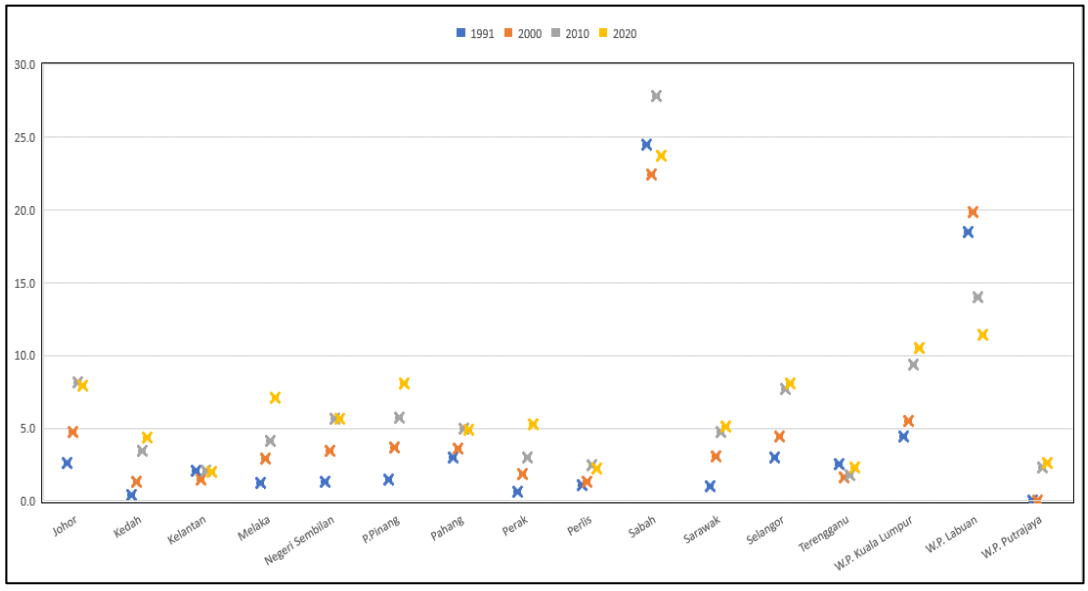


Figure 3. Percentage of Non-Citizen Population by State, 1991-2020.

Source: Adapted from DOSM Malaysia 2025

There were also three states with a low percentage of non-citizens, under 3% of their total population: WP Putrajaya (2.6%), Terengganu (2.3%), Perlis (2.3%), and Kelantan (2.0%). The growth of the BWN population between 1991 and 2020 exhibited diverse distribution patterns. Kedah experienced the highest growth rate of 14.6% from 1991 to 2000, with Sarawak following at 14.1% and Negeri Sembilan at 12.5%. During the years 2000 to 2010, Kedah once more achieved the highest growth rate of 11.3%, with Selangor following at 8.5% and Johor at 7.6%. The largest increase during the years 2010-2020 moved to Melaka (7.7%), Perak (6.6%), and WP Putrajaya (5.8%) (Figure 4). This illustration shows the increase in the non-citizen (BWN) population in every state of Malaysia from 1991 to 2020, demonstrating the differing growth rates among states throughout the thirty years. The illustration displays the regions with the fastest growth rates, like Kedah, Sarawak, and Melaka, alongside the areas with slower growth, for instance, Sabah.

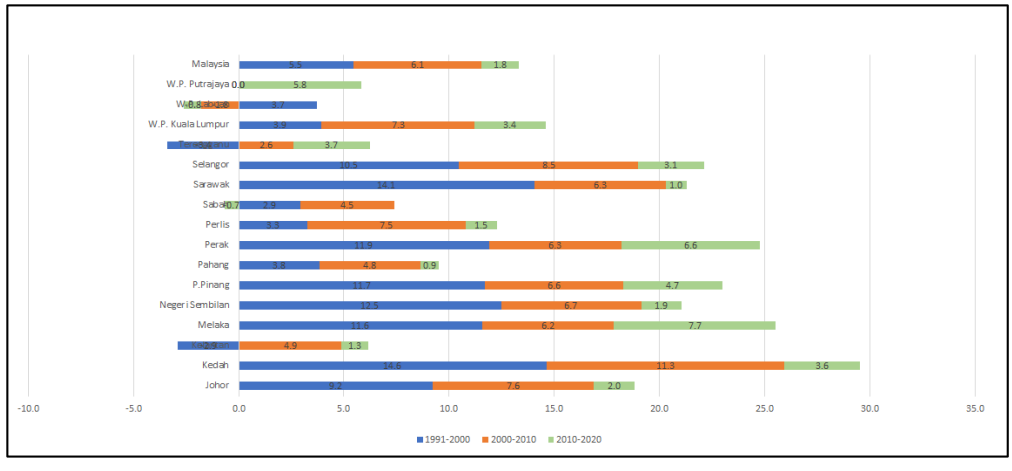


Figure 4. Growth of Non-Citizen Population by State, 1991-2020

Source: Adapted from DOSM Malaysia 2025

Despite Sabah experiencing a negative growth rate of -0.7% from 2010 to 2020, it maintained the largest population of non-citizens, totaling 810,000 individuals in 2020 (Table 1). This table shows the increase of the non-citizen (BWN) population in Malaysia from 1991 to 2020, detailing the quantity of non-citizens in each state and the growth rates for every decade. It emphasizes regions with notable growth in the BWN population and illustrates the general patterns over the thirty-year span.

Negeri	1991				2000					2010					2020				
	Jumlah Penduduk	Penduduk BWN	Peratus BWN	Komposisi BWN	Jumlah Penduduk	Penduduk BWN	Peratus BWN	Pertumbuhan 1991-2000	Komposisi BWN	Jumlah Penduduk	Penduduk BWN	Peratus BWN	Komposisi BWN	Komposisi BWN	Jumlah Penduduk	Penduduk BWN	Peratus BWN	Pertumbuhan 2010-2020	Komposisi BWN
Johor	2,069,740	53,282	2.6	7.1	2,584,997	122,213	4.7	9.2	10.0	3,230,440	262,352	8.1	7.6	11.6	4,009,670	319,167	8.0	2.0	11.9
Kedah	1,302,241	5,633	0.4	0.7	1,571,077	21,050	1.3	14.6	1.7	1,899,751	65,151	3.4	11.3	2.9	2,131,427	93,347	4.4	3.6	3.5
Kelantan	1,181,315	24,694	2.1	3.3	1,287,367	19,052	1.5	(2.9)	1.6	1,470,696	31,056	2.1	4.9	1.4	1,792,501	35,302	2.0	1.3	1.3
Melaka	506,321	6,206	1.2	0.8	605,239	17,593	2.9	11.6	1.4	790,136	32,865	4.2	6.2	1.5	998,428	71,067	7.1	7.7	2.6
Negeri Sembilan	692,897	9,357	1.4	1.2	829,774	28,744	3.5	12.5	2.3	986,204	55,939	5.7	6.7	2.5	1,199,974	67,745	5.6	1.9	2.5
P.Pinang	1,064,166	15,861	1.5	2.1	1,231,209	45,526	3.7	11.7	3.7	1,526,324	87,771	5.8	6.6	3.9	1,740,405	140,531	8.1	4.7	5.2
Pahang	1,045,003	31,278	3.0	4.2	1,229,104	44,181	3.6	3.8	3.6	1,440,741	71,448	5.0	4.8	3.2	1,591,295	78,065	4.9	0.9	2.9
Perak	1,877,471	12,399	0.7	1.7	1,973,368	36,185	1.8	11.9	2.9	2,299,582	67,949	3.0	6.3	3.0	2,496,041	131,204	5.3	6.6	4.9
Perlis	183,824	1,942	1.1	0.3	198,288	2,605	1.3	3.3	0.2	225,630	5,520	2.4	7.5	0.2	284,885	6,430	2.3	1.5	0.2
Sabah	1,734,685	425,175	24.5	56.6	2,468,246	552,967	22.4	2.9	45.1	3,117,405	867,190	27.8	4.5	38.5	3,418,785	810,443	23.7	(0.7)	30.1
Sarawak	1,642,771	17,172	1.0	2.3	2,009,893	60,885	3.0	14.1	5.0	2,399,839	113,772	4.7	6.3	5.0	2,453,677	125,280	5.1	1.0	4.7
Selangor	2,297,159	68,549	3.0	9.1	3,952,817	175,776	4.4	10.5	14.3	5,345,454	412,759	7.7	8.5	18.3	6,994,423	563,988	8.1	3.1	21.0
Terengganu	766,244	19,164	2.5	2.6	880,234	14,136	1.6	(3.4)	1.2	1,011,363	18,302	1.8	2.6	0.8	1,149,440	26,402	2.3	3.7	1.0
W.P. Kuala Lumpur	1,145,342	50,353	4.4	6.7	1,305,792	71,770	5.5	3.9	5.9	1,588,750	148,592	9.4	7.3	6.6	1,982,112	208,446	10.5	3.4	7.7
W.P. Labuan	54,241	10,048	18.5	1.3	70,871	14,055	19.8	3.7	1.1	83,920	11,780	14.0	(1.8)	0.5	95,120	10,832	11.4	(0.8)	0.4
W.P. Putrajaya	-	-	-	-	-	-	-	-	-	68,361	1,576	2.3	-	0.1	109,202	2,821	2.6	5.8	0.1
Malaysia	**17,563,420**	**751,113**	**4.3**	**100.0**	**22,198,276**	**1,226,738**	**5.5**	**5.5**	**100.0**	**27,484,596**	**2,254,022**	**8.2**	**6.1**	**100.0**	**32,447,385**	**2,691,070**	**8.3**	**1.8**	**100.0**

Table 2.Growth and Non-citizen population, 1991-2020

Notes: Jumlah Penduduk = Total Population; Penduduk BWN = Non-citizen population; Peratus BWN = % Non-citizen; Komposisi BWN = Non =-Citizen Composition

Source: DOSM Malaysia 2025

District Level

An analysis conducted at the district level for 1991 indicated that the districts with the largest non-citizen (BWN) populations were Tawau (92,033), Sandakan (67,433), and Lahad Datu (54,361), which constituted 62.4%, 69.7%, and 54.0% of their respective populations. In 2000, Kinabatangan became the district with the largest share of non-citizen population at 73.1%, whereas Sandakan noted the greatest total of BWN at 102,795. In 2010, Tawau reclaimed its status as the highest, with 164,729 non-citizens, trailed by WP Kuala Lumpur (148,592) and Petaling (148,491).

In 2020, Petaling emerged as the top contributor to the BWN population, housing 210,000 non-citizens, succeeded by WP Kuala Lumpur (208,446), Sandakan (144,840), and Johor Bahru (123,168) (Figure 5). A notable rise in the BWN population was noted in Petaling in 2010 and 2020, even though it had a lesser composition (9.2%). Sandakan exhibited the most steady growth, consistently staying among the top four during the entire period. Petaling and Johor Bahru, being economic and urban hubs, saw a swift increase in population since 1971, leading to a surge in the non-citizen demographic, especially by 2020 (Peng et al., 2021). Figure 5 shows the districts in Malaysia with the largest non-citizen populations (BWN) between 1991 and 2020. It emphasizes

the patterns in population growth at the district level, showcasing major contributors like Petaling, Sandakan, Tawau, and Johor Bahru, which saw substantial rises in their BWN populations over time.

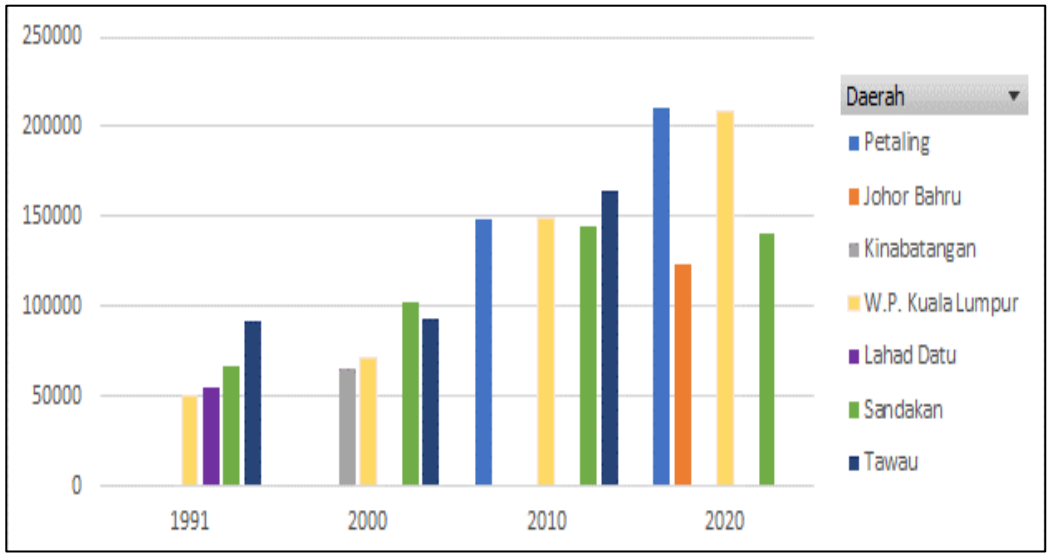
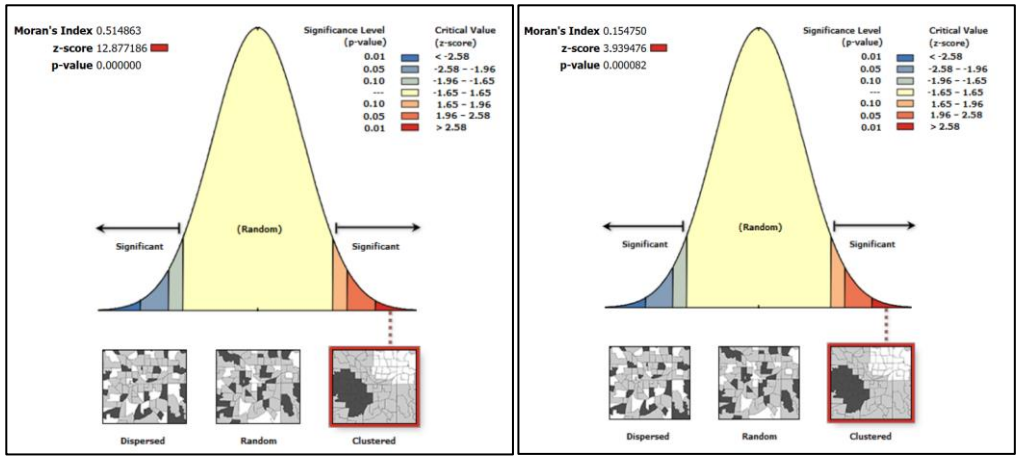


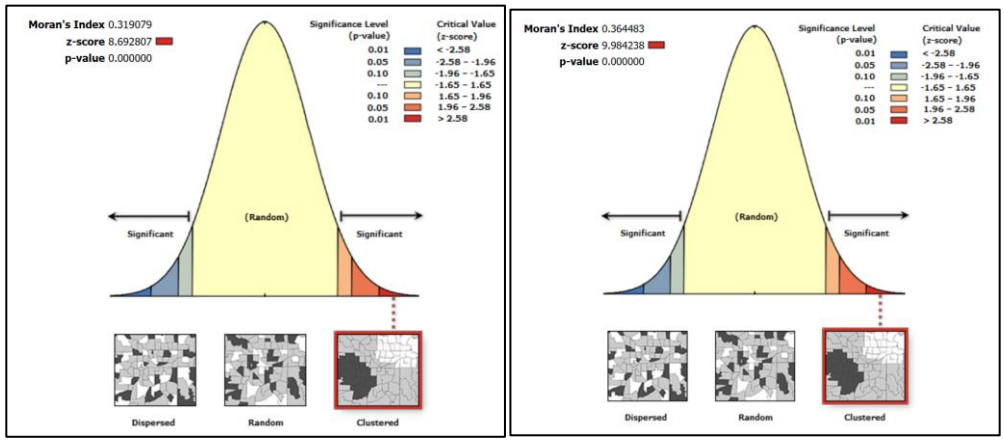
Figure 4. Districts with the Highest Non-Citizen (BWN) Population, 1991-2020.

Source: Adapted from DOSM Malaysia 2025

Figure 6 illustrates the outcomes of the spatial autocorrelation assessment utilizing Moran's I statistic from 1991 to 2020. Moran's I measures the extent of spatial clustering or dispersion of the non-citizen (BWN) population throughout various regions. Positive values of Moran's I suggest clustering, meaning similar values (either high or low) are spatially grouped, while negative values indicate dispersion, where values are distributed more randomly.



1991 2000



2010 2020

Figure 4. Spatial Autocorrelation Analysis Moran's I, 1991-2020.

Source: Adapted from DOSM Malaysia 2025

According to the findings of the spatial autocorrelation analysis, the pattern of distribution for the non-citizen (BWN) population appeared to be clustered throughout all periods from 1991 to 2020. The z-value peaked at 12.87 in 1991, fell to 3.94 in 2000, but later rose to 8.69 and 9.98 in 2010 and 2020, respectively (Figure 6). This grouped distribution suggests that the BWN population is more focused in certain districts within regions like Sabah, Selangor, WP Kuala Lumpur, and Johor.

Shift in the Mean Center of Non-Citizen Population

The average center of the non-citizen population (BWN) in Peninsular Malaysia has demonstrated a movement towards the states along the western coast. Beginning in 1991, the average center of the BWN population was situated in Temerloh, Pahang, and it moved to Bentong, Pahang in the following two periods (2000 and 2010). By 2020, the average center of the BWN population shifted further southwest (Figure 7). This change is driven by the rising BWN population in the northern states of Peninsular Malaysia (Penang, Perak, Perlis, and Kedah), which represented 21.3% in 2020 versus 17.9% in 2010, alongside the considerable increase in Selangor and WP Kuala Lumpur, which collectively made up 44.3% of the BWN population in 2020.

In East Malaysia (Sabah, Sarawak, and WP Labuan), the average location of the BWN population exhibited a fairly stable pattern and did not display a clear trend from 1991 to 2020. Sabah maintained a majority in the BWN population of East Malaysia, comprising 94% in 1991, and varying between 88-85% from 2000 to 2020. At first, the mean center was located in the eastern area of Tongod, adjacent to the Kinabatangan district, but it moved notably to the west by 2000 (Figure 5). This change occurred because of the rising BWN population in western Sabah and the growing number of BWN people in Sarawak, where the BWN share increased from 3.8% in 1991 to 9.7% in 2010. By 2010, the average center relocated to the central area of the Tongod district and subsequently shifted a bit south within the same district.

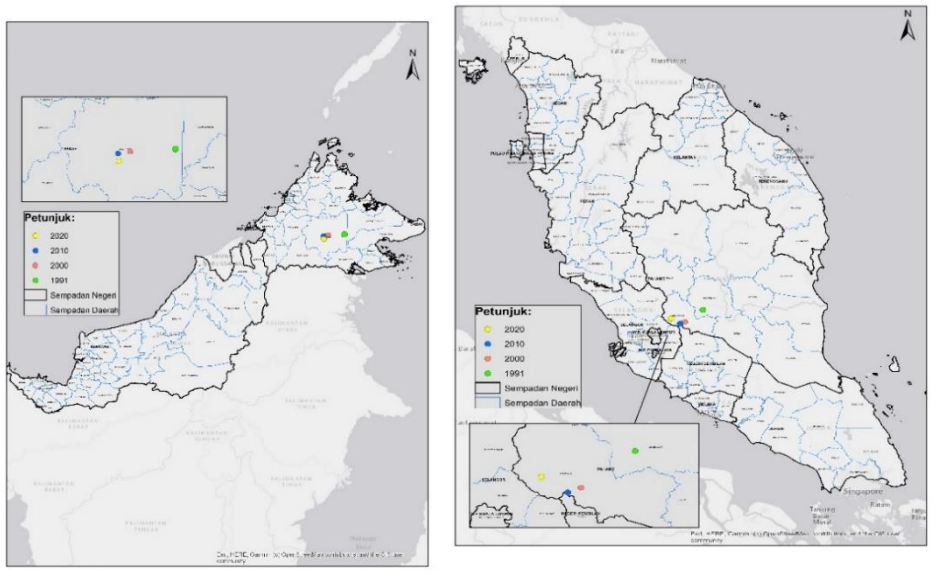


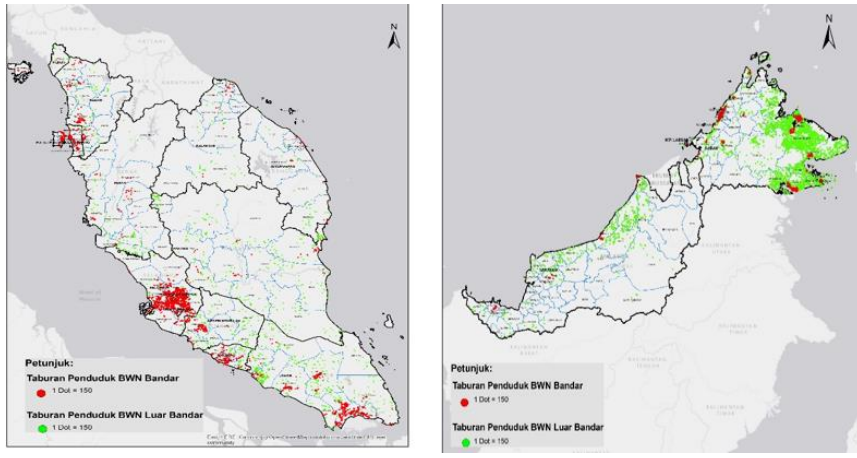
Figure 4. Mean Centre of Population for Non-Citizens (BWN), Peninsular Malaysia and Sabah & Sarawak, 1991-2020.

Notes: Petunjuk = Legend; Sempadan Negeri = State Border; Sempadan Daerah = State Border

Source: Adapted from DOSM Malaysia 2025

Strata Level

At the stratum level of urban and rural regions, the analysis reveals a steady trend of a growing share of the non-citizen population in urban regions. In 1991, 40.3% of the overall BWN population resided in urban locations, making up 3.3% of the total population of urban areas in Malaysia. The makeup of BWN in urban regions exceeded that of rural regions beginning in 2000, with figures at 58.0%, which then rose to 65.1% in 2010 and 69.1% in 2020. In that same timeframe, the proportion of BWN in urban regions increased from 7.5% to 7.6%. In 2010 and 2020, the spatial distribution of the BWN population was primarily in urban regions versus rural areas, especially in Klang Valley, Johor, and Penang (Figure 8, Figure 9, Figure 10, Figure 11). The significant urbanization in these regions, along with economic expansion driven by industrial and service industries, has been crucial in drawing BWN population and labor to these locations (Danial & Williamson, 2022). Nonetheless, the scenario varies in East Malaysia, especially in Sabah, where in 1991, 70% of the BWN population resided in rural regions, dropping to 52% and 47% in 2010 and 2020, respectively. Conversely, the BWN demographic in rural regions rose in 2020, with 56% in Sabah and 70% in Sarawak.

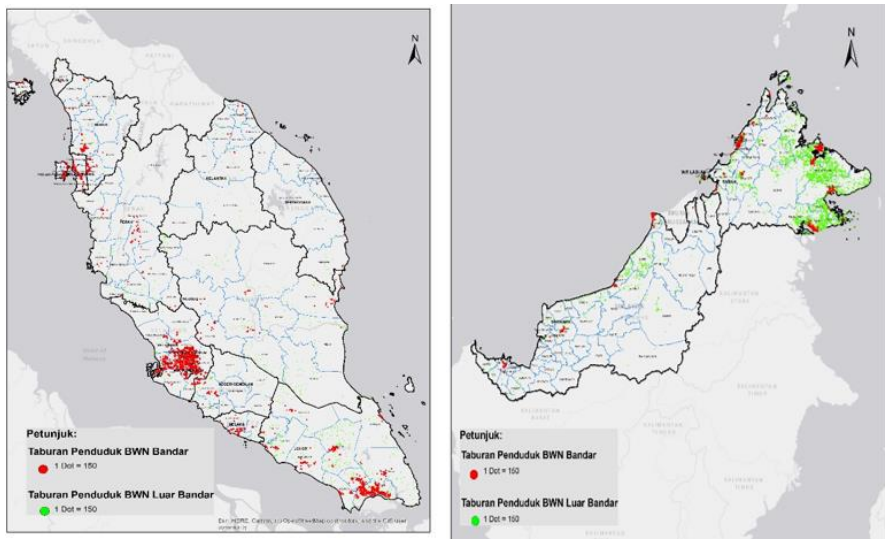


2020

Figure 8. Dot Density Distribution of BWN Population by Strata, 2020.

Notes: Petunjuk= Legend; Taburan Penduduk BWN Bandar = Urban Non-Citizen Population Distribution; Taburan Penduduk BWN Luar Bandar = Rural Non-Citizen Population Distribution

Source: Adapted from DOSM Malaysia 2025

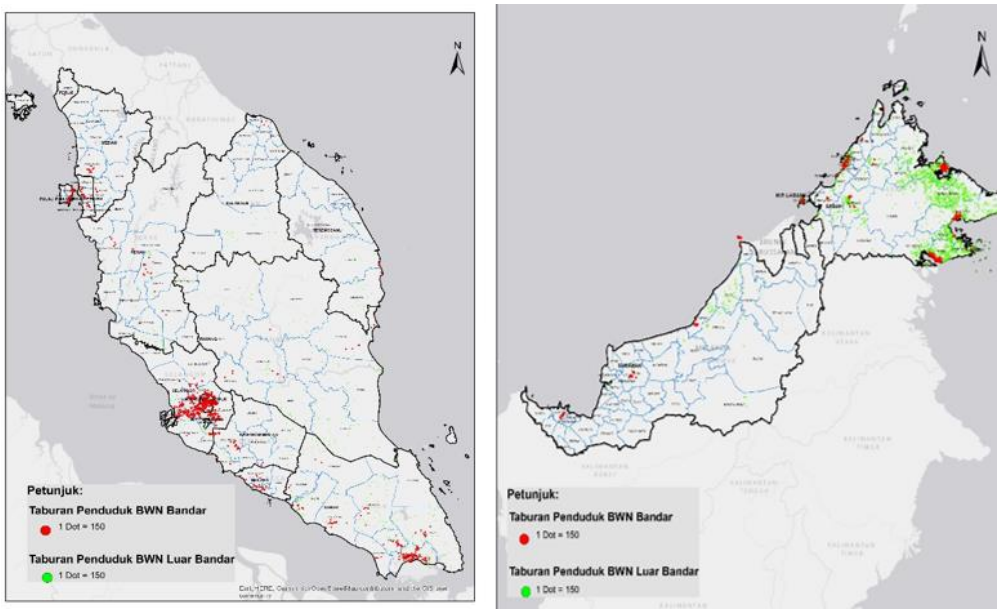


2010

Figure 9. Dot Density Distribution of BWN Population by Strata, 2010.

Notes: Petunjuk= Legend; Taburan Penduduk BWN Bandar = Urban Non-Citizen Population Distribution; Taburan Penduduk BWN Luar Bandar = Rural Non-Citizen Population Distribution

Source: Adapted from DOSM Malaysia 2025

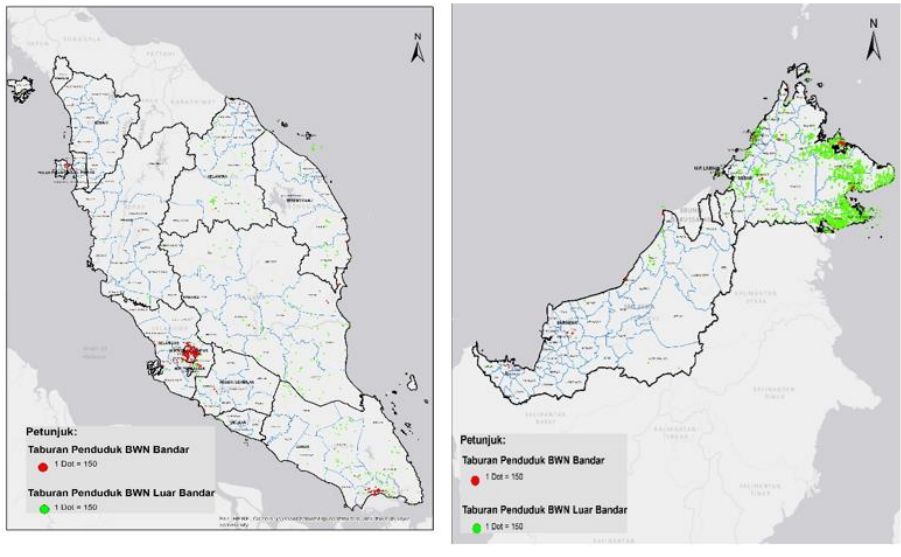


2000

Figure 10. Dot Density Distribution of BWN Population by Strata, 2000.

Notes: Petunjuk= Legend; Taburan Penduduk BWN Bandar = Urban Non-Citizen Population Distribution; Taburan Penduduk BWN Luar Bandar = Rural Non-Citizen Population Distribution

Source: Adapted from DOSM Malaysia 2025



1991

Figure 11. Dot Density Distribution of BWN Population by Strata, 1991.

Notes: Petunjuk= Legend; Taburan Penduduk BWN Bandar = Urban Non-Citizen Population Distribution; Taburan Penduduk BWN Luar Bandar = Rural Non-Citizen Population Distribution

Source: Adapted from DOSM Malaysia 2025

The increase of the non-citizen (BWN) population in Malaysia appears to be focused in particular regions because of geographical and economic influences. Regions experiencing growth in industrial and service sectors, especially in Peninsular Malaysia (Selangor, WP Kuala Lumpur, Johor, and Penang), have a significant population of BWN residents. Nevertheless, the growth trend of the BWN population at the state level between 1991 and 2020 exhibits varying patterns. States like Melaka, Perak, and WP Putrajaya saw significant BWN population growth in 2020, whereas Kedah, Selangor, and Johor were at the top in 2010. In East Malaysia, especially in Sabah, geographical elements, like being near international borders with the Philippines and Indonesia, play a role in the growth of the BWN population (Somiah, 2021). The movement of the average center of the BWN population towards the southwest of Peninsular Malaysia clearly demonstrates the migration patterns of BWN towards areas with fast industrial economic development and elevated urbanization levels, like Selangor, Penang, and WP Kuala Lumpur. As Malaysia's urban populations grow, the quantity of BWN residents is markedly moving towards urban and metropolitan regions, beginning in 2000.

At the district level, Tawau, Sandakan, Kinabatangan, and Kota Kinabalu in Sabah have become key areas for BWN population concentration. The use of spatial data at the smallest geographical levels and temporal analysis is highly beneficial for measuring the patterns and distribution of the BWN population across various geographical levels. Future research concerning demographic distribution and its relationship with social and economic information, such as business establishments and transportation networks, holds potential for further studies to provide a more detailed understanding of the BWN population distribution in Malaysia. At the same time, policies related to the employment of BWN labor in Malaysia need to be refined to ensure that the control of immigration and external impacts can be balanced to ensure the well-being of the citizens (Anderson, 2020).

Conclusion

Ongoing demographic changes, especially towards urban areas, are expected to amplify as countries experience deeper industrialization and urban growth. Future studies might examine the socioeconomic effects of non-citizen groups, analyzing their interactions with local communities, their contributions to economic growth, and their impact on social services and infrastructure. Furthermore, understanding these trends will heavily rely on the impact of migration policies on the growth and distribution of non-citizens.

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