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DO URBAN SPRAWL AND SPATIAL PLANNING STRATEGIES AFFECT RURAL SETTLEMENT AND RURAL BOUNDARIES IN PENANG?

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Abstract

The growing population and demand for urbanisation have led to pressure on rural areas and the natural environment. The crucial issue is protecting the rural area boundaries, which are essential for food security and traditional rural settlements. As urbanisation progresses due to the demand for development and population, the rural settlements and boundaries should be protected to ensure the sustainability of the resources for the population. The categorisation of land use data is inconsistent and poses several insufficient representations of rural boundaries in Penang. The main objective of this study is to compare the changes in rural boundaries in Penang in 2019 and the mapping of urban areas based on several data. The content analysis was used to compare and triangulate the data to be used for spatial analysis. The findings showed that the most prominent type of village is the traditional village, which accounted for 88%. Based on Penang's development priority areas (DPA) until 2030, 20133.83 acres of village or 52.92%. The village boundaries in Seberang Perai Utara District will be substantially affected, with an area of 7968.89 acres (20.95%). The implication of this study is that the protection of traditional villages and fishing villages requires attention given that most affected areas are traditional villages in Penang due to the development direction, with a total area of 18060.61 acres (47.47%).

Keyword: Urban sprawl, rural boundaries, rural settlement, spatial planning strategies and Penang

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INTRODUCTION

Rapid urbanisation often causes pressure on rural areas and the natural environment. Worldwide urbanisation has resulted in a significant increase in urban population from 751 million in 1950 to 7.7 billion in 2019, with a predicted increase to 9.7 billion by 2050 (United Nations, 2019). According to PLANMalaysia (2016), urbanisation is a transformation and application process of urban features to a specific area. This process comprises the migration of rural inhabitants to urban setting conditions, resulting in changes in social and economic activity, values and cultures (Othman, 2021). Urbanisation has led to the changing nature of rural areas and peri-urban areas in terms of changes in land uses that are commonly used for agriculture, natural resources and rural settlements. The most significant repercussion of urbanisation is urban sprawl. In general, rural areas are synonymous with unplanned, unregulated and uncoordinated growth of low density. It is distinguished by self-sustaining infinite outward growth in the forms of leapfrog, radial and ribbon development. It is frequently used derogatorily because of the negative externalities connected with the term "sprawl". Sprawl differs from urban expansion in that it is an unsustainable type of urbanisation (Sudhir Kumar, 2018).

In the context of Malaysian urban development, the urbanisation process is a crucial challenge in attaining the country's aspirations to become a developed country. Malaysia, similar to the Asia-Pacific region, has witnessed significant urbanisation as a result of economic development, industrialisation, major migrations and a natural growing population (Mohammed et al., 2016). According to study, states that are robust and engaged in economic development would inevitably feel the pressure of the urbanisation process. According to DOSM (2021), Penang dominated the 2021 GDP performance with a 6.8 percent increase, followed by Selangor (5.0 percent), Terengganu (5.0 percent), Perak (3.5 percent) and Kedah (3.5 percent) (3.2 percent). The detrimental consequence of urban sprawl is the impact on rural areas and settlements in Penang. According to Tew et al. (2019), Penang's urban area grew from 379.20 km2 in 2004 to 453.06 km2 in 2018, at a rate of 5.28 km2/year on the average. Based on the findings of the study, urban sprawl is an annual event and will continue to grow, thereby significantly affecting rural settlements and their boundaries. This situation is not novel, where Penang State's districts (Seberang Perai Tengah and Seberang Perai Selatan on the mainland, and Barat Daya on the island) have experienced sprawl growth as a result of rapid urbanisation since the late 1980s (Osman et al., 2017). As a result, every policy and development planning direction implemented by the state will inevitably influence the physical changes in the built environment within the territory under its jurisdiction. This study aims to investigate the changes in rural settlements and their boundaries and Penang spatial planning policy outlook.

FACTORS OF URBAN SPRAWL

According to Karakayaci (2016), the territories of urban sprawl, which are defined as areas that have lost their rural features but cannot be classified as urban, have unique ambiguities that result in various difficulties, such as unplanned urban expansion and non-agricultural exploitation. As a result, urban sprawl might be characterised as a buffer zone between rural and urban regions. Gordon and Richardson (1997) characterised urban sprawl as leapfrog development, and DiLorenzo (2000) defined it as cancer or virus-induced expansion. Wilson et al. (2003) and Galster et al. (2001) argued that describing rather than defining would be more appropriate in the case of urban sprawl.

Therefore, in the context of Malaysian development, Yin et al. (2022) claimed that Malaysia undertakes diverse land-use allocation and conversion in the city centre, resulting in leapfrogging urban development to the suburbs. This phenomenon has resulted in changes in land use/land cover in built-up areas, which have begun to expand on agriculture and forest areas in peri-urban areas. Changes in land use/cover have beneficial and negative effects on a region. The expansion of a built-up area is assumed to result in greater economic growth and job opportunities in a region. This trend has become a substantial risk to environmental deterioration, traffic congestion and overpopulation. As a result, changes in land use and cover must be carefully planned and monitored (Samat et al., 2020).

According to Yasin et al. (2021), the condition of urban sprawl differs widely, with a distinct sequence in each city, state and country. Thus, the drivers, pressures and dynamics of urban sprawl are undoubtedly diverse. The driving forces of urban sprawl are described in its urban features, which are derived from their preceding academic literature, are socioeconomic, institutional, demographic, market and technology. In addition, Sudhir Kumar (2018) stated that the major causes of urban sprawl in his comparative study of developing and developed world cities can be grouped into 10 causes, namely, population growth, uneven/regional disparities in development, economic growth, transportation, government policies, affordable housing, speculation, consumption of black money, credit/loan facility and the nuclear family. Specific findings of this study include rapid urbanisation, unequal development, affordable housing, income/employment opportunities, inadequate infrastructure, unplanned or poorly planned urban expansion and poor execution of developmental plans; they are the major causes of urban sprawl in the developing world. The planning process is unable to anticipate the future because challenges caused by increasing urbanisation restrict the planning exercise to primary crisis management. In a nutshell, government policy is the primary driving force behind the emergence of urban sprawl. Failures in planning and policy direction in development plans may greatly affect the issue of urban sprawl, as we become closer to being developed nations and achieving sustainable development.

MALAYSIAN DEVELOPMENT PLANNING FRAMEWORK

Act 172 is an act that enters into force for peninsular Malaysia and serves as the foundation of urban planning policy and legislation in Malaysia at present since the year 1976. The planning system is also arranged hierarchically amongst the federal government, state government and local authorities to attain sustainable development goals. According to Town and Country Planning Act 1976 (Act 172) Part 2, subsection 2A(2) (a) enshrined a formation of the National Physical Planning Council, which functions *"to promote town and country planning in the country, within the framework of national policy, as an efficient and effective tool for enhancing the physical environment and achieving sustainable development in the country".* In addition, Part 2, subsection 3 allocating the role of general planning policy at state government and local authority levels, where "*subject to Clauses (5) and (6) of Article 91 of the Constitution, the State Authority shall be responsible for the general policy in respect of the planning of the development and use of all lands and buildings within the area of every local authority in the State; the State Authority may, in or for the purpose of discharging the responsibility of the State Authority under this section, from time to time give to the Committee or any local planning authority directions of a general character not inconsistent with the provision of this Act, and the Committee or local planning authority shall give effect to such directions"*. Referring to PLANMalaysia (2020), planning governance is organised into three (3) tiers, namely, federal, regional/state and local. At the federal level, it is governed by the Ministry of Federal Territories, PLANMalaysia, federal departments and agencies. National Physical Plan, Five-Year Malaysia Plan, sectoral policies/strategies, National Urbanisation Policy and National Rural Planning Policy are implemented at the federal tier, translating spatial planning as a macro policy for Malaysians. In regional/state tiers, the spatial planning is governed by the respective state government and PLANMalaysia@States (within 12 states in Peninsular Malaysia). Under regional and state planning, the provision of specific policies for each state and several regions that are formed includes utilising regional plan, structure plan and sectoral policies/strategies as guides in strategic planning. Subsequently, Peninsular Malaysia has 100 local authorities (including the Federal Territories of Kuala Lumpur and Putrajaya). Local governments are responsible for the provision of two policies at the local tier: the Local Plan and the Special Area Plan for their respective territories. For instance, all policies that exist under this legal provision must be pragmatically implemented, monitored and reviewed at each tier to guarantee that the national state and the local government are effective, efficient and can procure sustainable development for Malaysians.

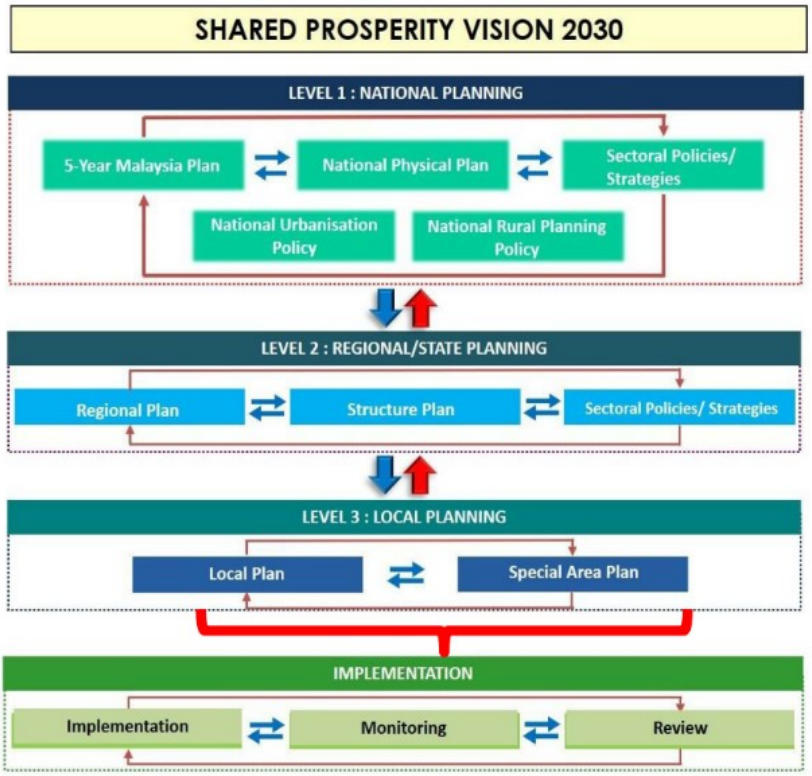

Figure 1: Malaysian Spatial Planning Framework
Source: Adopted from PLANMalaysia (2020)

RURAL SETTLEMENT IN MALAYSIA

Rural settlements, such as urban areas, are organised in a hierarchy that has been established based on criteria and features. The classification of the provided category against rural areas is performed to guarantee that each rural area performs its functions and appropriately governs the region. Malaysian settlements in rural areas are classified into three categories: towns, District Growth Centres (DGC) and villages. The definition and criteria for the three (3) categories of rural settlements are as follows (PLANMalaysia, 2017):

i. Town
"Town is a small settlement with urban characteristics but has a population of less than 10,000 people. Usually, towns provide various facilities and basic social services, such as schools, markets, public halls, playgrounds, police stations, mosques and clinics".

ii. District Growth Centre (DGC)
"DGC is a settlement outside the city where it provides various services, such as a centre for the dissemination of information and innovation, the distribution of necessities, collecting and marketing of village products as well as offering of non-agricultural job opportunities to the villagers".

iii. Villages
"Settlements other than towns and DGC are identified as villages, including traditional villages that are developed organically by settlers in groups or individually. Structured villages are developed by the government either in resettlement plans or plans to open up new land and private agricultural estates".

Typology of Villages in Malaysia

DPF Desa Negara 2030 is Malaysia's first spatial rural planning policy that fulfils the objectives of a national rural development policy. With the establishment of the country's rural planning policy, eight categories of villages were established, along with criteria for representing the privileged elements of rural settlements. The eight categories of villages established under DPF Desa Negara 2030 are illustrated in **Figure 2** below.

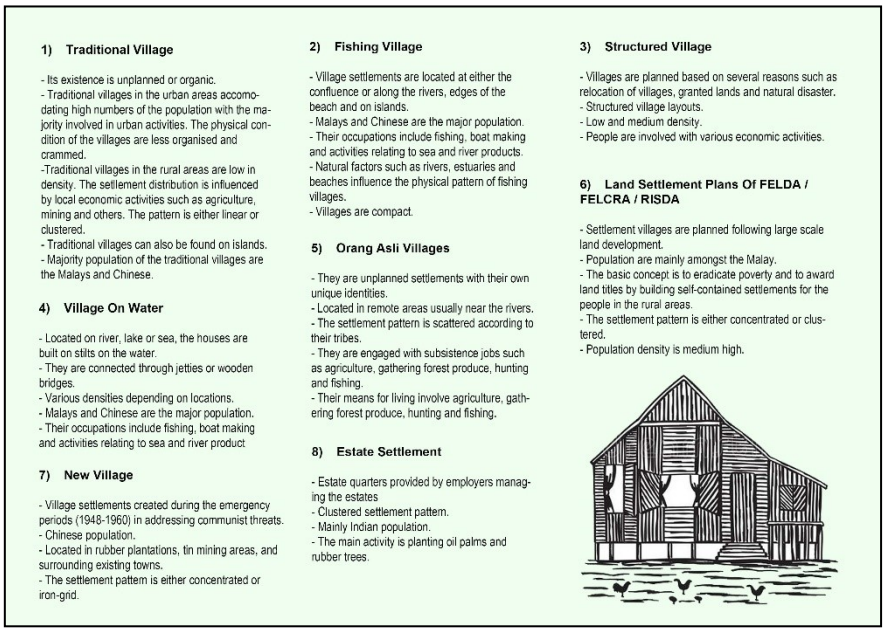

Figure 2: Eight (8) Categories of Village in Malaysia
Source: PLANMalaysia (2017)

METHODOLOGY

This study adopted a qualitative method by using content analysis. Several documents were gathered including secondary data obtained from spatial development policies, such as National Urban Policy, Rural Physical Planning Policy, National Physical Plan and Structure Plan. Further analysis was conducted using spatial analysis (Geographical Information System Software). A few criteria were selected, and the overlay technique was performed to map the affected boundaries of villages as gazetted protected areas for traditional villages and KESAS (paddy). The data were based on the Penang Policy Direction as mentioned in Penang Structure Plan and National Physical Plan. An overlay between village boundaries in 2019 and development priority areas (DPA) as stipulated in the Penang State Structure Plan 2030 has been made to produce a comparative analysis of the study.

DATA ANALYSIS AND FINDINGS

Table 1 presents the 638 villages in the state of Penang. Majority of the village categories found in the boundaries of the state of Penang are traditional villages with a percentage of 88.08%. Seberang Perai Utara District has the largest number of villages amongst other districts with 239 villages.

Table 1: Total Number of Villages by Category in Penang (2019)

Village Categories	Timur Laut District	Barat Daya District	Seberang Perai Utara District	Seberang Perai Tengah District	Seberang Perai Selatan District	Total	%
Traditional Village	59	48	228	118	109	562	88.08
Structured Village	6	6	5	9	2	28	4.38
Village on Water	6	*null*	*null*	*null*	*null*	6	0.94
Fishing Village	1	9	1	1	1	13	2.03
New Village	*null*	*null*	1	5	3	9	1.41
Estate Settlement	*null*	*null*	4	3	10	17	2.66
Squatter	*null*	*null*	*null*	3	*null*	3	0.47
Total	72	63	239	139	125	638	100

Source: PLANMalaysia (2019)

Projection of Village Boundaries affected by DPA in Penang State Structure Plan 2030

According to a projection based on Penang's DPA until 2030, a total of 20133.83 acres of village boundaries, or 52.92%, will be affected by the future development direction towards 2030. Referring to Table 2, the village boundaries in Seberang Perai Utara District will be significantly affected, with an area of 7968.89 acres (20.95%). This district has the largest number of villages in the state, where the main land use is agriculture, focused on paddy farming activities. Many areas in

this district have been gazetted as rice granaries. The Seberang Perai Tengah District is the second most affected, with a village boundary of 4876.38 acres (12.82%). The affected village boundaries in Seberang Perai Selatan District are 2519.57 acres with a percentage of 6.62%. Meanwhile, the spatial development trend outlined in the Penang State Structure Plan 2030 will influence the island part of the Barat Daya District, which comprises 3759.37 acres (9.88%). Nevertheless, the boundaries of the villages in the Timur Laut District are affected in general given that all of the villages in this district are located close to the urban area of George Town, which is the capital of Penang; the pace of urbanisation in this district is extremely fast. The only exception is the village on water, which has already been gazetted as a heritage village in the George Town special area plan. In terms of the entire category of villages in the state of Penang, the traditional village is the most affected, with a total area of 18060.61 acres (47.47%), as compared with other existing categories.

Table 2: Projection of Villages Boundary Affected by Development Outlook Based on Penang State Spatial Planning 2030

	Sum of Area (Acres)											
Village Categories	**Timur Laut District**		**Barat Daya District**		**Seberang Perai Utara District**		**Seberang Perai Tengah District**		**Seberang Perai Selatan District**		**Total Existing**	**Total Affected**
	Existing	**Affected**	**Existing**	**Affected**	**Existing**	**Affected**	**Existing**	**Affected**	**Existing**	**Affected**		
Traditional Village	868.86	868.86	3871.83	3086.91	20074.82	7520.51	5391.86	4372.49	4322.71	2211.84	34530.08	18060.61
Structured Village	134.67	134.67	248.39	248.39	95.10	95.10	168.39	168.39	108.67	14.32	755.21	660.85
Village on Water	22.55	*null*	*null*	*null*	*null*	*null*	*null*	*null*	*null*	*null*	22.55	*null*
Fishing Village	6.10	6.10	424.07	424.07	92.83	92.83	30.46	*null*	20.55	*null*	574.01	523.00
New Village	*null*	*null*	*null*	*null*	1100.78	*null*	340.69	310.89	293.53	180.75	1735.00	491.64
Estate Settlement	*null*	*null*	*null*	*null*	284.99	260.45	29.70	24.61	112.66	112.66	427.36	397.72
Total	1032.18	1009.63	4544.29	3759.37	21648.52	7968.89	5961.10	4876.38	4858.12	2519.57	**38044.21**	**20133.83**
%	2.71	2.65	11.94	9.88	56.90	20.95	15.67	12.82	12.77	6.62		**(52.92%)**

Source: Modified Data from PLANMalaysia (2019)

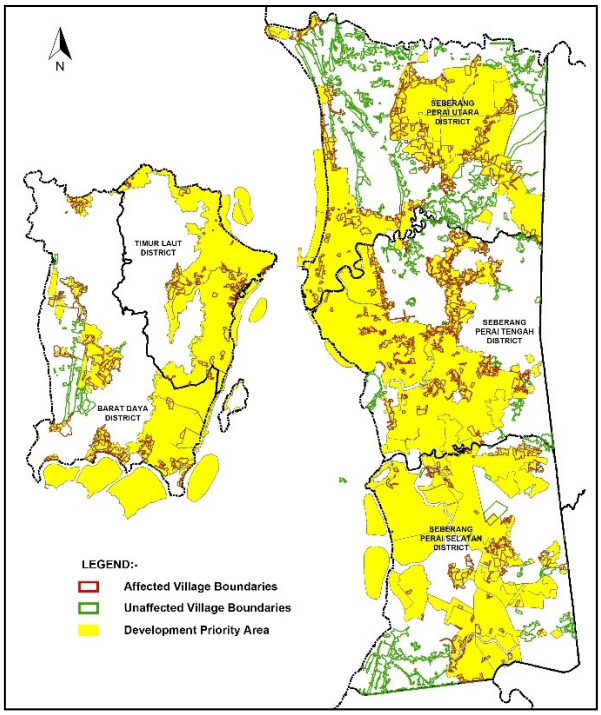

Figure 4: Map of Village Boundaries affected by Development Priority Areas based on the Penang State Structure Plan 2030

The Policies related to Malaysian Spatial Planning Framework

Table 3: Related Policies to Malaysian Spatial Planning Framework

Related Policies	Strategies/Policies Statement
Sustainable Development Goals (SDGs)	Goal 11 (Sustainable Cities and Communities) -"By 2030, enhance inclusive and sustainable urbanisation and capacity for participatory, integrated and sustainable human settlement planning and management in all countries" -"Support positive economic, social and environmental links amongst urban, peri-urban and rural areas by strengthening the national and regional development planning"
New Urban Agenda (NUA)	"Satisfy the challenges and opportunities of present and future sustained, inclusive and sustainable economic growth, leveraging urbanisation for structural transformation, high productivity, value-added activities and resource efficiency, harnessing local economies and taking note of the contribution of the informal economy whilst supporting a sustainable transition to the formal economy;

	-"Fulfil their territorial functions across administrative boundaries and act as hubs and drivers for balanced, sustainable and integrated urban and territorial development at all levels"
National Urbanisation Policy 2	Thrust 1: Efficient and Sustainable Urban Development NUP 4: Urban growth limit is determined based on its carrying capacity for all towns in the country. NUP 5: Optimal and balanced land use planning shall be given emphasis in urban development. NUP 7: Village development in towns shall be integrated with urban development. NUP 8: Environmentally Sensitive Area and Prime Agricultural Area shall be conserved.
National Rural Planning Policy 2030	The National Rural Physical Planning Policy 2030 was designed to address the issue of development imbalance between urban and rural areas and increasing urbanisation. Core 2: Strengthening of Symbiotic Relationships Urban–Rural Core 3: Strengthening of Rural Dwelling Capacity
4th National Physical Plan 2040	The fourth RFN with the goal of "Resilient and Prosperous", was drafted as a comprehensive development plan with a focus on aspects of national security planning, including the management of national water areas in the vicinity of three nautical miles, digital infrastructure improvement, smart development, a carbon-neutral country and guaranteeing national food security in addition to the formation of inclusive and viable communities. Core 1: Dynamic and Balanced Growth Core 2: Spatial Sustainability and Resilience to Climate Change Core 3: Liveable Environment and Inclusive Communities
Penang State Structure Plan 2030	Chapter D, 6.2: Conservation, Preservation and Development of Village Area SP 6.2.1: Planning and Developing Village Land Use Holistically SP 6.2.2: Conserve and Preserve the Identity Compatibility and Character of the Village with the Surrounding Area Especially Heritage Village SP 6.2.3: Encouraging Economic Activities to Support the Rural Tourism Industry
Local Plan	- Draft Local Plan for Seberang Perai 2030:- T2-01-2: Retention of Selected Villages to Improve the Quality of Life Action 1: Maintenance of Traditional Village Action 2: Redevelopment and Renewal of the Fishing Village Area - Local Plan for Barat Daya and Timur Laut District status is not yet available.

DISCUSSION

As shown in Figure 4, the overlay of affected villages within the development priority area is scattered into five main districts in Penang. The districts potentially affected due to pressure of development are Seberang Perai Utara and Seberang Perai Tengah. The development priority area has been identified in Penang Structure Plan 2030, considering future development, which concerns socio-economy, investment and state and regional growth. By 2030, the affected villages in DPA Penang will potentially transform into more competitive land uses, and the loss of rural settlements may affect human capital in food security. Furthermore, the development priority is a high investment area to be developed by the investors. Majority of the land ownership is individual and privately owned, restricting the sustenance of rural settlements. Some underlying reasons for selling their land are financial constraints and the profitable value for selling their land. Despite the potential loss of these villages, the State Government emphasised that the policy of Penang Structure Plan 2030 should consider village boundaries as well as identify potential villages that can be listed as heritage villages for preservation.

The unaffected areas are mostly for agriculture land use; the areas are gazetted for paddy agriculture, and some are still maintained because they are not priority for development. However, the non-gazetted area might be affected in the next 20–30 years if no action is taken by the state government to maintain it.

Valuable villages that are part of the state development should be protected to sustain and balance the development between urban and peri-urban. Hence, the state and local government play an important role to ensure a balance development direction in sustaining the human capital residing in the village area. The sustainability of the environment can be protected by imposing the policy or gazettement in protecting the village's boundaries, as highlighted in SGD.

CONCLUSION

Urbanisation and protecting the rural settlement boundary face crucial conflict. Albeit, several spatial planning frameworks emphasised on strategic approach for development in the future. The cost that our nation will incur should not be ignored. Although land ownership might be challenging for the sustainability of villages, the transformation of the land uses into more competitive investments in line with future development is more compelling for the landowners. Out-migration has been a factor of urban sprawl, and the conversion of village settlement affects the human capital in securing the food security, which is mainly concentrated in rural and peri urban areas. The protection of environmentally sensitive areas has been gazetted to secure the resources for our population and nation, but the factor of human capital settlements should be adhered to planning strategic framework.

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