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ENHANCING THE DEVELOPMENT OF UNDERGROUND LAND: ISSUES ON LEGAL, SOCIAL AND ECONOMIC ASPECTS

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Abstract: Underground development has been the way forward in the current development approach, especially in Malaysia. However, underground development has legal, social, and economic impacts on the nation's growth. This study examined the importance and issues involving current legal provisions, social concerns and cost or compensation for land acquisition. The study embarks on the qualitative methodology of doctrinal study and thematic content analysis from legal documents and legislation. Interviews and focus group discussions have been conducted with two (2) subject matter experts recognised by the Government of Malaysia in land acquisitions and land legislation, and engaged with land administrators for every state. The study also analyses the current legal provision and practice for compensation payment in underground land acquisition through case law. The study finds that the current ownership and rights are provided in the National Land Code of Malaysia, but the issue is on the implementation and decision of the State Authority in alienating the underground land. In addition, it is found that underground development needs to be readily accepted by the nation, in all aspects such as planning, legal provision and compensation for the underground space. Hence, the use of the physical underground land and the legal aspect must be in parallel with the development approach to provide a balance of needs.

Keywords: acquisition, development, land, legal, underground

1. INTRODUCTION

Development in current trends is to be vertical in nature. This development approach has been in the market to cater for the development in urban areas (bt Zaini et al., 2012). Thus, urban development is more towards vertical development, especially in developed countries (Zaini et al., 2021; Z. Zhang et al., 2020). Developments such as underground tunnels for train tracks are very much attached to the development in urban areas in developed countries (M. Zhang et al., 2022). Other development purposes, such as residential and commercial, are also alongside this development in such countries (Zaini et al., 2013).

However, developing countries are still looking into the implementation of the vertical development approach. In Malaysia, for example, underground developments are gaining its token as the preferred approach for urban development. Urban developments are vertical developments in addition to at-grade developments or horizontal developments. The scenario in Malaysia for vertical developments is fairly equal to other developed countries' approaches, but mainly on the public purpose development – public roads, rail tracks, and a combination of several uses, such as roads and flood mitigation.

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Vertical developments in a conventional method or approach connote the developments upward. The infrastructure is built from the surface of the land upwards, such as stratified buildings. References to the stratified buildings may differ for their purposes. In Malaysia, it is reported that the current stratified scheme amounts to 24,611 schemes throughout Peninsular Malaysia (Bakri, 2025). The buildings may be built for residential purposes, like condominiums and apartments. On the other hand, the buildings may be for commercial purposes, such as office spaces and shop lots. Moreover, there are also infrastructures with multi-purpose and combinations of different purposes. These developments introduced terms such as Small Office Home Office (SOHO), Services Apartments, commercial complexes, as well as hotels and residences. These instances are covered by legal frameworks such as the Strata Titles Act 1985 in Malaysia, the Land Titles (Strata) Act 1967 in Singapore and the Strata Scheme Development Act 2015 in New South Wales, Australia.

Conversely, the vertical development is also going downwards. The downward developments in the vertical approach may be initially for the basement parking, storage spaces or bunkers (Perperidou et al., 2021). Not to mention, the downward development is also for military purposes as safety vaults or weapon storage. At least, the use of underground land is linked to utilities such as electricity, sewerage and water supply (Land Acquisition Plan Tuz Gölü Underground Gas Storage Project, 2005; Yan et al., 2019).

However, the main concern of the research is on the civil and public infrastructure of daily activities. Several works of literature show that downward developments have evolved from rail tracks as for public amenities, to further advanced use of the underground land, such as to provide a city or a neighbourhood underground (Konykhov & Kolybin, 2021). Thus, this development of vertical downwards approaches is gaining extension to other purposes (Bobylev, 2009; Zhou & Zhao, 2016).

Defining underground development, some scholars refer to the term underground as the subsoil, sub-terrain and subsurface (Volchko et al., 2020). In Malaysia, the definition of underground land is found in the National Land Code [Act 828] (NLC). Section 92A was inserted in the NLC in 1990 to define underground land and matters connected to it. It is a move to provide the legal framework for underground land ownership for development. Besides, there are also vertical land use regulations that need to be adhered to (Zaini et al., 2021). Land use is governed by specific legislation for land development. It is suggested by scholars that the development of underground land needs to have a master plan (Jamalludin et al., 2016). Additionally, the Malaysian framework in NLC also introduces another term, such as stratum. Under NLC, stratum is defined as "*a cubic layer of underground land*", whereas underground land means "*land which lies below the surface of the earth*".

Further, in Malaysia, the underground land is rarely involved in the alienation of land as the first option of disposal of land by the State Authority. Most of the underground land use in Malaysia is prepared through mutual agreement and compulsory land acquisitions. The theory of land ownership in Malaysia, which confers ownership and rights to the proprietor for the surface, above and underground land, should also be read together with the obligations to the public for the support of the land. Similarly, as the land is among the main factors in economic and infrastructure development, valuation of the land and compensation should be adequate, fair and just to the land owner in the case of compulsory land acquisition.

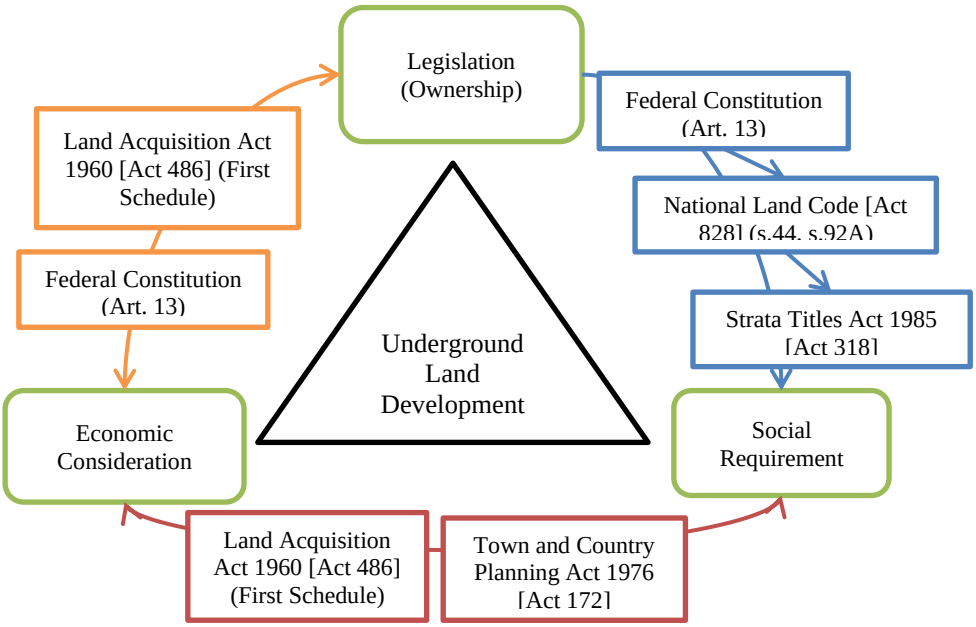

Figure 1. *Conceptual Legal Framework on theory and principles in underground land development*

In such a case, this paper seeks to explore the connectivity and nexus of legal, social and economic aspects in considering how to enhance the underground land development framework as in Figure 1. This discussion will be further elaborated in a subsequent section on the legal position of underground land development. Nevertheless, the research is narrowed down to the implementation of compulsory land acquisition in Malaysia. The findings from the content analysis will be discussed in the subsequent paragraph. This paper will complete with a conceptualisation and policy reform recommendation before the formal conclusions on the findings of the research.

2. MATERIAL AND METHODS

The researcher embarks on the use of qualitative methods. The qualitative method in the current study is the preferred option to answer the question of how the connection between several elements can impact the development of underground spaces. As the study is based on the doctrinal study, as to the legal position of the development, content analysis is done on the data available to the study. The data are from the provision of the law of a selected country, which is Malaysia. Several lists of legislation used are as Table 1 below.

Table 1. *List of Considered Legislation*

Short title	Act	Status and date of enforcement	Year
National Land Code	Act 828	In force	Revised 2020
Strata Titles Act 1985	Act 318	In force	Updated 2021
Land Acquisition Act 1960	Act 486	In force	Updated 2022

Apart from the legislation, this research also approaches subject matter experts in land administration, who is in the land administration organisation. These subject matter experts are recognised by the Public Service Department of Malaysia (*Jabatan Perkhidmatan Awam – JPA*) in their field of land administration. They are now attached to the Department of Director General of Lands and Mines, Malaysia (*Jabatan Ketua Pengarah Tanah dan Galian Persekutuan – JKPTG*).

Besides, the information and awareness of underground development in Malaysia are still new, so a non-probability sampling is chosen. Participants are from specific players in underground development, especially the land administrators and underground developers. Small group discussions are also organised to gain inputs from well-known scholars in land acquisition, such as a Professor in Land Law, as well as the President of the Association of Land Professionals of Malaysia (*Pertubuhan Professional Tanah Malaysia – PERTAMA*).

3. RESULTS

3.1. Legal provision

The provision of law in the underground legal framework has been in place under the National Land Code of Malaysia. The initial introduction of the underground legal framework is based on the development and construction of underground parking at Dataran Merdeka. It is debated in the House of Representatives in the Parliament of Malaysia as to the development of the underground land and the need to have an underground legal framework. Thus, in 1990, the National Land Code [Act 828] (NLC) was amended to introduce underground ownership. It is introduced under Part Five (A), which is a portion of the NLC on the Disposal of Underground Land (National Land Code [Act 828], 2020). Section 92A of the NLC provides 3 important terms, which is as follows –

> ***"92A Interpretation***
> *In this Part, unless the context otherwise requires—*
> *"adjoining underground land" means underground land adjoining a stratum above, below, and on the sides of, the stratum;*
> *"stratum" means a cubic layer of underground land; and*
> *"underground land" means land which lies below the surface of the earth."*

These definitions mentioned in the NLC will be used in any development of underground lands. The development refers to the development of below the surface of the earth, which is below the surface of the land.

As such, it includes the land at the same level, but may differ as to the height of the land. It is further explained in the circular published by the JKPTG on underground land disposal, as in Figure 2, including the land below water, and underground in a hill. The circular was in force in 2018 before being revised due to the development of the law. The current circular published by JKPTG further advises in relation to the amendment to the NLC and the consequences of the land acquisition (Panduan Pelaksanaan Pelupusan Tanah Bawah Tanah Di Bawah Kanun Tanah Negara (Disemak-2020) [Akta 828], 2021).

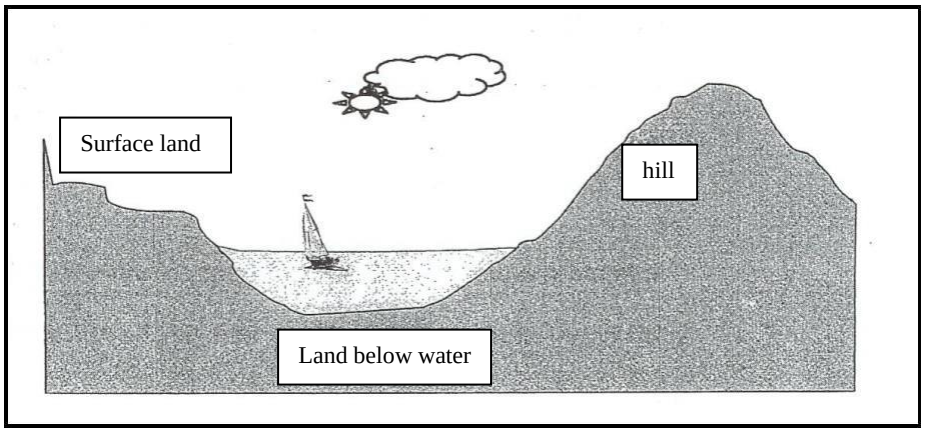

Figure 2. *The underground land (label amended from the source)*

Besides, the development of underground land is guided by the planning authority. In Malaysia, the Department of Town and Country Planning (*Jabatan Perancangan Bandar dan Desa – JPBD/PLANMalaysia*)[6] is the planning authority and provides the guidelines for development. In this particular case, PLANMalaysia published several planning guidelines to cater for the needs of development as well as to govern the planning activities. One of the planning guidelines is the planning guidelines for underground development (PLANMalaysia, 2022). It was published in 2022, echoing the amendments to the law on the underground legal framework.

In addition, the preparation of land for underground development is also provided by the Land Acquisition Act 1960 [Act 486]. The previous legal framework on land acquisition did not provide for underground land acquisition. This scenario created hiccups in the development of the project, at that time, the Mass Rapid Transit (MRT). It establishes the need for various research gaps and contributes to various research findings by scholars, particularly on the underground legal framework in Malaysia[7]. Several records of the findings are to amend the current law, and others suggested enacting another law (Hassan, 2016; Zaini, 2016). This particular finding seems consistent with the initiative taken by the government.

As such, in 2016, Act 486 was amended to include the land acquisition for underground land, together with the provisions of various situations and scenarios of acquisition under strata title (Mohamed, 2017; Senawi et al., 2018). This legal framework came into force in 2017 after being assented to by the King on 31st August 2016. Thus, it will support the needs of development, such as the Mass Rapid Transit (MRT) development, and other development needs for the use of underground land.

For the purpose of clarification, further guidelines were published by the JKTPG. The circular of the JKPTG provides detailed explanations of the process and procedure for implementing the land acquisition (Panduan Pelaksanaan Pengambilan Tanah Bawah Tanah, 2020). It is mentioned that the acquisition of underground land is a land acquisition of part of the land, which can be acquired through Act 486. Section 7 of Act 486 says –

> *"**Preparation of plan and list of lands***
> *7. (1) Whenever any lands are needed for any of the purposes referred to in section 3 the Land Administrator shall prepare and submit to the State Authority—*
> *(a) a plan of the whole area of such lands, showing the particular lands, or parts thereof, which it will be necessary to acquire; and*
> *(b) a list of such lands, in Form C.*
> *(2) **Where the acquisition of part of the land refers to underground land**, the plan referred to in paragraph (1)(a) shall also describe the extent and area of the underground land to be acquired."(**emphasis added**)*

[6] PLANMalaysia is the rebranding name referring to the Department to provide clear picture of its functions.
[7] Various publications and research done by Farah Zaini, scholars from Malaysia, focusing on the development of the underground legal framework in Malaysia.

By virtue of this section, compulsory land acquisition can be invoked for the preparation of underground land development. It is worth noting that compulsory land acquisition is applicable only to individual land titles. It refers to the alienated land which has been disposed of by the government, in particular, the State Authority, for the purposes as per the application.

Thus, the invocation of compulsory land acquisition will come together with the requirement to provide and payment of compensation. It is a general rule that the land acquired, which is the property of a person, is to be compensated because of the acquisition. The principle of Article 13 of the Federal Constitution of Malaysia needs to be adhered to. In addition, Act 486 also requires payment of compensation as formulated in the First Schedule of Act 486. This legal proposition illustrates the need to focus on the economic and social aspects of the aggrieved parties involved in the compulsory land acquisition, as well as the development of the underground land.

3.2. Economic valuation method

Therefore, the payment of compensation must be at the heart of the compulsory land acquisition process and proceedings. The payment of compensation is basically guided by the economic principle of the market value of the land. It is the first principle of payment of compensation. The land needs to be valued according to the market value. As per the discussion with the participants in the research, the market value for the underground land is not yet ready in a solid way. According to Jaiya (2025), one of the subject matter experts says that the valuation of land is subject to the respected authority, and the land administrator has no authority to decide deliberately. As in Malaysia, the valuation is done by a valuer who is guided by an institutional authority known as the Valuation and Property Services Department (*Jabatan Penilaian dan Perkhidmatan Harta - JPPH*). The JPPH will provide guidelines through their circular, which will be used by not only government valuers, but also private valuers.

The research finds that there are several methods of underground valuation as proposed by scholars. The valuation methods are suggested to differ on a case-by-case basis, depending on their purpose. In general, the literature and scholars suggest several methods. The methods of valuation that are currently discussed by scholars can be summarised as in Table 2 below.

Based on Malaysian cases and jurisdiction, one of the scholars suggested that the underground valuation should use the extended version of the Residual Method and the Comparison Method with a mixture of other principles (Abd Rashid, 2016). The findings show that several methods can be used for the valuation of underground land. The initial possible approaches are the comparison method, the residual method, the cost method and the shadow method. However, it is maintained that the legal aspects must be in place for the best solution as to the rights and ownership of the land.

Table 2. *Valuation Methods for Underground Land*

Type	Description	Scholars and Sources
Residual Value Analysis	This method quantifies the economic benefit and subsurface land value by **comparing the economic returns** of the underground space development with the original land use. It is particularly useful in urban planning to ensure the economic feasibility of underground projects.	Zhu, W., Fu, J., Yang, J., Tong, L. Urban underground space value: Case study of Kaisheng Square Planning in Lanzhou city Proceedings of 12th International Conference of the Associated Research Centers for Urban Underground Space, ACUUS 2009, 2009
Integrated Valuation Models	Combining the **cost method, income reduction method, and floor utility ratio method** can provide a comprehensive value assessment model for underground space use. Factors such as location, traffic, and business type significantly influence the value of underground commercial space.	Shi, Y., Zhou, L. Land value assessment and spatial variation in underground commercial space in Shanghai Dili Xuebao/Acta Geographica Sinica, 2017
Direct Evaluation Method	This method is increasingly used due to its ability to directly assess the value of underground space use rights, considering **market data and policy impacts**. It involves selecting appropriate evaluation methods, determining parameters, and accounting for policy subsidies.	Zhang, J. Appraisal Methods and Case Analysis of the Land-use Right's Price of Urban Underground Space Chinese Journal of Underground Space and Engineering, 2020

Type	Description	Scholars and Sources
Space Distribution Theory	Establishing a land-use price evaluation model based on space distribution theory helps in quickly determining the land-use prices for underground spaces. This model supports **orderly land transactions** and legal compliance.	Lin, G.-B., Cai, W.-M., Hao, S., Liu, H.-W. Evaluation of land-use right price of urban underground space Journal of Tianjin Polytechnic University, 2012
Real and Potential Value	Underground space resources can generate economic value, and the methods used to evaluate this vary depending on the type of **resource used directly and indirectly**. Some considerations factors such as the **carrying capacity**, geological suitability, and overall quality to ensure the optimal utilisation of underground spaces.	Wu, Y., Wen, H., & Fu, M. (2024). A Review of Research on the Value Evaluation of Urban Underground Space. *Land*, *13*(4), 474.

Meanwhile, in order to give value to the underground land, the legal and administrative aspects need to be considered as well (Hussin et al., 2017). This finding concurs with the previous finding that involves the consideration of legal and administrative aspects. It is also important to differentiate the approach of valuation methods as to the disposal of land by alienation and the payment of compensation, as discussed above.

3.3. Social impacts

The element of social value is also discussed for the underground development. The rights of access, for example, must be clearly mentioned in securing the ownership and rights (Abdul Jalil & Mohd Arshad, 2019, 2020). The rights of access have been provided to allow the owner to have full use of his land rights. Similarly, the NLC also provides that the adjacent land needs to provide support to the land. As such, the underground land must also be in consideration of the principle of accessibility.

According to Ismail (2024), social impact is one of the principles in the discussion of the valuation of the land. It is important to note that the development, including underground developments, should always consider the social status of the affected parties[8]. An example is the development at Kampung Bharu, Kuala Lumpur, which is an area of totally Malay residents. They must consider the impact on its social value, as the development may involve the influx of other members of society to stay and dwell in the area after the development. The development of an underground station for light rail transit (LRT) has also been an example of the loss of *in situ* social value, and affects the compensation of compulsory land acquisition at the site (Omar, 2024).

This proposal is agreed upon by another participant, and according to Saiful Azman (2024), as the social impact assessment plays an important role in development, the social value must be considered[9]. Additionally, the Social Impact Assessment has been a requirement for any development which falls within the ambit of its guidelines. The guidelines known as Social Impact Assessment Implementation Guidelines (Panduan Pelaksanaan SIA - PPSIA) provide that projects which fall under the purview of Federal PLANMalaysia and State PLANMalaysia must adhere to the guidelines, especially on understanding the land use.

In a case study on underground development involving compulsory land acquisition, the plot of land has the sentimental value of becoming the earliest shopping mall in Kuala Lumpur. According to one land administrator[10]. The advice given to them by the respective government valuer is that the sentimental value of the land or property is not calculated and cannot be considered to be included in the compensation value of the land. Thus, an issue such as goodwill is not considered to be an element of compensation, although it has social value for the property or land.

[8] Discussion and interview with the participant acting as the President of the Association of Land Professionals of Malaysia on 5th September 2024.
[9] Presentation on 5th September 2024 in *Seminar Pembangunan Semula Bandar* 2025, at Kuala Lumpur.
[10] An online consultation and interview held on 10th December 2024 between all the land administrator for compulsory land acquisition in Peninsular Malaysia under JKPTG.

4. DISCUSSION

4.1. Evolution In Underground Development

4.1.1. Whole land ownership

Taking into consideration the underground land development, there is significant and emerging development of underground development in Malaysia (Mohamed et al., 2023). Since the introduction of the alienation of underground land in Malaysia, there is still no single title that has been alienated and registered to the proprietor throughout the country, particularly in Peninsular Malaysia[11]. According to the record of the interview session, most of the underground development in Malaysia is arranged under the State land and involves State or Federal projects. This is shown by several projects, as mentioned by JPPH, and several studies, as in Table 3 below (Abd Rashid, 2016; Abu, 2023; bt Zaini et al., 2012; Zaini et al., 2013).

Table 3. *Development of underground land in Malaysia (Abu, 2023)*

Purpose	Development Projects	Completed
Commercial and Parking area	Plaza Dataran Merdeka (Merdeka Square)	1990
Commercial and Parking area	Petronas Twin Tower	1997
Rail Track Tunnel/Station	Light Rail Transit (LRT)(Kelana Jaya Line)	1998
Dam	*Pergau* Dam	2000
Road / Flood Tunnel	SMART Tunnel	2007
Rail Track Tunnel/Station	Mass Rapid Transit (MRT) 1	2016

On the contrary, underground developments in urban areas are very much intense. As such, it is said that the land in urban areas is very scarce, which invites vertical development, whether it be stratified buildings upwards, or be it vertical development underground downwards. In the case where the development of an alienated land vertically upwards, the Strata Titles Act 1985 [Act 318] is ready and enables the development in its legal framework. This stratified development also used the underground land for its development, but it falls under the purview and ambit of Act 318.

The silo development of underground land is rarely be developed, other than several developments as in Table 3. The commercial area of underground land is also not meant to be an individual title which transfers the right and ownership to another person, but only on the tenancy or lease transaction. This situation mirrors the earlier development of underground land or strata title in New South Wales, Australia (Strata Community Association, 2025).

4.1.2. Mutual Agreement

Furthermore, the development of the underground in Malaysia is still in its infancy stage. This emerging development is not fully explored, while the development is mostly on the public amenities and infrastructure, such as rail tracks and train stations. These developments can initially only be done by using State lands or acquiring the whole land, not only the underground land. This happens as the legal framework is not up-to-date to cope with the current emerging development approach (Mohamed et al., 2023; Mohamed & Musa, 2019). Thus, the part of the land which is underground land cannot be prepared for development, although the development needs the underground land only.

Thus, the only solution to the underground development at that time was to resort to an agreement known as a Mutual Agreement (*MA*) to co-exist on the plot of the land. Several MAs have been signed by the project proponents or the project implementation of Mass Rapid Transit (MRT) with the proprietor of the surface land. This resulted in the cost of underground development being borne by the proprietor of the land and the MRT, as agreed for the co-existence.

In order to secure the land ownership and the rights of the co-existence parties, it must be registered in the land title, as the principle of "registration is everything" is still applicable (Syed Abdul Kader et al., 2023; *Teh Bee v K. Maruthamuthu*, 1977). The registration took place under the "express condition" of the title, which will define the depth and rights of the parties, expressly and impliedly, if any.

[11] Records from interview and small group discussion between the participants on the compulsory land acquisition of the underground land through 2023 until 2025.

4.2. Challenges of Developing Underground Land

4.2.1. Underground land ownership

There are challenges in providing ownership of the underground land (Saeidian et al., 2021; Zaini et al., 2014, 2015). Ownership is very important as it carries rights to the land (Zaini & Mohsin, 2021). As per the principles of Malaysian land legislation, registration is everything; the title to the underground land, to this extent, is very important (Alias et al., 2000). As such, it is agreed that similar legal considerations need to be clearly mentioned (Itagaki, 2020).

This research finds that there is still no stratum title issued just yet. While the underground use has been emerging, the State Authorities in Peninsular Malaysia seem not ready to embrace the stratum title. From a legal perspective, the NLC only provides and enables the ownership of the underground land. Similarly, Act 486 provides that the underground land can be compulsorily acquired. This enabling provision was in force in 1990 and 2017, respectively.

However, the underground land acquisition is subject to the readiness of the State Authority. It is based on the requirement that the State Authority need to come out with the rules and regulations on the implementation matter of the underground development. These include the issuance of titles in continuation as a result of the partial underground land acquisition. On the other hand, the premium of the land, which is referred to as a fee in some countries, needs to be determined. The calculation of the premium as well as the quit rent, must be in accordance with the new area, more accurately, the cubic volume, and must consider the volume that has been taken and left to the surface land proprietor.

Hence, the underground land should be regulated from the early stage of alienation or disposal policy as provided under the NLC, until the implementation of the disposal. The State should be ready with the provision detailing the implementation of the underground land development, with the calculation of the premium and rent under the State land rules, to accommodate the successful and timely process of the development.

4.2.2. 3D element

In order to proceed with the stratum or underground land title, the plan of the land is now evolving from two-dimensional (2D) into three-dimensional (3D). Fortunately, the NLC has provided the plan to the title in continuation of the partial underground land acquisition as amended under section 396 of the NLC. It provides that the element of 3D, which confers the cubic volume of the land, must be stated through the plan of the land. In such a case, the respective authority, namely the Department of Survey and Mapping Malaysia (*Jabatan Ukur dan Pemetaan Malaysia – JUPEM*), has issued the guidelines under its power to issue circulars for the purpose of cadastre and plan preparation.

According to JUPEM, the plan in a 3D element is practically ready, and they are able to produce the plan of the land for the purpose of issuance of the underground title or title with specific depth. However, a holistic approach to the implementation of a 3D survey is yet to be finalised. Meanwhile, several plans which involve the element of 3D for the title in continuation and the title with specific depth have been prepared by JUPEM. For instance, the plan for the underground land acquisition has been prepared pending registration of the land. Yet, JUPEM is still improving the procedure and standard operating procedures to guide the surveyor in preparing the plans.

The proprietor of the land, which consists of a natural person or body or corporation, needs to be aware of the limitations of their rights and ownership (Bahagian Dasar dan Konsultasi, 2021). Under this 3D environment, the extent of enjoyment of the land might be reduced accordingly. The surface land will have to be the land with limited to a certain depth, though originally the title of the land might confer full rights of enjoyment to the land. As such, this situation must be advocated to the public for their acceptance and readiness in this change of ownership throughout the nation.

In addition, vertical development extends to the underground land; space above the surface of the land also exists within the current development. A tunnel within a building or a tunnel passing through the hill requires the same attention as underground development. It involves the need for a future 3D framework in the development of infrastructure above the surface of the land (Mohamed et al., 2024). Hence, the development of underground land or above the surface of the land involves multi-layer development, which involves different rights and ownership that should be addressed and compensated in a new land legislation framework.

4.3. Compensation rights

4.3.1. Economic value

As regards the economic impact and social impact, they can be combined under the compensation rights. It is also worth to note also that the legal spaces or ownership need to be in 3D perspective for underground land (Ramlakhan et al., 2023). This element will define the actual rights as regards to the border or boundaries of the land and its surface land. By virtue of guidelines prepared by the JPPH, the valuation of the underground land is still vague and might be open to challenges. This issue is recognised by JPPH, according to the presentation by the JPPH officers in 2024.

The underground land is the rights of the surface landowner or proprietor as long as the title does not specifically mention the depth of the land. Similarly, the ownership of the land also provides full rights to the underground land use by the proprietor. Subject to other laws, the enjoyment rights of the underground land are protected by the NLC, as mentioned under section 44 of the NLC. Thus, the surface landowner or proprietor can develop the land upwards to the sky and downwards to the underground lands.

Any attempt to use the underground land should come with the application of a different use from the proprietor or application of compulsory land acquisition from the other parties regarding the land of another. Here is the main issue that comes to consider the compensation payable to the current surface land proprietor. According to all the participants and respondents, the underground land still falls under the right of the proprietor, which requires payment of compensation if there is compulsory underground land acquisition.

4.3.2. Best practices

However, the effective and reasonable use of the underground land is not specifically mentioned. According to Anesh (2025)[12], the reasonable use and underground enjoyment of the land must be set or tied to the category of land. He gives an example of the application of underground development in Singapore, where the element of underground compensation is limited to 30 meters downwards only.

This finding seems similar to the suggestion of the respondent in one of the research studies done on the valuation of underground land (Abd Rashid, 2016). In addition, he further reiterated that the Constitution of Singapore did not mention the rights of property in the same way as the Malaysian Federal Constitution. As such, the payment of compensation to the aggrieved parties is not solely a legal obligation. As compared to Malaysia, the payment of compensation must be paid and must be adequate, as mentioned in the Federal Constitution and Act 486.

Moreover, in most cases of payment of compensation in compulsory land acquisition, the aggrieved parties will object to the award by the land administrator and appeal to the court for a better payment of compensation. The issue of adequacy of compensation deals with the social impact of the use of the compulsory land acquisition provision. It will be a similar case with the underground land acquisition, where the land which belongs to the company or corporation has more potential for development, especially in urban areas. Thus, the depth of the rights and reasonable use play an important role in determining the adequacy of payment of compensation. The valuation of the land might be best to considering the real and potential value of the land.

4.4. Contextualisation and policy reform

The findings of this study can be summarised that there are interdependencies between legal, social and economic aspects of underground land development. The underground land development should be provided and guided by the legal framework, clearly and substantively. In Malaysia, there should be a solid legal framework on underground land ownership and defining the rights and obligations of the landowner as well as the authorities involved, the Federal and State Authorities. As State Authorities in Malaysia are the direct and authoritative jurisdiction on land matters, the provisions of the land ownership together with its rights and obligations should be ready for the implementation of underground land development.

This can be replicated and modified by the international cases where the legal framework of land administration needs to be reviewed in order to implement underground land development. Especially, countries which adopt the Torrens system of land tenure should also embark on the revision of the framework and strengthen it for the success of underground land development. In addition, in compulsory land acquisition practices, the compensation needs to be addressed for adequate, fair and just compensation. The Constitution of a country plays a vital role in addressing these issues, as mentioned in previous discussions.

[12] Interview and discussion conducted on 22nd January 2025.

Policy reform in Malaysia may focus on amending the NLC and the Land Acquisition Act 1960 [Act 486]. The policymakers should incorporate the three-dimensional (3D) elements in land ownership to cater the preparation for a plan to be attached to the land, especially the surface land with a particular depth, as a result of the compulsory land acquisition of the underground land for underground land development. Particularly, the preparation for a plan as provided under section 396 of NLC should be revisited. Moreover, the depth which can be lawfully enjoyed by the landowners should also be specific, in the NLC as well as in Act 486, to accommodate the fair and just payment of compensation in the case of underground land acquisition.

Furthermore, the other legislation related to the development, such as the Town and Country Planning Act 1976 [Act 172], should also guide the developer for the obligations and rights of the landowner so as, no further challenge brought to the court because of being affected by the underground development. Current guidelines can be further incorporated into the Act 172 to further enhance the underground development.

5. CONCLUSION

The study finds that the current ownership and rights are provided in the National Land Code of Malaysia, but the issue is in the implementation and decision of the State Authority in alienating the underground land. The State Authority need to be more responsive to the development, especially the emerging development of stratified and underground land. Rules and regulations need to be amended in support of the enabling provision as amended by the NLC or related land legislation.

In addition, it is found that underground development needs to be ready and accepted by the nation in all aspects as discussed in the above sections, such as planning, legal provision and compensation for the underground space. The planning of the underground land must be and should be feasible to the economic values of the land development. As to the urban development, the underground seems imminent and should be well-advised by the respective parties on the social, environmental and economic perspectives.

Hence, the use of the physical underground land and the legal aspect must be in parallel with the development approach to provide a balance of needs. The nation could receive a return on investment, while the people may obtain the benefit of the development. Further study may look into the involvement of the technological aspects, such as GIS and BIM, as well as the cadastre aspects, because this study is limited and did not cover these aspects.

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