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## THE CHALLENGES OF INDONESIA LAND ADMINISTRATION SYSTEM IN UPPER AND LOWER GROUND SPATIAL PLANNING

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### Abstract

Indonesia is a country with a fairly high economic development. The development is followed by the growth of economic centers in its big cities such as Jakarta, Surabaya, and Makassar and so on. Massive construction in these cities has been resulting in depletion of land availability for settlement purposes and community activities. The pace of economic growth that is followed by the high rate of population growth in the big cities has been causing quite complex problems such as the number of people who do not have sufficient space to live in due to limited land.

In response to this problem, the local government is trying to utilize space effectively by using the upper and lower ground in development to overcome the limited land. Vertical development by utilizing the upper and lower ground is chosen to provide adequate housing and community centers such as offices, roads and shopping centers.

The city development should be followed by the development of existing land administration in order to overcome the problems and possible spatial conflicts. This paper attempts to reveal simply what over ground and underground spatial challenges need to be resolved through the land administration in Indonesia and how solutions to these challenges based on legal, institutional and spatial framework.

**Keywords:** Development, upper and lower ground, spatial planning, land administration

### 1. Background and Context

Indonesia has large territory which spreads from Sabang in Nangroe Aceh Darussalam Province to Meureuke in Papua Province. The Western region of Indonesia has a relatively more rapid development compared to the central and eastern regions of Indonesia. Jakarta, which is located in western region and the capital of Indonesia, is one of the largest cities in the world due to its economic development and the rapid increase of its population. The large number of residents inhabit Jakarta due to uncontrolled urbanization. The inequality of development between rural and urban and western and eastern Indonesia leads that problem persist. That problem also encourages Jakarta to be a center of economy and business that has been forcing to intensively use space to support the resident needs.

Population that rapidly grow has been forcing the municipal government began to make policies to intensify the use of upper and lower ground space for business and residential purposes. Recently, living in an apartment has become a lifestyle in Jakarta. Apartments are built in urban centers for businessmen who want easily approaching their offices, shopping centers have been built with tower buildings integrated with apartments and transport centers, and roads, electricity, water facilities also utilize upper and lower

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ground space. In Jakarta and other big city, development by utilizing space upper and lower the ground has become a necessity at this time.

This situation holds potential problems such as spatial conflicts. Integrated spatial planning and land administration system is absolutely necessary. But there many things that need to be considered by the government in the process of arranging upper and lower ground space. This is because the process of existing spatial planning has not considering 3-dimensional space.

To overcome these problems, the concept of 3D cadastre has been introduced. The basic reason why 3D cadastre needs to be considered in the redesign of Indonesia cadastre system is the increasing space utilization particularly in urban area. Currently, the increasing needs of the utilization of under and above land surface are not yet provided by the present land registration system. The needs of 3D cadastre to register 3D properties is realized by National Land Agency (BPN) as government organization whose mandate to execute land and cadastral registration and supply land information in Indonesia.

## **2. Indonesian Land Registration**

Indonesia has 2 (two) types of land right, namely Primary Land Right and Secondary Land Right. The right grants the authority to the holder of the land right to use and build on his land. In the framework of utilizing ground space there is no clear restriction on ownership rights. according to article 4 of the 1960 BAL, the earth, water and airspace, including the natural resources, contained therein are in the highest instance controlled by the state being and authoritative organization of the whole people.

The implementation of all matter related to land may be delegated to the autonomous regions and adat law communities. The rights of controlled by state provide the authority:

- to regulate and implement the appropriation, the utilization, the reservation and the cultivation of that earth, water and air space as mention above.
- to determine and regulate the legal relations between persons, concerning the earth, water and air space.
- to determine and regulate the legal relations between persons and legal acts, concerning the earth, water and air space

From the explanation about the existing right above, the Indonesian land right can be divided into three broad categories:

- Primary title: This title is directly derived from the state. For example, right of ownership, right of building and right of management.
- Secondary title: This title is granted by other title holder based on the contract agreement, The agreement state the primary titleholder gives the other party to have right to take advantages from the land owned by primary title holder. For example, right of use, right to lease land for building.
- Security of right: The title granted because of mortgage.

The relation between primary and secondary title in the Indonesian land law could be seen at below figure:

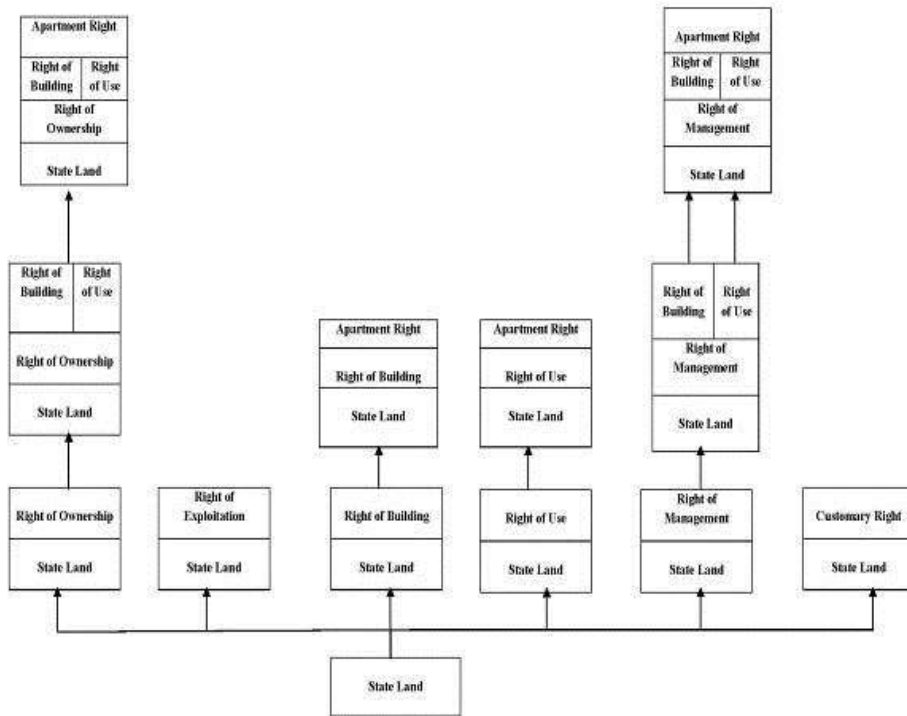


Figure 1. Relation Between Primary Title and Secondary Title

### 3. 3D Cadastre

Cadastre should be able to provide clear information between the property, right and rights owners so that the cadastre can answer these questions: which rightful claimants claim which rights and interest to which lot of land, that reflect the principle of specialty. The principle of specialty is needed to develop cadastre system to manage the intensive use of space above and under land surface. 3D cadastre is a concept that is created in order to fulfil the interest of public that need complete, accurate, land information to support the activities related to land.

3D cadastre is a concept to overcome the problems related to how to give better insight for registering the uses of space, which have been happening in the recent time. (Stoter and Van Oosterom 2006) explains that 3D cadastre is a cadastre that registers and gives insight into rights and restrictions not only on parcels but also on 3D property units. A 3D property unit, also abbreviated as 3D property is that (bounded) amount of space to which a person is entitled by means of real rights. 3D property situations or 3D situations refer to situations in which different property units are located on top of each other or constructed in even more complex structures i.e. interlocking one another.

In principle, 3D cadastre is needed if there are multiuse and multi ownership of land exist, it is stated by Van Der Molen (2001), In situation where separation of ownership is

present, the legal object should be represented on the cadastral map. If the legal object coincides with the real object, the representation of the legal object includes the real object. If not, the orientation function of the cadastral map makes representation of the real object recommendable.

Based on Stoter and Salzmann (2003), the solution to register 3D properties can be achieved with 3 ways

- a. Full 3D cadastre, in which persons can explicitly be entitled to volumes, in this solution the registration object is fully bounded by 3D volumes so the parcel is not considered as a basis for land registration anymore.
- b. Hybrid cadastre, this solution provides opportunities to combine existing 2D registration for traditional parcel and 3D registration for 3D property situation. There are two alternatives of hybrid solutions:
  - Alternative 1: registration of 2D parcels in all cases of real property registration, and additional registration of 3D legal space in the case of 3D property units within one parcel, using a bottom and top height level of the space to which rights apply.
  - Alternative 2: registration of 2D parcels in all cases of real property registration and additional registration of the legal space of physical objects in 3D space.
- c. 3D administrative tags or files linked to parcels that exist in the current cadastral registration.

Figure show the model how this solution will maintain subject, object and right of cadastral system.

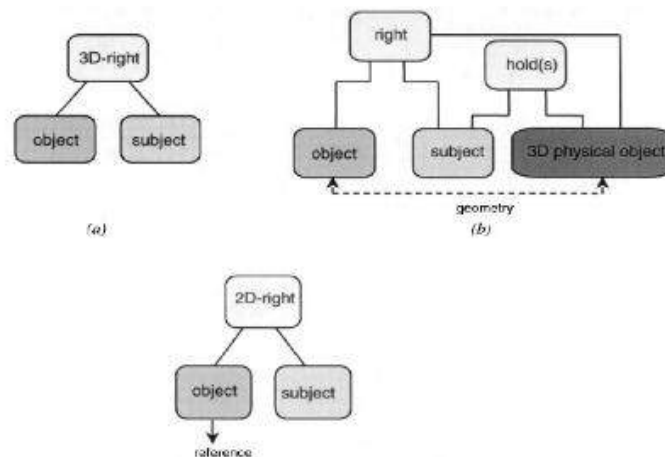


Figure 2. Models of 3D cadastre solution (Stoter and Salzmann 2003)

#### 4. Managing 3D Property In Indonesian Land Administration

Indonesian Land Law adopts the principle of horizontal separation. It provides the possibility of separation ownership between parcel and buildings in the same plot of land. In general, landowner is also the owner of existing buildings above it, but by giving

secondary land title above the primary land title based on the agreement between land owner and building owner, the horizontal division therefore could be implemented. The Right of Building and The Right to Lease Land for Building are usually used in the case of horizontal division.

The problem of registering 3D Property in Indonesia mainly in providing the proper title for 3D situation can be explained as follow:

- Case 1

The use of basements as part of building construction is often found in big cities in Indonesia. Parts of underground construction is often used as a parking lot, shops, offices etc. In such cases, if the construction of the underground building is in accordance with the rights to the land granted, no special space title are required.

The problem arise when the use of underground space is different with the use of ground surface. A typical example of this problem is the monorail transportation that has been constructing in Jakarta. It uses the underground space as its track while other land use and land ownership locate on the land surface. Other multiuse case of land also happen in Blok M Jakarta. 3D situation can be seen in Blok M, shopping Centre that is located in underground while bus terminal is located above shopping centre. In this case the existing land law has not been able to grant the proper land rights. So it is needed the new type named the right of underground utilization. This right is based on article 33 verse 3 of the 1945 constitution which states that The earth, water and the contained land resources, is brought under the state and used for the citizen prosperity”. The meaning of the earth in the article is not only the surface of the ground but also the body of earth. The reason for the creation of this new right is to grant the security of title holder and other parties who take advantage of the space and provide security for the users of the underground buildings and buildings above them.

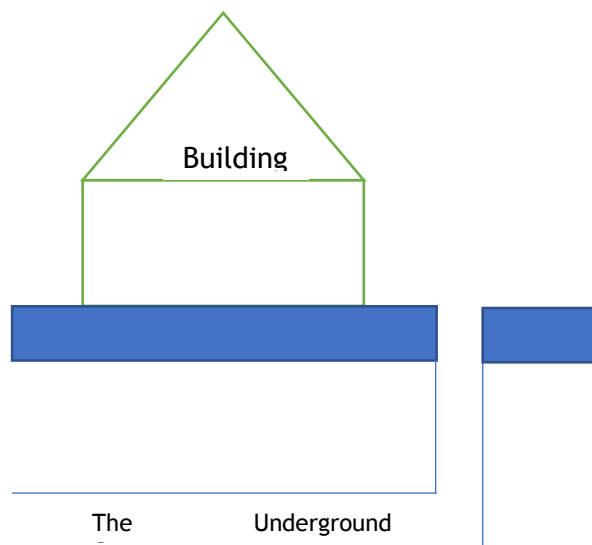


Figure 3. Example of underground 3D situation



Jakarta, with its complex infrastructure inside, has been facing many problem because there are not enough information about where the underground infrastructure is located such as cable, pipe, conduit etc. The situation is more complex because there is lack coordination between institutions that have responsibility to manage them. This conditions have been pushing many problem such us flood, irregular development, disruption of community activities due to excavation of roads, etc.

- Case 2

Another common case is the use of space above the land surface that still has a physical relationship with the land surface beneath it. Examples of such cases are fly over and bridge over road. In such cases, the existing land rights can still be used. The reason for the use of existing land rights is that although the building is in the upper space but still physically connected to the ground. For this case, using the existing right (The right of building and the use right) still can manage for titling the rightful claimant (Hutagalung 2008).

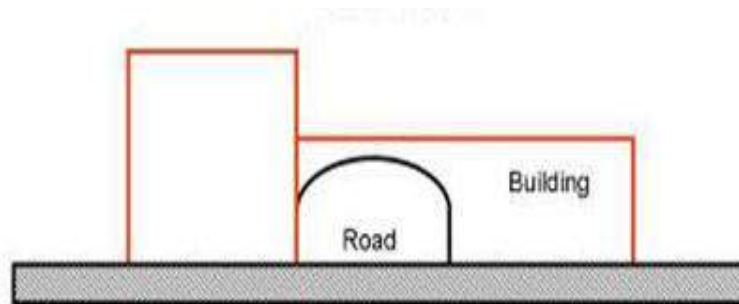


Figure 3. Example of 3D situation above Land Surface

As it is generally accepted, in the real situation, world is in 3D situations including geographic objects. The physical property and the accompanying rights always have a 3D component. But the existing cadastre still ignores the 3 dimensional reality by registering and depicting the map on the 2D situation. The Indonesia cadastre system, like general cadastre in the world, is still using 2D based registration to model cadastre objects.

According to (Tamtomo 2008), the development of 3D cadastre in Indonesia has to consider points as follow:

- It should not consider to empower the state authority, but to give service for public
- It should not have orientation to quo status, that just merely refer to the existing implemented law, it is true that the land registration still cannot cope the 2 dimension problems but it does not mean the registration of space use can be neglected.
- The visionary thinking and holistic insight to operate the public decision are needed to build the new system.



National Land Agency offices (BPN) have been equipped with GIS applications to handle cadastral data. The application is an integrated application called Land Office Computerization System. In this application system, 3D information is managed as 2 D information by storing the floor plan as a scan file connected to the main database. But the problem of managing 3D property as previously mentioned is the data about them scattered in many institution without one map that store them in integrated database. Recently, BPN only manage one type of 3D property namely apartment unit.

The visualization of the existing cadastral system in order to inform the apartment unit can be seen in the below picture.

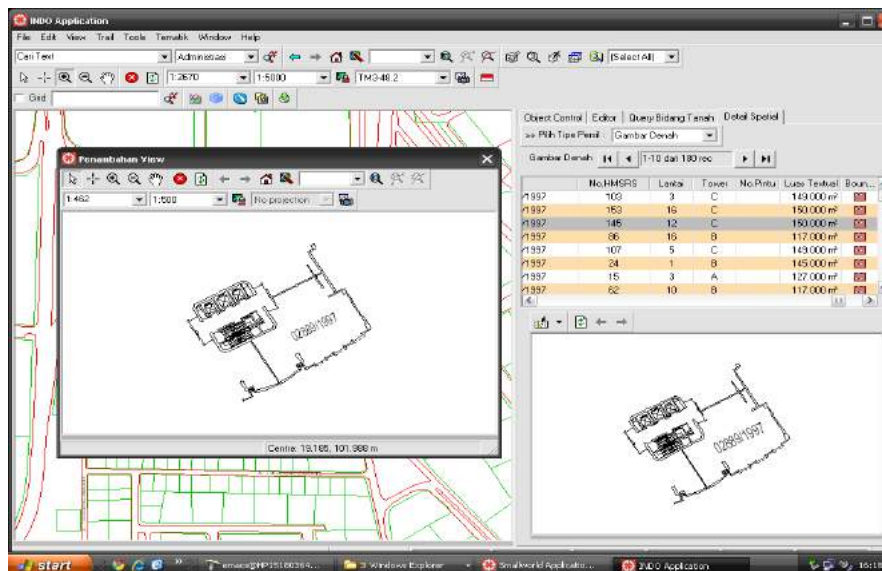


Figure 4. Visualization of apartment unit Registration in Land Office Computerization System

The weaknesses of the existing system in order to register 3D property can be summarized as follow:

- The legal part does not provide yet sufficient regulation for all types of 3D situations
- No integration between cadastral map and spatial information of 3D property
- Cadastral registration cannot provide 3D information on how properties are located in the building complex itself, it because there is separation between cadastre map which contain the whole parcels and the division plan which contain spatial information relate to the unit of property ownership, thus cadastral map merely describe the position of parcel where then building erect on.
- No height information in strata plan/drawing plan because cadastral surveying is not executed for 3D property but just survey and map common surface land right.
- It is not possible to view 3D property unit interactively, which is helpful to get insight into complex 3D property
- Limited accessibility of data exchange because analogue achieves is still used.

## 5. Strategy to improve Existing System

Basically, the current cadastral system in Indonesia adopts the third solution of 3D property registration that uses tags or external files to give spatial information of apartment unit cases only. The system uses scanned drawing plans to illustrate the shape of registered apartment units.

In relation to its efforts to conduct a complete land registration, including to provide information on 3D property, BPN can perform the following strategies:

- Providing 3D cadastral registration to register 3D properties using the advantages of combination between cadastral registration and land registration;
- Improving insight of 3D situation using 3D registration meanwhile keep running 2D registration (using hybrid solution);
- Playing a role to improve institutional and legal background of 3D properties management with other organizations and increasing the role of other government organizations such as Geospatial Information Agency (BIG), municipalities, tax agency to provide 3D cadastral registration, because property management is not solely the responsibility of BPN but multi-sectoral responsibility;
- Increasing participation of private sectors for survey and mapping activities because surveying and mapping 3D situations is more complicated and expensive than 2D situations;
- Using existing ICT technology (LOC) to provide an information system that can be easily accessed by customers and updating technology especially for surveying and mapping 3D situations.

## 6. Conclusion

- The needs of registering property in 3D can be seen from the reality in the real world that space utilizations have pushed multi-use and multi-ownership in different strata of space. It makes a question how to register this kind of phenomena in a proper way. According to the main task of cadastre that should give information for the public with complete and detailed information (publicity and speciality)
- In the Indonesian legal point of view there is no big problem in registering 3D property as long as the existing right can follow the complexity of land utilization in the recent time. But for certain cases there is a need to provide new titles that can give security for space right owners.
- The consideration should be taken by BPN before implementation of 3D cadastre registration such as providing sufficient regulation to give guidance for 3D registration and technical reference of 3D properties survey. In addition, the most important part is improving the GIS software that is used in order to manage 3D spatial data.

- One map policy is necessary to handle management of 3D property. The strong relationship between BPN, Municipality, BIG and others are needed to build integrated map.

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