

Solutions for Quality Improvement of Slum Settlement with Limited Area Using Vertical Land Consolidation Concepts in Urban Village (Case Study: Babakan Surabaya Urban Village, Bandung City, Indonesia)

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Key words: Slum Settlement, Vertical Land Consolidation

SUMMARY

Bandung City is the center of government of West Java Province and is an area with a high population density. This population density is not accompanied by the land availability for settlements, which has caused a lot of slums to emerge in the city of Bandung. In reality settlements are one of the very basic needs for human life. For this reason, it is necessary to re-establish the slum area using land consolidation program to produce habitable occupancy in directed development, planned and sustainable. Land consolidation in Indonesia is regulated in Regulation of the head of Head of Indonesia Land Agency Number 4 of 1991, as the basic of land consolidation program. The case study in this study was in the urban village, namely Babakan Surabaya, Bandung City, Indonesia. Questionnaires are distributed to the 100 respondents as the basic information to produce appropriate land consolidation. This questionnaire contains questions concerning the comfort and safety of their current habitation and their desired future habitation. Besides that, spatial data, such as parcels distribution, parcel area, and other facility in that area are needed to design the vertical development in that area. Building criteria referring to The Regulation of the Minister of Public Housing of the Republic of Indonesia Number 22 of 2008. the regulation was used as a consideration for the design of a land consolidation program. In this research would be discussed the variables that determine the success of land consolidation and modelling Land Donation for Development (STUP) and Land Substitute for Development Costs (TPBP) in Babakan Surabaya Urban Village, Bandung City, Indonesia.

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1. INTRODUCTION

The implementation of land consolidation in Indonesia began in 1982, the first location was held in Renon, Denpasar, Bali Province (Siregar, 2013). However, the regulation of the implementation of new land consolidation was published in 1991 with the National Land Agency (Perka) Regulation Number 4 of 1991 concerning Land Consolidation. According to Perka No.4 of 1991, land consolidation (KT) is a participatory land policy in the form of rearranging land tenure and ownership, as well as the use and use of land to be orderly and orderly so that it becomes a decent area for settlements. In this case, the active participation of the community was very influential on the implementation of land consolidation, because the provision of land through STUP (land donation for development) and development was financed through TPBP (replacement land for development costs) originating from community land.

Until now, both agricultural land consolidation and non-agricultural / settlement land consolidation (hereinafter referred to as Urban Land Consolidation / KTP because it is implemented in urban areas and for settlement development purposes) are still ongoing (Siregar, 2013). Conceptually, it can be formulated that the Consolidation of Urban Land (KTP) is a land policy in urban (urban) and suburban (urban fringe) areas concerning the restructuring of land tenure and use in accordance with the Spatial Planning and land acquisition efforts for development purposes to improve environmental quality live with community participation (Sitorus, 2006). In its application, KT is divided into two types, there are KT horizontally and KT vertically. KT in a horizontal manner is a concept of urban development with a horizontal (horizontal) spatial utilization approach, while KT is vertically a concept of urban development with upward (vertical) space utilization (Sitorus, 2015).

The successful implementation of the KT plan in Indonesia is very dependent on the administrative and financial aspects (Alhafidh and Sunaryo, 2015; Premonowati, 2006; Siregar, 2013). Administrative aspects are related to community approval of KT participants (Alhafidh and Sunaryo, 2015; Siregar, 2013). This is stated in Perka BPN No. 4 of 1991, new KT can be carried out if it has obtained approval from at least 85% of landowners, whose land area covers at least 85% of the total land area to be consolidated. The financial aspects are related to the availability of funds, both from non-governmental organizations, and the government budget in KT financing (Premonowati, 2006). The absence of special methodologies that can be applied generally to the implementation of the KT plan causes the KT policy to be taken for each region to be different, considering that the results of the analysis will depend on conditions and development needs (Crecente et al., 2001; Sitorus, 2015). It is expected that with the

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implementation of the KT, settlements that were previously slum or irregular land will be organized, both in form, area, location and environment (Ariesta, 2008).

Besides being able to fix the irregular land, KT also has functions, including: 1) as land acquisition for public facilities, including road infrastructure, environmental facilities, health facilities, and others (Sitorus, 2006); 2) increase land prices from the initial transaction before consolidating with land prices after consolidation of 400% to 900% (Mulyanti, 2015); 3) the benefits gained from implementing KT are not only for landowners, but the government also benefits because it can build public facilities without having to do land acquisition (Wijaya et al., 2016). These studies use horizontal KT consisting of several research variables, including people affected by KT, location or area KT, and costs used in the KT process (Mulyanti, 2015; Sitorus, 2006; Wijaya et al., 2016). However, horizontal KT has a disadvantage when applied to slum settlements, because the limited land available does not match the population and capacity of the settlement (Hariyanto, 2007).

Therefore, vertical consolidation is the right answer in the implementation of consolidation in slum settlements by building flats (rusun). The construction of flats is a model for handling slums in urban areas by changing the conditions of residential environments that are very densely populated and considered not to qualify anymore as a decent dwelling place. The way that is done in the construction of flats is to minimize land for housing but by increasing the floor area. Residual land is used for placement of productive urban functions such as commercial, office or entertainment centers and placement of environmental infrastructure (roads and public utilities) and environmental facilities (social facilities and public facilities). Flats are as a multi-storey building that is functionally structured in a horizontal and vertical direction consisting of units or units with clear boundaries both in size and breadth (Basri et al., 2010). Flats are one of the right choices and need to be supported by planning and architectural approaches that have a sustainable concept in order to achieve occupancy with greater comfort and quality of the environment

2. MATERIAL AND METHODS

This study has several methods used in the data collection process and the analysis process carried out. The following is a flow diagram of the research methodology carried out, as in Figure 1.

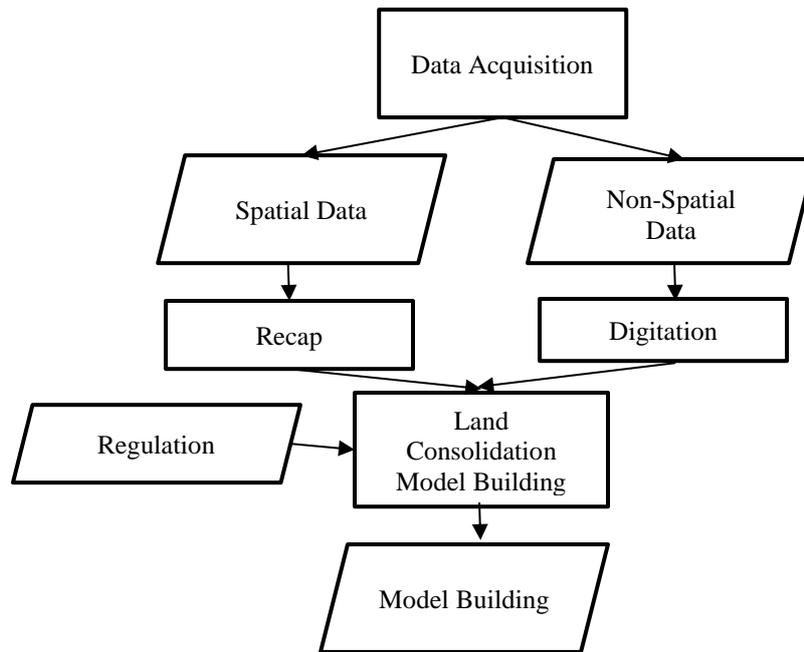


Figure 1. Research methodology

2.1. Regulation in Indonesia

Types of flat units referring to the draft Raperwal Bandung City Building, as follows:

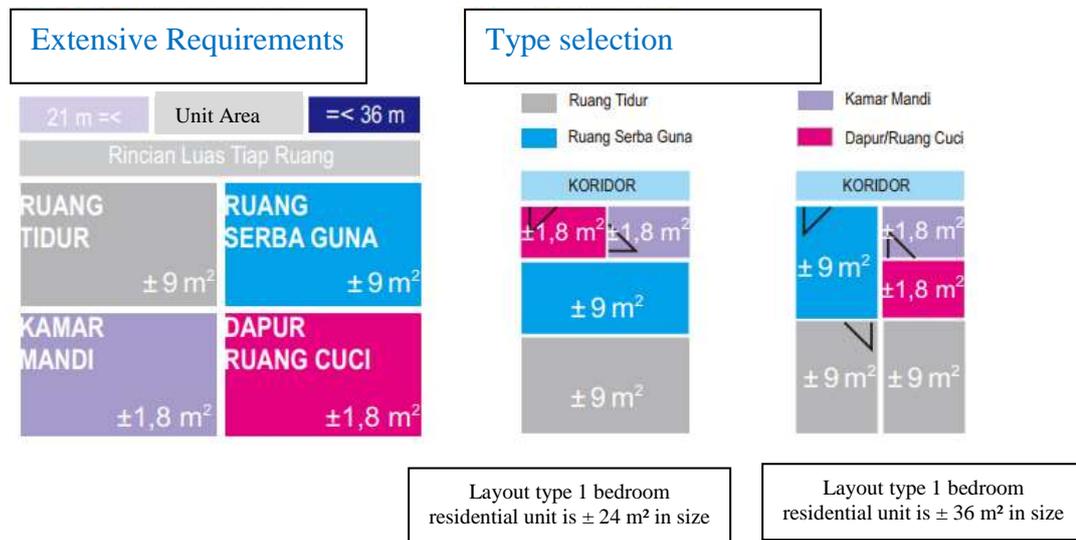


Figure 2. Type apartment units (Source: Montana et al., 2016)

2.2. Data Acquisition

Data acquisition consist of two types of data, spatial data and non-spatial data. Spatial data using Bing imagery which is processed with the help of AutoCad Map 3D software. With the use of sensory methods, it can facilitate researchers to get the number of fields and the extent of fields in the research area, without direct measurement of objects. The

sensory method is well used in this study, specifically relating to community land ownership because if direct measurements are carried out on each plot of land it will take longer. Non-spatial data was taken using questionnaires where spread evenly in Babakan Surabaya Village, Bandung Regency. The questionnaire consist of question about comfortable and uncomfortable living situation in recent, and what they expected would be change well. Other than that, we counseled society to understand the basic concept of land consolidation and gave the information about advantages and disadvantages of using it.



Figure 3. Research area at RW 09 at Babakan Surabaya, Bandung City



Figure 4. Digitizing the research area

2.3. Development of Model Building

To develop model building as the result of land consolidation, beside following regulation, the Land Donation for Development (STUP) and Land Substitute for

Development Costs (TPBP) need to be calculated based on the Construction Costs for Flats and The compensation in the form of a flat unit.

The cost of building towers is based on the flat area that will be built as compensation for affected communities. The construction of a flat planned by using a concrete structure, which generally uses light brick, with an estimated price of buildings / m² for the city of Bandung in 2016 of IDR 3,500,000 in accordance with the PU standard in 2016 in Hidayat et al (2016). The data is accumulated with an increase in property prices by 8% - 10% a year (detik.com, 2017). So that the estimated price of buildings / m² for the city of Bandung in 2018 is Rp. 4,060,000 / m². The compensation in the form of a flat unit based on Montana (2016) is divided into two units, there are type 24 and type 36, with the division of units as follows:

- An area under 51 m² was compensated for a 24 m² flat unit
- An area of 51 m² - 100 m² was compensated for a 36 m² flat unit
- The area of 100 m² - 200 m² is compensated for 2 units of flat with an area of 36 m²
- An area above 200 m² is compensated for 3 units of flat with a total area of 36 m²

3. RESULT AND DISCUSSION

3.1. Babakan Surabaya Village Situation

The area of settlements in the research area of RW 09, Babakan Surabaya, is 17,422 m². This area is the result of the total area of the study amounting to 18,634 m² reduced by an area of 6 non-residential areas, including: one factory; indomaret; bank; tutoring; and a shop of 1,212 m². There are 208 fields which are settlements, inhabited by 447 families with a population of 1,483 people. So the population density at RW 09 is 200 people/ 0.0025 km² and the building density is 119 buildings/ha.

These results it can be seen that these settlements are slum settlements referring to the Directorate General of Regional Development of the Ministry of Home Affairs, that is facilities and infrastructure below the minimum standard as a place of residence, for example having; high population density > 200 people / km²; building density > 110 buildings / ha.

There are fundamental differences which are taken into consideration that the research area does not fit the criteria of a decent house, in accordance with the Regulation of the Minister of Public Housing of the Republic of Indonesia No. 22 of 2008 concerning minimum service standards in the field of public housing in the provincial and regency/city areas, including those in Table 2.

Table 2. Service Facility in Babakan Surabaya Village

No	Circumstances in the field	Fulfill / Not	Criteria for residential homes
1	There are many buildings that do not have a foundation or lower structure.	Does not fill	Meet building safety requirements including: upper structure; middle structure; and lower structure
2	Many houses in narrow alleys build two-level houses, and the balconies jutting into the aisles. So that the	Does not fill	Ensuring health includes lighting, heating and sanitation.

	<p>lighting in is very minimal and very dangerous if there is a fire, because there is no access for the extinguisher.</p> 		
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So re-compliance of the area is needed that it can improve the quality of life of the surrounding community with the KT program. The KT program can be implemented if it gets the approval of the landowner community whose area the program will be implemented. From the results of a survey conducted in the research area of RW 09 at Babakan Surabaya, there are 214 buildings (including one factory, industrial facilities, banks, and shops, tutoring places) of various sizes, inhabited by 447 families according to the Babakan Urban Village data Surabaya. Sampling was obtained by using a purposive random sampling technique of 100 families 100 plots of land, obtained various answers relating to community agreement regarding the implementation of vertical land consolidation. Data was taken using questionnaires made by researchers referring to the Regulation of the Head of the National Land Agency No.4 of 1991, new KT can be done if it has obtained approval from at least 85% of landowners, whose land area covers at least 85% of the total area of land to be consolidated.

The following are the answers obtained from 100 families representing 100 parcels of land relating to the question of community agreement regarding vertical land consolidation at RW 09 area of Babakan Surabaya:

- Answering as many as 28 reasons:
 - so that the region can be well organized, as much as 57%
 - the costs used in the development process do not collected from citizens (free), as much as 7%
- Answering doubts as many as 36, for various reasons. Most reasons include:
 - cost of living will increase, as much as 11%
 - the house is a legacy so it is difficult to share it because there are several households in one building, as many as 11%
 - it's hard to go up to the flat unless there is an elevator, as much as 19%

- that is not a building owner, only contract; security of flat construction is safe for children; fear of heights; and confused when the construction was carried out where to go.
- Answering not agree as many as 36, for various reasons. Among these reasons there are similar reasons for people who answer doubts, including:
 - they have comfortable with the environment like today, as much as 39%
 - because they have a dorm or shop business, if a flat is built, how will it continue; because of inheritance; difficulty having to go up stairs; living costs increase; at the time of construction, confused where to move.

From the answers above, it can be seen that the number who choose to agree only 28 out of a total of 100 questionnaires. Then the percentage of people who agreed to carry out vertical land consolidation was: $(28) / (100) \times 100 = 28\%$. By looking at the results of the survey, vertical land consolidation has not been implemented at the RW 09 region of Babakan Surabaya, because according to the Regulation of the Head of the National Land Agency No.4 of 1991, new KT can be done if it has obtained approval from at least 85% of landowners, whose land area covers at least 85% of the total land area to be consolidated.

So, intensive counseling is needed for all levels of society at RW 09, Babakan Surabaya Village, relating to the concept and implementation of vertical land consolidation. We hope, so that the public will know the importance of the KT concept vertically is very appropriate to help and solve the housing needs of the people in slums, by prioritizing the efficiency of land use and structuring settlements in urban areas

3.2. Model Building of Land Consolidation'

The study will focus on the people who agree to the KT program, because at the time the survey was conducted there had never been any counseling either by researchers or complaint in connection with the holding of KT research in the region. So that many people consider the research to be a program from the government that will implement the KT in the region and many of them do not agree to the program. This area is assumed to be in the same area, that is RT 08 because from the results of the survey conducted, the community in that area had the highest number of agree voters among the other RTs at the time of filling out the questionnaire, those in Figure 6. Therefore, the research focused on the answers which agreed to only KT programs as many as 28 fields with a total land area of 1,467 m². With area:

- Area under 51 m² in 19 fields, is compensated for a flat unit of 24 m².
- Area of 51 m² - 100 m² in 7 fields, given compensation for flat units with an area of 36 m².
- Area of 100 m² - 200 m² in 1 field, given compensation for 2 units of flat with an area of 36 m².
- Area of over 200 m² in 1 field, given compensation for 3 units of flat with an area of 36 m².

So that the total towers needed in modeling the replacement of the flat unit for the community who agree on the KT program are 19 units of flat type 24 m² and 12 units of flat type 36 m².

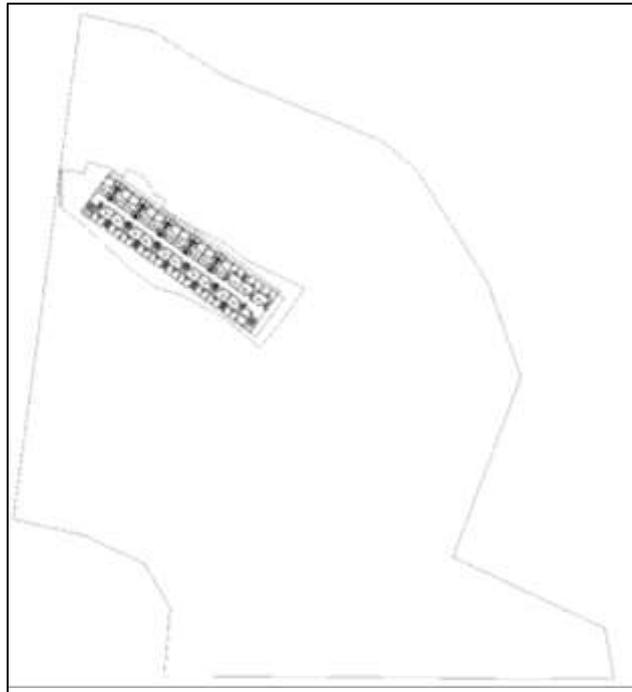


Figure 5. Model land consolidation vertical at RW 09, focus on the people who agree to the KT program that is RT 08.

3.3. Cost Calculation

a. Cost of Building Unit for Flats

To be able to accommodate 31 residential units, the construction of towers with a flat size each floor is required including residential units and corridors in accordance with the building's dilation limit of 60 m and the width adjusted to the needs is 60 m x 14 m.

• Buildings

Each floor has 10 type of 24 m² flat units and 13 flats with 36 m² type units. The following is a design made for each floor, found in Figure 6.

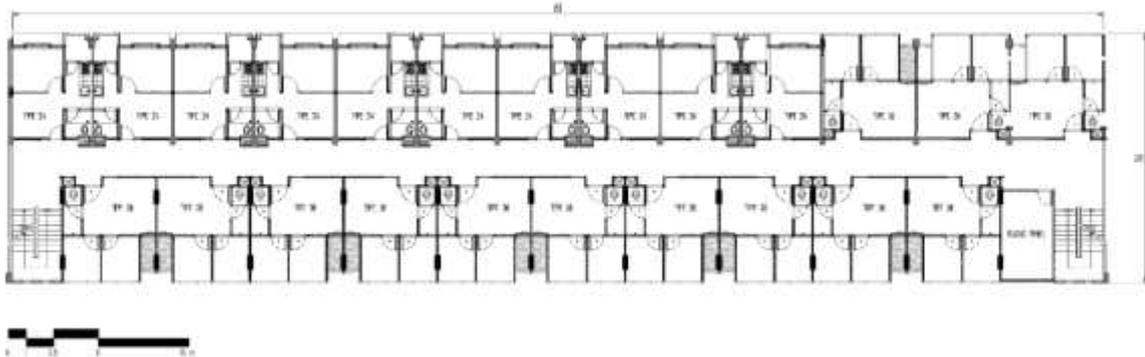


Figure 6. Design of Flats for Each Floor

This means that there will be more than one floor that can be used to accommodate 31 flat residential units. Details of fees required for one floor:

$$\text{Floor area} = 60 \text{ m} \times 14 \text{ m} = 840 \text{ m}^2$$

$$\text{Cost for 1 floor} = \text{Floor area} \times \text{Building price} / \text{m}^2$$

$$= 840 \times \text{Rp } 4,060,000, -$$

$$= \text{Rp. } 3,410,400,000, -$$

The flat building consists of six floors because it does not use a lift, in accordance with Minister of Public Works Regulation No. 5 of 2007 concerning technical guidelines for the construction of high-rise simple flats, namely the use of lifts planned for floors 6 and above. The first floor is for parking, while the second and so on are intended for residential. So there are five floors that are intended for community housing affected by KT and flat housing that is sold as TPBP. The total occupancy in these flat buildings is: - 23 units x 5 floors = 115 units, which are divided into 50 units of type 24 m² and 65 units of type 36 m².

From the total occupancy of 115 units, 31 of them are compensation for the original owner and free of charge for releasing the land for KT. So the cost of making a flat is borne by the buyer of the flat which is commercialized as TPBP.

Flat construction costs for:

- The cost of building a flat = Cost of 1 floor x 6
- $$= \text{Rp. } 3,410,400,000, - \times 6$$
- $$= \text{Rp. } 20,462,400,000$$

b. Cost of Public Area Development

The area of land used as STUP is the total area of KT area which is equal to 1,467 m². Whereas the area of STUP for public areas is the total area reduced by the apartment area of 627 m². In general, it uses sand, grass, grass blocks, other facilities, so it can be estimated that the price of public areas is ± Rp. 400,000 / m² (Hidayat, 2016). The cost required for the public area is 627 x Rp. 400,000 = Rp. 250,800,000, -

c. Total cost

So that the total cost needed in the construction of flat areas and public areas is the cost of building towers plus the cost of building public areas. So the total cost needed is equal to:

$$= \text{Rp. } 250,800,000 + \text{Rp. } 20,462,400,000$$

$$= \text{Rp. } 20,713,200,000$$

These costs are borne by the buyers of commercial towers with detailed funds as follows:

- 24 m² types that are commercialized: 50 units - 19 units = 31 units
- Type 36 m² commercialized: 65 units - 12 units = 53 units
- The total area of the commercialized flat: (31 units x 24 m²) + (53 units x 36 m²) = 744 m² + 1,908 m² = 2,652 m²
- The selling price of flat / m² commercialized: Rp. Rp. 20,713,200,000: 2,652 = ± Rp. 7,810,408, - rounded up to Rp. 7,850,000

4. CONCLUSION

Based on the results of the research carried out, there are several things that can be concluded from this activity as follows:

- From the results of a field survey, it was found that RW 09 at Babakan Surabaya Village was included in a slum settlement, referring to the Directorate General of Regional

Development of the Ministry of Home Affairs, there are facilities and infrastructure below the minimum standard as a place to settle.

- For this reason, efforts are needed to improve the environmental conditions of the slums with the KT program. Because of the limited availability of land, the program chosen was KT vertically with plans to build flats.
- Unfortunately, the vertical KT program has not been accepted by the community of RW 09 at Babakan Surabaya, Bandung City. Therefore, intensive counseling is needed for all levels of society at RW 09, Babakan Surabaya, related to the concept and implementation of vertical KT, so that the program can be realized and improve the quality of life for the surrounding community.
- So that in this study, flat models only accommodate the people who agree on vertical KT programs, assumed in the same area, namely RT 08. Because of the results of the survey conducted, the community in that area had the highest number of voters among other RTs when filling questionnaire.
- STUP and TPBP used in the implementation of the vertical KT program, namely the STUP covering an area of the total area used in the RT 08 implementation area of 1,467 m², while the TPBP used in the construction of towers comes from selling commercialized flat unit.
- Flat building consists of six floors because it does not use lifts, in accordance with Minister of Public Works Regulation No. 5 of 2007 concerning technical guidelines for the construction of high-rise simple flats, that the use of lifts planned for floors 6 and above. The first floor is for parking, while the second and the other are intended for residential. So there are five floors that are intended for community housing affected by KT and flat housing that is sold as TPBP.
- The selling price of commercialized flat units is:
 - Type 24 m² = 24 x Rp 7.850,000, - = Rp 188,400,000, -
 - Type 36 m² = 36 x Rp. 7.850,000, - = Rp. 282,600,000, -

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