

Determining Quantity Model of Built-Up Occupancy Residential in Musi Banyuasin District

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ABSTRACT

The determination of the quantity of dwellings in Musi Banyuasin district is a form of activity in seeing the development of the number of dwellings on built-up residential land when the existing data on the quantity of dwellings needed for the base year has not been obtained during secondary data collection. The importance of existing occupancy quantity data in planning activities, of course, is as a basis for determining the level of future occupancy shortages (projections). The purpose of this research is to determine the existing data on the number of dwellings in 2022 as an alternative form of providing the quantity of dwellings on built-up settlement land that will be used as planning data in Musi Banyuasin district. The method used is a quantitative approach with analytical methods, statistical, spatial and technical. Based on the results of the analysis, the quantity of dwelling units in Musi Banyuasin district on 7,528 hectares of built-up settlement land resulted in 205,962 dwelling units spread across all sub-districts with an average dwelling area of 148 square meters per house consisting of 124,441 households. These results are based on an assessment of the standard deviation and correlation level of 3 alternative comparison data, namely 213,645 dwelling units and 243,227 dwelling units, both of which have standard deviation and correlation values below the value of alternative 1.

Keywords: Settlement; Residential; Decision; Statistics; Technical

ABSTRAK

Penentuan jumlah hunian di Kabupaten Musi Banyuasin merupakan bentuk kegiatan untuk melihat perkembangan jumlah hunian di lahan permukiman terbangun ketika data eksisting mengenai jumlah hunian yang dibutuhkan untuk tahun dasar belum diperoleh selama pengumpulan data sekunder. Pentingnya data kuantitas hunian eksisting dalam kegiatan perencanaan tentu saja sebagai dasar untuk menentukan tingkat kekurangan hunian di masa depan (proyeksi). Tujuan dari penelitian ini adalah untuk menentukan data eksisting mengenai jumlah hunian pada tahun 2022 sebagai bentuk alternatif penyediaan kuantitas hunian di lahan permukiman terbangun yang akan digunakan sebagai data perencanaan di Kabupaten Musi Banyuasin. Metode yang digunakan adalah pendekatan kuantitatif dengan metode analisis, statistik, spasial, dan teknis. Berdasarkan hasil analisis, jumlah unit hunian di Kabupaten Musi Banyuasin pada lahan permukiman terbangun seluas 7.528 hektar menghasilkan 205.962 unit hunian yang tersebar di seluruh kecamatan dengan rata-rata luas hunian sebesar 148 meter persegi per rumah yang terdiri dari 124.441 rumah tangga. Hasil ini didasarkan pada penilaian terhadap nilai standar deviasi dan tingkat korelasi dari 3 data perbandingan alternatif, yaitu 213.645 unit hunian dan 243.227 unit hunian, di mana keduanya memiliki nilai standar deviasi dan korelasi di bawah nilai alternatif 1.

Kata kunci: Permukiman; Hunian; Keputusan; Statistik; Teknis.

1. INTRODUCTION

One of the growth of the city is the increasing need for housing as a place of residence along with the development of settlement centers where humans are very fast and advanced in using them, so that the implications experience expansion (Fahyudi et al., 2020). The need for housing as a place to live for urban residents will experience a growth process, as the influence of a city that can attract people from outside to come with all their interests. This can certainly affect the need for space, and trigger the growth and development of a city which is influenced from various aspects (Nugroho et al., 2022).

The level of importance of housing development basically plays a very important role in controlling the pace of development so that it has a positive and sustainable impact starting from the planning of houses (Yuliana, 2021). Along with the level of housing needs as a place to live in urban areas, of course, the existing condition of the number of residential units on built-up residential land must be known. This is to initiate a planning process, as a basis for consideration to find out how much the occupancy rate on built-up settlement land is at the sub-district level.

Musi Banyuasin Regency, South Sumatra Province, in its development program is implementing the development of residential areas to meet housing needs within 5 years, namely 2022 - 2026. The stages of the development program require the support of existing data on the quantity of dwellings in the base year of 2022 spread across 15 sub-districts of Musi Banyuasin Regency. The existing data on the number of dwellings based on the sub-district level in Musi Banyuasin district in 2022 has not been obtained, along with time constraints and a long administrative process and various other problems such as not updating the data on the number of dwellings during preliminary data collection. Based on the 2017 data on the quantity of dwellings spread across Musi Banyuasin district amounting to 137,795 thousand units, it is necessary to update the data, especially in 2022. Anticipating the fulfillment of data needs on the quantity of dwellings in Musi Banyuasin district in 2022-2026 certainly requires the support of existing data, one of which is data on the quantity of dwellings in 2022 as the base year of planning.

The purpose of this research is to determine the quantity of existing residential data in 2022 on built-up residential land that can represent alternative planning data in Musi Banyuasin district. Various weaknesses in this study, related to the assumptions used when compared with direct surveys, both through primary and secondary data. This research activity as an alternative in fulfilling the data needs of the quantity of dwelling units is of

course through the process of statistical data testing, correlation and standard deviation. This method has been done during the selection of population projection methods by analyzing and comparing the available variable (population) data with population data from the calculation of the projection method used (Muta'Ali, 2013).

Based on previous research to meet the needs of data on the quantity of dwellings (houses) as planning data in housing and settlement development, namely using assumptions based on the number of heads of families (kk), where each kk will be occupied by one family of four people in 1 house (Alvaranty & Widyastomo, 2022). Other research states that housing needs (Backlog) can be measured, one of which is in terms of occupancy with the concept of calculation using the number of people in 1 family (Fahmi & Widyawati, 2020). Based on the above research, data on the quantity of dwellings in the base year can use the assumption of the number of 1 head of household (KK) per house occupied by between 4 and 6 people divided by the total population. As for the differences between previous research and the research being conducted, this research process is systematic and structured through statistical tests that can be understood by other researchers, namely standard deviation and correlation analysis.

The availability of existing data is an important variable needed for planning, therefore this research theoretically accelerates the analysis process in predicting the development of housing and settlement development in the short, medium and long term. The fulfillment of basic planning data needs should be sourced from secondary data, namely data from related agencies, one of which is data from the central statistics agency.

2. METHODOLOGY

This research uses a quantitative approach that focuses on determining the quantity of dwelling units on built-up settlement land in Musi Banyuasin district. Secondary data sources were obtained through several related agencies based on Total population based on head of family (KK), Existing land use map or satellite image map.

The analysis process in determining the quantity of housing in Musi Banyuasin district goes through several stages, namely determining the population and sample using population data based on the number of families. Data on the number of 1 household is assumed to be 1 housing unit at the sub-district level. Next, this data will be used as population data where some heads of households to be sampled are then processed to be digitized on the land map of built settlements based on the number of samples that have been

determined, next, determining the land area of built settlements based on data already available in related agencies, and determining the area of residential land per housing unit in built settlements at the sub-district level is processed using ArcGis software. next determine the quantity of occupancy with the calculation process going through several stages as follows:

- a. Land area of built-up settlements is composited into land use of 30 percent for infrastructure and utilities (PSU) and 70 percent for residential land. Furthermore, the results of the composition of 70 percent for residential land are used as the basis for research, namely determining the quantity of occupancy on the residential land.
- b. Furthermore, 70 percent of built-up residential land is further compartmentalized where 60 percent is for building land and 40 percent is for private land.
- c. Determine the area of residential land per house based on the sub-district level in Musi Banyuasin district. To obtain the value of residential land area per house through 3 comparisons:
 1. Based on sub-district level calculation results.
 2. Based on the results of the district-level average calculation.
 3. Based on data from the Indonesian national standard (SNI) 03-1733-2004 on Procedures for Planning Residential Environments in Cities.
- d. Determining the quantity of dwellings on built-up residential land, the calculation process is built-up residential land area (ha) multiplied by 60 percent and then divided by the area of residential land per house (m²) or Built-up Residential Land Area (ha) x 60 percent divided by the area of residential land (m²). The next process applies the same calculation to comparison 2 and 3.

Next, the decision-making stage in selecting the results of the calculation of the quantity of occupancy data on built-up residential land in Musi Banyuasin district with a method through statistical tests with the SPSS program, namely correlation and standard deviation. Interpretation of the two statistical analyses above where the correlation value is close to 1, which is very strong so that the highest level of accuracy (accuracy) of prediction becomes the final decision.

3. RESULTS AND DISCUSSION

- a) Stage of Determining the Number of Sample Population

Population and samples serve to determine the number of observations in calculating the area of residential land spread across each sub-district, where each 1 sample is assumed to be 1 dwelling. The formula for determining the sample size needed in this study uses 2 processes according to Sugiono (Riduwan., 2013) :

- 1) Determine the population sample with the formula: $n = \frac{N}{N \cdot d^2 + 1}$ (1) Sample population

Description : n = number of samples, N = Population, d^2 = Precision set.

Sample calculation of population sample size $\frac{124.441}{(124.441) \cdot (0.06^2) + 1} = 277$

- 2) Determine the sample size.

Based on the sample value the population is determined. Furthermore, determining the sample in each sub-district using the stratified sample formula,

$n_i = \frac{N_1}{N} \times n$ (2) Stratified Sample

Description: n_i = stratified sample, N_1 = number of kk sub-district, N = total population (kk) of 15 sub-districts, n = number of samples,.

Example of calculation in Babat Supat sub-district $= \frac{6602}{124.441} \times 277 = 14.7$

Based on calculations based on the population and sample formulas above, the number of samples is then recapitulated in the table as presented in table 1.

Table.1 Total Population and Samples

No	Districts	Number of Family Heads (KK) (N1)	total population	Sample size Poptation	Stratified Sample Distribution	Distribution Average. Sample
			(N)	(n)	(ni)	
1	Babat Supat	6.602	124.441	277	14,7	20
2	Babat Toman	7.213	124.441	277	16	20
3	Batanghari Leko	3.934	124.441	277	9	20
4	Bayung Lencir	5.348	124.441	277	12	20
5	Jirak Jaya	5.016	124.441	277	11	20
6	Keluang	4.670	124.441	277	10	20
7	Lais	3.817	124.441	277	8	20
8	Lalan	18.223	124.441	277	41	20
9	Lawang Wetan	10.691	124.441	277	24	20
10	Plakat Tinggi	12.363	124.441	277	28	20
11	Sanga Desa	6.547	124.441	277	15	20

No	Districts	Number of Family Heads (KK) (N1)	total population	Sample size Poptation	Stratified Sample Distribution	Distributio n Average. Sample
			(N)	(n)	(ni)	
12	Sekayu	7.148	124.441	277	16	20
13	Sungai Keruh	15.073	124.441	277	34	20
14	Sungai Lilin	7.859	124.441	277	17	20
15	Tungkal Jaya	99.32	124.441	277	22	20
Musi Bayuasin		124.441			277	300
Average					18,46	20

Source: Analysis result, 2022

Based on the calculation results in table 2, where the total population of 124,441 thousand households in Musi Banyuasin district resulted in a sample size of 277 households spread across 15 sub-districts. Data distribution of different samples from the smallest 8 kk to the largest sample of 41 kk, when summed up the average results in 18.46 kk. To simplify the calculation, the researcher assumed by rounding up to 20 families in 15 sub-districts.

b) Determining the land area of built-up settlements by sub-district level

Data on the land area of built-up settlements in Musi Banyuasin Regency, obtained from secondary data that has been processed from agencies with a land area of 7,528 hectares.. Gambaran data luas lahan permukiman terbangun tersaji pada tabel 2.

Table. 2 Land Area of Built Settlements in Musi Banyuasin Regency

No	Districts	Area of Built-up Settlement Land (ha)
1	Sanga Desa	245,08
2	Babat Toman	292,99
3	Batanghari Leko	189,17
4	Plakat Tinggi	251,86
5	Lawang Wetan	163,06
6	Sungai Keruh	155,28
7	Jirak Jaya	116,22
8	Sekayu	537,47
9	Lais	291,85
10	Sungai Lilin	1223,17
11	Keluang	695,5
12	Babat Supat	553,1
13	Bayung Lencir	1291,3
14	Lalan	605,87
15	Tungkal Jaya	916,52
Total		7.528

Source: RP3KP Musi Banyuasin District, 2022

The land area of built settlements in the table above is the result of processing from the housing and settlement agency of Musi Banyuasin district, through the RP3KP development program. Furthermore, it is used as basic data in determining the quantity of dwelling units spread across 15 sub-districts.

c) Stage of Determining Residential Area in Built-up Settlement Land

The area of occupancy in built-up residential land in Musi Banyuasin Regency is calculated through 3 stages, namely,

1. Determine the dwelling area based on the sub-district level of the digitized built-up settlement land as comparison 1;
2. Determine the area of occupancy based on the average value of the sub-district as a comparison 2;
3. Determine the occupancy area based on national standards as a comparison 3.

The area of occupancy in built-up residential land spread across 15 sub-districts of Musi Banyuasin district either through the calculation process or based on national standards is presented in table 3.

Table.3 Residential land area per house in Musi Banyuasin district

No	Districts	Residential Area (m2) comparison 1	Residential Area (Average) (m2) comparison 2	Residential Area Based on Regulation /SNI (m2) comparison
1	Sanga Desa	158,40	148,24	130
2	Babat Toman	162,37		
3	Batanghari Leko	129,41		
4	Plakat Tinggi	153,87		
5	Lawang Wetan	120,05		
6	Sungai Keruh	134,92		
7	Jirak Jaya	125,79		
8	Sekayu	150,91		
9	Lais	132,65		
10	Sungai Lilin	144,96		
11	Keluang	160,24		
12	Babat Supat	149,94		
13	Bayung Lencir	160,34		
14	Lalan	157,10		
15	Tungkal Jaya	182,70		

Average	148,24		
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Source: Analysis result, 2022

Based on the table above, the land area of residential comparison 1, the average residential area per sub-district varies greatly from the smallest area of 120.05 square meters to the largest land area of 182.70 m². Average residential land area of 148.24 m² for comparison 2. The three comparisons will each be used as the basis for determining the quantity of dwellings in each sub-district of Musi Banyuasin Regency.

d) Determining the quantity of dwellings on built-up settlement land
Determination of the quantity of dwellings on built-up residential land uses a formula based on the Indonesian national standard (SNI) 03-1733-2004 concerning Procedures for Planning Residential Environments in Urban Areas as follows:

1. Determine Built-up Settlement Land Area x 60 percent divided by residential land area based on comparison 1 (per sub-district);
2. Determine Built-up Settlement Land Area x 60 percent divided by residential land area based on comparator 2 (average of 15 sub-districts);
3. Determine the Built-up Settlement Land Area x 60 percent divided by the residential land area based on comparator 3 (SNI).

Based on the calculation process above, comparison 1 produces a total dwelling quantity of 205,962 units, the dwelling quantity in comparison 2 is 213,645 units and the dwelling quantity in comparison 3 is 243,227 units. For more details, it is presented in table 4

Table.4 Quantity of Occupancy on Built-up Settlement Land in Musi Banyuasin Regency

No	Districts	Quantity of Occupancy Comparison1	Quantity of Occupancy Comparison 2	Quantity of Occupancy Comparison3
		Unit	Unit	Unit
1	Sanga Desa	6.498	6.955	7.918
2	Babat Toman	7.578	8.315	9.466
3	Batanghari Leko	6.139	5.368	6.112
4	Plakat Tinggi	6.875	7.147	8.137
5	Lawang Wetan	5.705	4.627	5.268
6	Sungai Keruh	4.834	4.407	5.017
7	Jirak Jaya	3.881	3.298	3.755
8	Sekayu	14.958	15.253	17.364
9	Lais	9.241	8.282	9.429
10	Sungai Lilin	35.439	34.712	39.518
11	Keluang	18.229	19.737	22.470
12	Babat Supat	15.493	15.696	17.869
13	Bayung Lencir	33.825	36.645	41.719
14	Lalan	16.198	17.194	19.574
15	Tungkal Jaya	21.069	26.009	29.611
Total		205.962	213.645	243.227

Source: Analysis result, 2022

e. Residential Quantity Selection Decision on Built-up Settlement Land in Musi Banyuasin Regency

Based on the test results using standard deviation and correlation where the quantity of dwellings for comparison 1, 2 and 3 to the number of families in 2020, results in a correlation value of 67.6 percent for comparison 1, correlation for comparison 2 of 67.1 percent and comparison 3 of 67 percent. The decision that can be considered from the test, then, the highest correlation value (close to 1 or 100 percent) is assumed to be predictive data in providing data on the quantity of existing dwellings on built-up settlement land that can be used as planning data in Musi Banyuasin Regency. Based on the results of the statistical test data, the quantity of dwellings on built-up settlement land in 2022 amounted to 205,962 units inhabited by 124,436 households on built-up settlement land of 7,528 ha.

Table 5

Table. 5 Testing the Quantity of Occupancy on Built-up Settlement Land in Musi Banyuasin Regency

No	Districts	Area of Built-up Settlement	Number of Households (kk) Year 2022	Quantity of Occupancy Comparison1	Quantity of Occupancy Comparison2	Quantity of Occupancy Comparison3
		(Ha)	KK	Unit	Unit	Unit
1	Sanga Desa	245,08	6.602	6.498	6.955	7.918
2	Babat Toman	292,99	7.213	7.578	8.315	9.466
3	Batanghari Leko	189,17	3.934	6.139	5.368	6.112

4	Plakat Tinggi	251,86	5.348	6.875	7.147	8.137
5	Lawang Wetan	163,06	5.016	5.705	4.627	5.268
6	Sungai Keruh	155,28	4.670	4.834	4.407	5.017
7	Jirak Jaya	116,22	3.817	3.881	3.298	3.755
8	Sekayu	537,47	18.223	14.958	15.253	17.364
9	Lais	291,85	10.691	9.241	8.282	9.429
10	Sungai Lilin	1223,17	12.363	35.439	34.712	39.518
11	Keluang	695,5	6.547	18.229	19.737	22.470
12	Babat Supat	553,1	7.148	15.493	15.696	17.869
13	Bayung Lencir	1291,3	15.073	33.825	36.645	41.719
14	Lalan	605,87	7.859	16.198	17.194	19.574
15	Tungkal Jaya	916,52	9.932	21.069	26.009	29.611
Total		7.528	124.436	205.962	213.645	243.227
Standard Deviation				8.066	8.667	9.958
Correlation				0,676	0,671	0,67

Source: Data Processing Results, 2023

4. CONCLUSION

Faced with an urgent situation where settlement and housing planning requires secondary data. So the role of planners certainly makes various alternatives to find data on the quantity of occupancy in an area. along with various problems, related to data availability, such as not updating occupancy data and limited time in data collection. Meanwhile, the planning process continues. This certainly requires other alternatives to meet the needs of occupancy data as basic planning data, especially to estimate current and future housing needs. Therefore, this research is expected to provide various alternatives in determining the quantity of dwellings that represent planning data in each region. The weaknesses of this research certainly exist, but as long as there is a systematic process with various statistical tests, it can certainly be considered to be used as a tool to meet the needs of secondary data, one of which is determining the quantity of occupancy on built-up residential land using statistical, spatial and technical methods.

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