Optimization Model for Subsidized Housing using Linier Programming Associated with Land Suitability

by Alif Catur Murti

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Optimization Model for Subsidized Housing using Linier Programming Associated with Land Suitability

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Abstract. The increasing population from year to year raises the problem of population density. The population density of the Kudus Distric from 2010 to 2014 increases in quality every year. Recorded in the Central Bureau of Statistics in 2010 the population density (Soul Per Km2) around 1833 and in 2014 reached 1931. Population growth rate is proportional to the growth rate of existing houses as shelter. The Government of Kudus District as a program implementing "million houses" from the President of the Republic of Indonesia provides solutions in terms of security in the administration of land administration. Developers of subsidized housing need to take several aspects in development, such as Spatial Planning in each region, especially Kudus District, the long-term program and government functions. There needs to be a system capable of determining the optimal level of the type of housing to be built with the suitability of existing land. There needs to be a system capable of determining the optimal level of the type of housing to be built with the suitability of existing land. condition that need to reach the optimal level can be done by using linear programming method. All these things can be integrated and execute with the existence of eco-friendly Development System

1. Introduction

The growing population of semaking increases from year to year raises the problem of population density. The density of the residents of the kudus distric from 2010 to 2014 increase in quality every year. Recorded to the Central Bureau of Statistics, in 2010 the population density (Soul Per Km^2) around 1833 and in 2014 reached 1931. The rate of population growth is proportional to the rate of growth of existing homes as shelter [1].

Housing and settlements are one of the basic human needs and an important factor in the improvement of human dignity and the need to create conditions that can encourage housing development to maintain housing and settlement availability. In the framework of providing facilities for low income communities and as much as possible to provide facilities necessary for business financing through Financing Issuing Institution with sharia principles[2].

Increase in some component prices Building materials and low-income communities still have sufficient purchasing power So the government will need to determine the price Limit the maximum price of subsidized housing and its limitations The price and amount of money and the amount of money used maximally for the maximum down payment credit financed and subsidized KPR interest rates. Procurement of Housing and Settlements by Various. Subsidiary Subsidiaries through Subsidized Sharia Loans[2].

Housing and Settlement Area is a unified system consisting of coaching, organizing, organizing, settlement, maintenance and repair, prevention and improvement of quality of Housing and Slums,

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supply and maintenance, and community role. Settlement Area Plan, hereinafter abbreviated as RKP, is a document to be used in an environment consistent with short-term, medium- and long-term plans and conditions[3].

The existence of different views on the side of the housing developer, in addition to subsidized housing developers must pay attention to aspects of Spatial Planning (RTRW), land functions, and land conditions that exist in the field, the developer must also consider the optimal side of housing construction to be built for profit. the maximum. The use of linear programming methods makes it possible to perform profit optimization[4][5][6][7].

The process of subsidized housing development that became the program of the President of the Republic of Indonesia, named "a million homes" became the attention of many parties. The ability to build and utilize existing facilities remains RTRW Kabupaten itself makes a system capable of performing optimization process.

2. Method

Research conducted in the form of quantitative and qualitative research, and the following are the stages of the research carried out:

a. Identification of problems
   At this stage, problems were found in how to implement the system in overcoming land use for subsidized housing.

b. Data collection
   The data needed is in the RTRW map, housing area, type of housing built and price. In addition, it is necessary to support data sourced from books, journals, and other literature that have something to do with this research.

c. System Analysis and Design
   At this stage the system analysis process is carried out, and the following is a system information framework which can be seen in Figure 1:

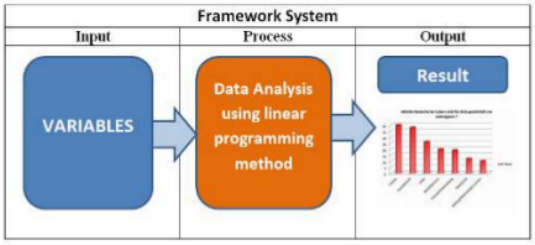

Figure 1. Information System Framework

2.1 References

Research conducted by Neng Ikeu, this research was conducted in Coastal Cirebon City which physically has potential resources to be developed in the future. Problems that occur today, that of the existing land use in the coastal area has not been able to improve the economy of coastal communities. The method of analysis used in this research is qualitative data analysis method and quantitative data analysis method by using Linear Programming analyzer. The results can be given is to maximize the utilization of port land and trade services as an alternative combination of land use that can increase economic growth in the coastal area of Cirebon City[8].

Research conducted Sudarsana Challenges on housing developers is to formulate the number of types of homes that will be developed so as to meet the market aspect, government appeals in the provision of simple homes and maximum profit margin. The purpose of this study is to formulate the composition of the number of various types of houses built to achieve the optimum solution and with maximum profit. The optimization method used is the simplex method. As the object of study is the construction of Taman Wira Umadui housing in Denpasar. Type of house that is built is type A, B and C. The analysis

shows the optimum composition of the type of type that is built is type A house as many as 28 units, type B houses as many as 17 units and type C houses as many as 54 units[9].
Erlina's research on the need for homes for people after food and clothing. In Sei Rampah will be built a Housing namely Bumi Sergai Housing, with two types. Type 65 (X1) and Type 45 (X2). This problem will be modeled into a mathematical model of integer programming that is part of a linear programming problem, where the decision variable must be an integer. The problem of integer programming will be solved using branch and bound method which first change the problem of integer programming into linear programming form, then used simplex method to solve the problem of linear programming. With the objective function of house selling price Z = 180.000.000X1 + 140.000.000X2 and function of building materials constraints. The number of houses for type 65 is 36 units and 45 types as many as 62 units[4].

2.2 Subsidize Housing

In accordance with Regulation of the Minister of Public Works and People's Housing of the Republic of Indonesia in 2016, it is explained several points that [10]:

a. Subsidized Housing Assistance Subsidies hereinafter referred to as SBUMS are Government subsidies granted to low-income communities in the framework of fulfilling part / all of the down payment on housing acquisition.
b. Prosperous Home Ownership Credit, hereinafter referred to as KPR Sejahtera, is a mortgage or home financing with the support of housing finance liquidity facilities which include “KPR Sejahtera Tapak“ and “KPR Sejahtera Susun“ which are issued by the Implementing Bank conventionally and with sharia principles

2.3 Linear Programming

The Linear Program Model is also called the formulation model, that show the process model that all problems involve the effort to reach the subject with collection of limits such as resource constraints [11].

a. The linear programming model of these problems.
b. Function of purpose to be maximized and minimized
c. Collection of limitations
d. Decision variables to measure activity level
e. All boundary and functional relationships are linear

Most of the problems management by using limited resources to achieve the desired goals (desired goals). In the limited resources state must produce optimal results. In other words how to adjust to the input (input) that allows to get the work of the output (output) of the production of goods or services optimal

3. Result and Discussion

At this time to support the government movement to create cheaper housing, many developers compete to provide it. This creates problems in two ways, the first problem related to land use and the second problem related to land use optimization. Faulty use of land can be solved by adjusting the map of local governance plan. With the guidance of the spatial plan of all administrative processes related to development will not encounter problems, but if developers in building not pay attention to these aspects, in the future will encounter barriers in terms of policy. Variable that be used are : land area , type house, selling price associated with land suitability. Problems related to optimizing land use for maximum benefit can be solved using Linear Programing method. Based on previous case study method Linear programming method is able to solve problems in determining or reaching maximum profit with certain indicator limit. Most developers only think to get the most profit without thinking about other factors, especially environmental factors. By bringing together an integrated concept of land suitability with the optimization of profit can create an environmentally friendly system. Eco-friendly development system can be seen in Figure 2.

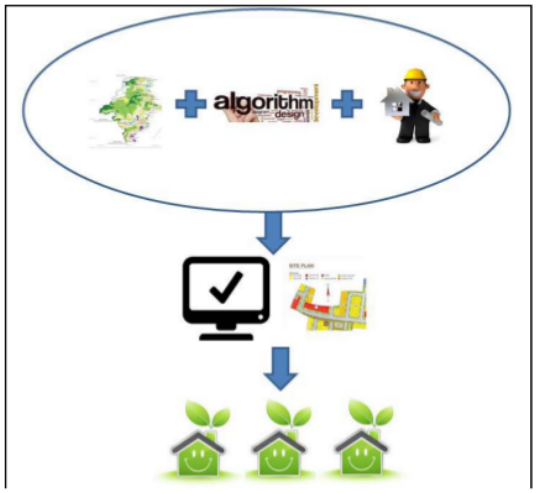

Figure 2. Eco-friendly development system

In the drawing concept of the cycle can be seen:

a. Map of Regional Spatial Planning (looking at the function of the land to be used), housing can only be built on land that is intended for development.
b. Calculation of land area, type of housing, and selling price using linear programming method. To maximize land use.
c. Development does the calculation of materials used to build.
d. The First, Second and Third Processes must be synchronized by computer to create optimal housing site plan.
e. Development can start building eco-friendly subsidize housing

With the establishment of the concept of Eco-friendly development system, housing and government developers have a common vision. Keep safeguarding the environment but also from the developers side do not feel disadvantaged by optimizing land use by using linear programming.

4. Conclusion

Based on the explanation of the results and discussion, the concept of Eco-friendly development system if implemented will be able to assist the government in implementing policies related to the provision of subsidized housing but also not detrimental from the developer side in obtaining profit. In the implementation of this program will not violate the rules of use of land functions because in the planning process pay attention to the map of regional spatial plans. Precisely the target in land use optimization becomes the main focus in the concept of this system. Minimizing any possible negative outbreaks is also a benefit of implementing this system.

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Judul Karya Ilmiah (paper) : Optimization Model for Subsidized Housing using Linier Programming Associated with Land Suitability

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Lampiran 6

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