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Optimizing Green Open Space (GOS) Management for Spatial Utilization in Palu City in Terms of Ecological, Economic, Social and Policy Aspect

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Abstract
Tha management of green open space (GOS) has lasted for long time period in Palu city but the fact is the results have not been as expected. The research aimed is to determine the level of knowledge and understanding; appropriate socialization method; partial effect and correlations between (X) variable on (Y) in (GOS) management; appropriate policies and strategies in order to strengthen institution to manage GOS utilization in Palu city and to compose a simulation of dynamical system. This research was conducted in Palu with the number of its sample was 400 respondents. The result shows that that the level of public knowledge about GOS reaches 68.75% or 275 respondents with the level of understanding is in nescience category and the appropriate socialization methods are counseling and Society Group Formation which concerns on spatial and provision complaint unit. Multiple linear analysis method is obtained from 12 independent variable and dependent variables, linked simultaneously and clear partial effect, with poor correlation R^2 51%, Stepwise method obtains seven independent variables in its model; GOS index Palu city overall is optimal with point 3.962 ($IGOS_{city}$3, 962> 1),the GOS balance index private in Palu has not been able to perform optimally (GOS_{city} Private<1); There is causality *(causal loops)* based on space by area and population growth with variables (X) in term of ecological, economic, social, and policy on variable (Y); The strategies and policies of GOS Management to strengthening the institution are in quadrant 1, namely, the relationship the strength and its possibility with the value is 1, 51 and 1, 44; 1, 72 and 1, 87.
Keywords: Likert Scale Analysis, Multiple Regression Analysis, Research Variables, hypotheses, GOS index.

Background

Kota Palu is one of region in the eastern territory of Indonesia, as the capital of Central Sulawesi Province. Palu is experiencing establishment necessity due to the increasing population growth and the potential exists in the city of Palu. Therefore, the government needs to give any attention in spatial management. Space will never grow (wide spatial remains the same), the increasing of higher population growth mainly due to urbanization factor which becomes one of the main problems in Palu. The high number of the population tends to increase over time. This has an impact on greater city spatial use which reduced the availability of open space utilization or the occurrence of spatial use in urban areas, either in green open space (GOS) and non- green open space (Non-GOS), which potentially turn into residential, industrial, educational and trade sector (Guidelines RTH Supply and Utilization in Urban Area, 2008). According to Joga and Ismaun (2011), the reduction quality and quantity of public open space, particularly green open space (GOS) in the last 30 years is significant. The existing of GOS have converted largely to other urban infrastructures, such as; shopping centers and commercial facilities, residential areas including apartments, as well as roads infrastructure.

The following objectives are; 1). Obtaining information on the level of society knowledge and understanding are focusing on the importance of the management and provision of green space in Palu; 2). Generating appropriate socialization method is on the importance of the management and provision of green space in Palu; 3) Analyzing its effect partially and correlations between variables (X) in terms of; ecological, economic, social and variables (Y) policy of spatial use on green open space in Palu; 4). Calculating and resulting the public and private GOS index balance in villages, sub districts and Palu area. Then, composing a dynamic simulation model is based on the population growth in Palu; 5). Determining what policies and strategies will be applied on institutional strengthening management of green space in Palu.

The formulation of hypotheses: 1). the relationship between the variables (X) in terms of; ecological, economic, social, and variables (Y) policy on spatial use is small-scale. Ho: $\mu = 0$, Ha: $\mu \neq 0$, 2). the effect of variable (X) in terms of; ecological, economic, social, and variable (Y); policy on spatial use is significant. Ho: $\mu = 0$, Ha: $\mu \neq 0$.

Research Methodology

The research location of study about "Optimizing Management on Green Open Space in Space Utilization, in terms of; ecological, economic, and social and policy" was in Palu city. This research was implemented through

two steps. The first step was prepared for the plan or initial survey on any matters relating to the condition of area/GOS management sector which took 1 (one) year, started from on early June 2012 to the last May 2013. The second step was from the beginning of June 2013 until the end of July 2014.

Materials and instruments in this research were papers, printer ink, note book as media for questionnaire, statistic book (Palu in Figures), journals, research documents or relevant planning document, magazines or newsletters. Roll meter, digital cameras, Global Positioning System (GPS), plotter, professional computer, printer, stationery such as pen, pencil and ruler, and POWERSIM Studio 7.

Collecting data was through interview techniques, field survey and literature review. The number of population was 86.964 families. Sampling method was stratified sample. Methods of data collection were; 1). Primary data was collected by structural interview was questionnaires which had been prepared and "Enumerator" to record and explain its contents. 2). Before, the questionnaires were distributed, first performed was testing to respondents as much as 5% from the samples number, there were 20 respondents; 3). After giving questionnaire to respondents, the questionnaires were evaluated, whether there were numbers or difficult questions to be answered by the respondents, then they would be corrected; 4). To facilitate the respondents to answer the question at the time, then the respondent was facilitated by the "Enumerator" in order to answer the question in accordance with the contents; 5). In addition to facilitate the respondents, "Enumerator" has duty to make important notes matters relating to the point questions in the questionnaire which had been already prepared; 6). Secondary data collection, research documentation in the form of reports and/or other evidence related to the research.

Result Discussion

The Novelty of research about optimizing Management on Green Open Space (GOS) in Space Utilization, in terms of; ecological, economic, and social and policy in Palu are; 1). This is the first study which reveals completely the upstream and downstream problems, as well as about the level of knowledge and understanding of the community, the appropriate socialization method in management and provision of green space, analyzing the effect partially, simultaneously and correlation effect to variable (X) in terms of; ecology, economy, social, and policy on variable (Y) spatial use; 2). The first research in Palu which describes index of public GOS and balance index of private GOS in order to o determine whether management and provision of green space in the villages, districts, and in Palu are optimal; 3). Composing a dynamic simulation models systems based on green space provision area and population growth; 4). The expected output is a dynamic simulation models system providing green space, as well as the policies and strategies to strengthen the management of green space in Palu.

1. The level of societies' knowledge and understanding on GOS

The results of the 400 respondents have generally identified, the level of public knowledge shows that society who already known about GOS are only 275 respondents (68.75%) while those who do not know at all about are 125 respondents (31.25%). Societies who provide feedback about the understanding of GOS in some of the statements are many of them still asking about the GOS itself, such as: 1) Lack of community involvement since the preparation of a program and activities to complete the programs and activities implemented; 2) Socialization and disseminating information only certain community so that not all of them are involved in it; 3) The lack of direct counseling involving neighborhood and commune in the scope of village government; 4) The Government of Palu only prioritize the implementation of labor-intensive for the environmental cleanliness. However, there is no empowerment effort about how to create the management and provision of green space. Many of them still do not understand about the importance of GOS, so that disseminating information is needed to provide insight to the public to be more aware and involved in the use and management of green space in Palu.

According Pranoto, (2008) the understanding in GOS is necessity needed to be built from green aspect *(Architecture)*, it looks as an environmentally sound architecture which concern on natural global environmental conservation with emphasis on energy efficiency, sustainable patterns and holistic approaches. This paradigm is begun from ecological design concept which emphasizes the dependence *(interdependencies)* and linkage *(interconnectedness)* between all systems *(natural and artificial)* to the local environment and biosphere.

According to study conducted by Rahadiani, et al (2014) to understand the implementation of the projects are still many failures because its implementation is still largely on top-down approach, less involving communities in the planning so that they participate less in taking control, maintaining, and supporting implementation of activities.

Based on the study results have obtained cumulative score is 9.042 of societies' understanding about GOS, with an average score was 1004.67 or nescience category, so that the level of public understanding on how important of the provision and management of GOS in order to reach the optimization of the utilization space GOS management are minimum or they have not understand yet. Thus, they do not maximize the management, utilization, provision, and maintenance of GOS existing to create Palu as the Green City (Clean, Clear and Safe). Then, it is important to increase public awareness about the meaning of GOS in accordance with the functions and benefits needed by them. Socialization / dissemination are necessity to inform intensively and continuously

to public by involved the government districts and villages. That is not growing public awareness about the importance of green space management and provisioning. It can be interpreted that there is the lack of public awareness about the importance of GOS management and provision.

2. The application of appropriate socialization method

The appropriate method of socialization / dissemination information is expected to enhance the societies' ability and understanding on the provision and management of GOS in Palu. Societies' participation are needed to maintain and manage GOS no matter how great the ability of local governments to provide green space to the public but if otherwise there are no awareness and societies' ability to understand and to give attention for green space which has been provided, it seems futile.

Mungkasa (2011) expresses that media socialization for the public need to be adapted to the culture and characteristics of local communities that are commonly known for them, for example, wall magazine in public place, worship place through loudspeakers, and creating caricatures with familiar characters. Furthermore, Santoso (2011) said that there is spatial socialization where GOS is a key part of the spatial arrangement content in order to find out of how to participate in space utilization control and planning.

Based on score analysis and appropriate socialization methods category has conducted in each sub district in Palu. There are 9 (nine) respondents statements. There are 7 (seven) of 8 (eight) sub districts, namely, Mantikulore, South Palu, North Palu, West palu, Ulujadi, Tatanga and Tawaeli. Most people from these sub districts prefer that appropriate socialization/dissemination information are applied through 3 methods, they are; "Counseling Media and Society Group Formation which concerned on spatial and provision complaint unit". East Palu is the only one sub district which has selected 1 (one) method, that is “Directly". Overall, the most appropriate methods for information socialization and dissemination are counseling and Society group formation which concern on spatial and provision complaint unit. The information socialization and dissemination is needed to support the sustainability of provision and management of GOS, so that people are able to participate directly in creating the Green Palu. Various green space media socialization of its city have long been held “authorized" by the government or non-governmental organizations, any foundations which have concerned on awareness-rising to encourage and support the existence of any green space for societies. It has already realized that green space is necessary exist between the concrete building structures as a malleable and environmental conditioning (Rijal, 2008). There are several reasons why socialization has not been implemented intensively by the Government; 1). Creating program for urban green space has not become a priority activity; 2). Limited budget and financing to carry out information socialization / dissemination; 3). The absence of a cooperative relationship is between the media, Non-Governmental Organization, as well as officially financial institutions (banking), and; 4). There are no commitment and consensus between the executive and the legislature. Then, GOS management is merely seeking to issue a regulation course in the form of Regional Regulation of Palu No. 4 of 2015. The information socialization / dissemination which have been running directly to the societies; electronic media and society group formation which concern on spatial and provision complaint unit in each district/city are conducted intensively by Office of Public Works – Human Settlement and Spatial Planning of Central Sulawesi Province.

3. Partial effect and simultaneous between variable (X) in terms of; ecology, economy , social, and policy to variable (Y) spatial use

Partial effect and correlation in optimization green open space management for spatial utilization in Palu has already analyzed by using regression and correlation analysis method. It has obtained that GOS management and 8 (eight) district related to 4 (four) variables and twelve (12) sub-variables.

Table 1. Regression Analysis Result

No.	Variable	Regression Coefficients	Std. Error	t- counted	Significance
1	2	3	4	5	6
1	Rainfall	0,130	0,051	2,542*	0,011
2	Air Temperature	0,337	0,052	6,437*	0,000
3	Green Open Space Facilities	-0,052	0,032	-1,643	0,101
4	Level of Income	-0,086	0,033	-2,619	0,009
5	Type of Business	0,063	0,035	1,804	0,072
6	Community visit pattern	0,219	0,062	3,543*	0,000
7	Total Population	-0,102	0,048	-2,145	0,033
8	Level of Education	-0,085	0,032	-2,632	0,009
9	Density of Population	-0,128	0,059	-2,165	0,031
10	Priority Program	0,127	0,050	2,519*	0,012
11	Incentives and Disincentives	0,216	0,048	4,463*	0,000
12	Sanction	0,177	0,033	5,274*	0,000
Constants					0,331
t Table					1,966
F Counted					33,009
F Table					1,777
R^2 (*Square*)					0,506
R					0,711

Regression analysis has been conducted to determine the extent of the partial effect of variable (Y) spatial use on variables (X) include; ecological, economic, social, and policy. Sugiyono (2014), has explained the benefits of regression result analysis is to determine whether the dependent variable is increasing or decreasing can be performed through increasing independent variable or not. On the words, Vinarti et al (2014), regression analysis is substantially used to create an equation which would be expected to help those who need to predict the dependent variable values of the independent variables. Widhiarso (2011) describes that the linear regression analysis is a statistical analysis instrument which is used to test whether there is influence between the independent variable on the dependent variable.

Based on stepwise method from twelve independent variables, there are seven variables categorize regression model. The first is Community visit pattern model (X_6); the second is air temperature (X_2); the third is sanctions (X_{12}); the fourth is rainfall (X_1); the fifth is incentives and disincentives green open space management (X_{11}); the sixth is level of income (X_4), and the last one is priority programs (X_{10}) after doing. The regression equation after stepwise method is as follows:

$$Y = -0{,}223 + 0{,}212\,X_6 + 0{,}276\,X_2 + 0{,}159\,X_{12} + 0{,}191\,X_1 + 0{,}138\,X_{11} - 0{,}089\,X_4 + 0{,}125\,X_{10}$$

Based on these equations, it has obtained R-square X_6 is 0.324 or clearly states that 32.4% of community visit pattern model has affected spatial utilization while the remaining is 67.6% in which has influenced by other factors; R-square X_2 is 0.389 which shows only 38.9% of air temperatures has affected the space utilization while 61.1% is influenced by other factors; R-square X_{12} is 0.430, describes only 43% of giving reaction to sanctions variable on spatial utilization while 57% is influenced by other factors; R-square X_1 is 0.450, explains only 45% of the rainfall variables while the remaining 55% is influenced by other factors; R-square X_{11} is 0.463, describes that there is 46.3% of incentives and disincentives variables affects the spatial utilization while the remaining 53.7% is influenced by other factors. The calculation of R-square X_4 is 0.473, explains that there are 47.3% of level of income affects the spatial utilization while the remaining 52.7% is influenced by other factors; then R-square X_{10} was 0,482, explains that only 48.2% of government priority programs variables affect spatial utilization in Palu while the rest is influenced by other factors which is not included in the model.

T test result is partially to variable community visit pattern (X_6). It has obtained that t-counted = 3.393 (t> t table = 1.966) with 0.01 significance level (sign <alpha 5%), then partially of community visit pattern (X_6) significantly affects on spatial use planning. T-test results partially to variable air temperature (X_2), obtained t-counted = 5.404 (t> t table = 1.966) with 0.00 significance value (sign <alpha 5%), then partially air temperature (X_2) influential significant effect on spatial use. T-test results partially to the variable sanctions (X_{12}), which has obtained t-counted = 4.816 (t> t table = 1.966) of 0.000 with significance value (sign <alpha 5%), then partially sanctioning (X_{12}) significant effect on spatial use. T-test results partially to variable rainfall (X_1), has obtained t-counted = 3.936 (t> t table = 1.966) with 0.000 significance value (sign <alpha 5%), then the partial precipitation (X_1) influential significant effect on spatial use. T-test results partially to variable incentives and disincentives (X_{11}), has obtained t-counted = 3.161 (t> t table = 1.966) with 0.002 significance value (sign <alpha 5%), then partially incentives and disincentives (X_{11}) significantly affect spatial use. T-test results partially to variable income level (X_4), has obtained the value t = - 2.878 (t <t table = 1.966) with 0.004 significance value (sign <alpha 5%), then the partial income level (X_4) effect no significant effect on spatial use. T test results partially to

the variable priority programs (X_{10}), has obtained t-counted = 2.683 (t> t table = 1.966) with 0.008 significance value (sign <alpha 5%), then partially priority programs (X10) effect significant has effected on spatial use.

The next step is the F-test where it is F table value = 1.777. This value is lower than F counted (F table = 1.777 <F count = 52.131) in which shows from seven variables categorized relatively into regression model is on 95 % level, as well as the significance value is lower than 5% alpha (0.000 <0.05). These results shows that the stepwise method in order to get synchronously the best model of each variable influence the variable spatial use planning (Y), thus H0 is rejected because of the independent variable (X) effected mutual significant on spatial use (Y).

4. Index of green open space in Palu

GOS index is a key element of forming cozy city, productive and sustainable, green space where that index to be basic in determining the GOS proportion in urban areas, included: 1). environmental conservation in the city; 2). Any issues and developing a sustainable city; 3). Management of city and tropical garden; 4). Designing and urban planning, and; 5). GOS recommendation and determination regarding on RTRWK and RDTRK, then, zones, sub-zones, block and sub-block of residential development can be determined and defined on function and spatial allotment. Furthermore, Muta'ali, (2012) says that the purpose of GOS is for several points, they are: 1). Maintaining environmental urban ecosystem looks into harmony; 2). Creating the balance between the natural environment and the built environment in urban areas, and; 3). Improving healthy, elegant, clean, and comfortable environment.

GOS as a counterweight urban ecosystem is belonging hydrology system, climatology, biodiversity, and other ecological systems which aims to improve the quality of environment, city aesthetics, health, and welfare (Joga and Ismaun 2011).

Based on the research results to the public GOS was known that the sub district of Palu. Palu East and West are the center of Palu with area is each 7.71 km2 (0.771 ha) and 8.28 km2 (0.828 ha) and the number of very dense population and the constructed area is very solid with GOS_{City} index respectively is (0,048 and 0,084 <1). It shows that there is no provided land for the green space development and the lack of planning (master plan) from the beginning of GOS which already caused two (2) those sub districts function less or poorest for preserving the ecological / environmental urban areas. The next sub districts are Mantikulore and Tawaeli, located around suburb of Palu with fairly wide area is severally 206.80 km2 and 59.75 km2. Total population was less function and medium constructed area with GOS_{City} index was (4.768 and 3.363> 1) apiece. It is noted that there is still available vacant land / abandoned land with the ability GOS works optimally to protect health environment in urban areas. Honestly, in North Palu sub district, there is 1 (one) village which has perfect green space, namely, Taipa village with value index is 4.616> 1. It means that in Taipa Village has existing land to function greatly in protecting health environment in urban areas. The value of the index above illustrates that the green space provision in Palu is in the range between optimal and suboptimal. Thus, the government should build GOS in order to answer demand in provision of green space in some villages or sub-districts in urban areas.

This Research is not only about public GOS index but also private GOS index. It is found out that private GOS is not optimal in order to preserve environment in spatial private in all village and sub districts in Palu. There are 8 (eight) sub districts consisted of 45 (forty five) villages. Index balance of GOS_{City} <1, it describes that the ability of private green space to work less or not optimal to preserve the environment in a private space in urban areas (Muta'ali, 2012). Furthermore, there are 8 sub districts, 2 sub districts which have an index balance GOS_{City} is close to 1, that is East Palu sub district and Palu itself. The balance index is 0.087 and 0.070) which described the balance between the availability of private green space private with utility private green space is needed in East Palu and West Palu already. It has almost to meet the availability standard of private GOS in Palu to fill environmental comfort. As the center of Palu, East Palu and West Palu require provision of private GOS because of the level of population density and building density is higher. There is possibility to create private GOS because it has fulfilled balance index of GOS, which is equal to 1 (IKRTHCity=1).

The provision of GOS cannot be considered optimal. It has obtained that the value of balance index of private GOS of 6 sub districts from 8 sub districts < 1. The lowest balance index of GOS has fallen to 2 districts, they are; Mantikulore and Tawaeli with $IKRTH_{City}$ is 0,003. This Happened because of dissemination and population growth are relatively lower which followed by constructed area grows in medium level. The amount value of balance index of private GOS shows that the provision of private GOS in Palu has not been optimal in favor of comfortable environment in urban areas.

5. The Dynamic simulation models systems of GOS provision in Palu

The composing method for simulation is necessary needed in order to identify problems which consist of the background, a purpose composing the model, framework and assumptions used. Based on supporting data and literature review, then the model is composed by an instrument, called POWERSIM Studio 7. Then, the

simulation has carried out by changing some parameters or variables propulsion system that produced simulation in the form of graphs or data calculations. The simulation results are compared with the real situation or known verification results. If the simulation results show the trend in accordance with the actual state, the model is considered suitable. But if the simulation model went opposite, then it needed to be fixed. Thereafter, the result analyzed and reached conclusion (Sasongko, 2008).

Dynamic model system optimized the provision of GOS. This system model is focusing to public awareness level users or society in Palu. Dynamic model system is a combination of sequence simulation dynamic models which is converging on optimizing the provision of GOS. The combination of dynamic model system both from providing an ideal green space, income, pattern public visit and understanding and knowledge of the community, all of them are on how higher the level of public awareness on the provision of GOS by local governments every year. The Provision of GOS, of course, based on regulation of public works about the guidelines for the provision of GOS which is to protect the environment and to sustain the availability oxygen. Honestly, the provision of GOS is generally not occurred with the public awareness in using, maintaining and managing the existing GOS. In the dynamic model, the researcher has tried to pictured optimization of the provision of GOS from the public awareness level. See in Figure 1.

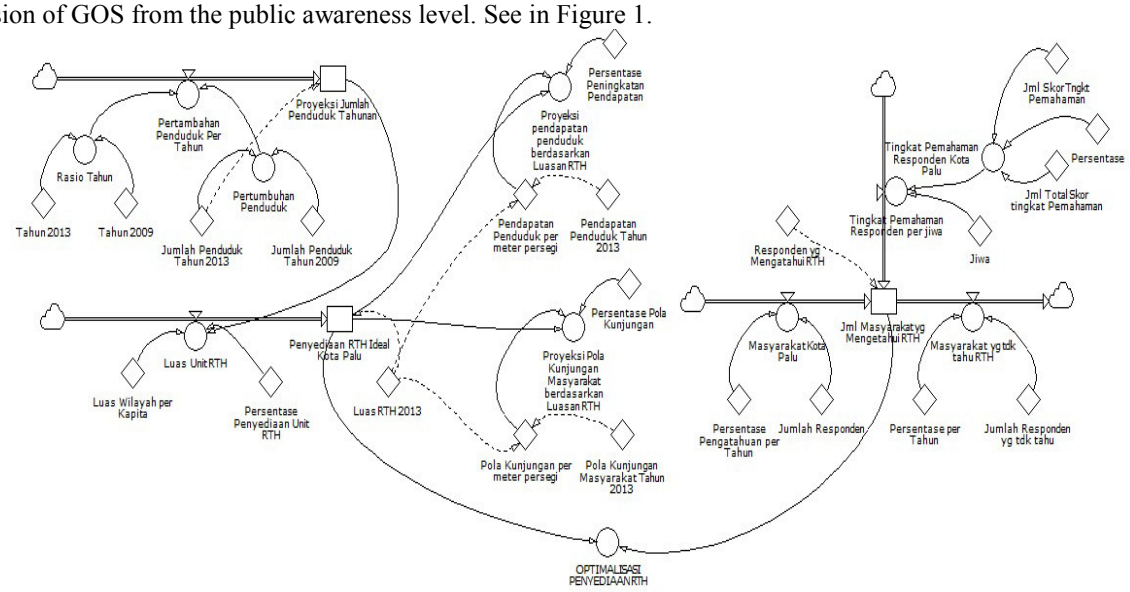

Figure 1. Dynamic Model of Optimizing of GOS Provision

Figure 1, dynamic model system in which is a combination of models of population projection system, providing an ideal GOS. The result projections is based on GOS wide area, community visit pattern, the level of understanding of respondents per capita and the number of community who know about GOS annually. Based on the dynamic model is then has obtained by the system model to optimize the provision of GOS which describe the simulation of public awareness of the provision of GOS, the projected level of public awareness has seen from the number of people who know RTH based on the amount of GOS ideal in Palu, where the results of the simulation model can be seen in Table 2 and Figure 2.

Table 2. Simulation Model Dynamic Result in Optimizing the Provision of GOS

Year	Optimizing the Provision of GOS (m2/Inhabitant)
2013	1.287.756,91
2014	658.572,35
2015	449.415,89
2016	345.115,89
2017	282.734,40
2018	241.305,50
2019	211.847,05
2020	189.869,07

Sources: Primary data after processed, 2013

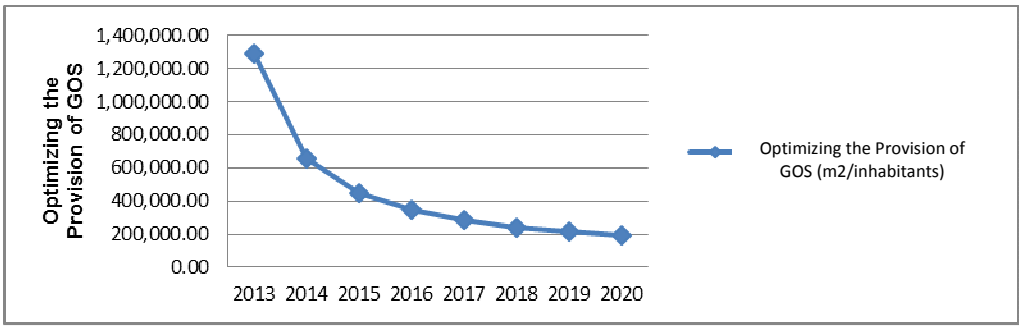

Figure 2. Graph Results Simulation Model Graphic Result of Optimizing GOS Provision

Figure 2 shows that the trend of simulation generated is decreased until 2020 where society realize the existence of GOS and the local government has provided GOS but it is not in accordance with the public awareness to preserve, maintain, manage the existing ones.

6. Strategies and Policies Institutional Strengthening of GOS Management

Before and during the research has conducted by the researcher, in particular the institutional strengthening of GOS management in Palu. There are various activities which already implemented in both observations in the field or through direct on-site survey; one of them was Focus Group Discussions (FGD) method. This method has been applied in order to find out the objectives of institutional strengthening. It has obtained that there is 71.96% the objectives of institutional strengthening and interpretation of inhibition institutional strengthening are 28.04% in 45 villages from 8 sub districts.

In figure 3 and 4 shows, the strength of the organization or its institution. The strength of GOS management, strategies and policies and strategies are in the quadrant 1. It describes that the interface between the interface between the strengths and opportunities are absolutely necessary, that GOS management, utilization and provision run effectively on spatial utilization in Palu. In quadrant I, it can be integrated the key and its opportunity as SO (strengths-opportunities) strategy which are towards the expansion or perfection, growth, certain expansion field in performing coordination role between departments / agencies and any parties (stakeholders) to achieve goals or opportunities which make the institutional of GOS management become better in Palu. In this quadrant 1 of its organization (department / agency and the party / stakeholder) is considered to have their own primacy. It is needed to reform to be better in order to integrate the duties and responsibilities of the respective department / agency involved in GOS management in Palu.

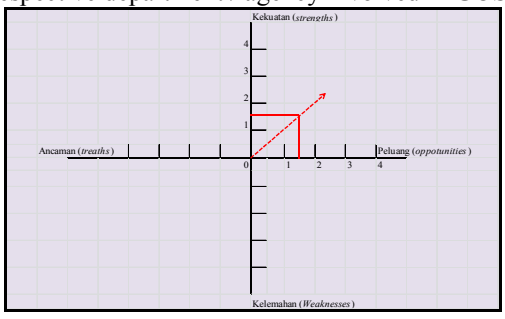

Figure 3. Map of the Strength Policy of GOS Management

Note:
(*Strenghts*)+ (*Weaknesses*)= **1,09+0,43 = 1,52**
(*Opprotunities*)+ (*Treaths*) = **0,93+0,51= 1,44**

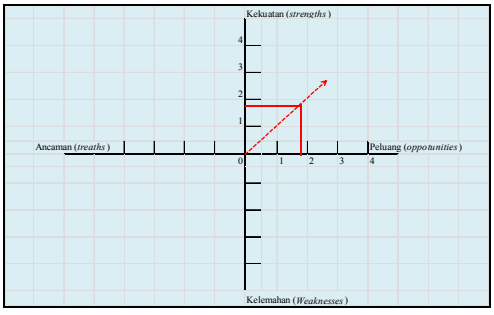

Figure 4 Map of the Strength Policy of GOS Management

Note:
(*Strenghts*)+ (*Weaknesses*)= **1,55+0,17 = 1,72**
(*Opprotunities*)+ (*Treaths*) = **1,73+0,14 = 1,87**

Conclusion

The level of public knowledge, include the level of perception and participation and the level of society's understanding is still categorized in low level.

The appropriate methods in the provision and management of GOS in are through counseling and society group formation which concerned on spatial and provision complaint unit. In addition, another method which is appropriate to be applied is direct/face-to-face method, by using electronic media (Dialog at and media methods electronic through (Having dialogue at Indonesia Radio Station (RRI) and Television of The Republic of Indonesia TVRI) and Print Media (newspapers, magazines, leaflets, banners / billboards, etc.).

Based on the result analysis through stepwise method, there are 7 variables which can be found; the variable of X_6 of community visit pattern, X_2 of temperature, X_{12} of sanctions, X_1 of rainfall, X_{11} of incentives

and disincentives, X_4 of level of income, X_{10} priority programs. Therefore, H0 is rejected because of the independent variable (X) give effect significantly to variable (Y) of land use planning. For the correlation analysis result, it obtain that the correlation value (R) is 0,711 or (71.1%) while R-square value ($R2$) is 0.506 (50.6%), and the correlation coefficient [r] is in the range of "weak".

In Palu, GOS index is roundly optimal which is around 3.962 (3.962 GOS_{City}> 1). GOS index of sub districts, there are 4 sub districts has optimal function (GOS_{City} > 1), namely, Mantikulore, Ulujadi, Tatanga and Tawaeli. Another sub districts which have less function are East Palu, South Palu, North Palu and West Palu. Then, GOS index of villages from 45 villages, there are 15 villages categorized optimal while the rest, 30 villages is not optimal yet. Balance index of private GOS in Palu, sub district and village, they are still not optimal ($IGOS_{City}$ of private < 1). Dynamic simulation model system apply a software, called POWERSIM studio 7, there is causal loop on how optimize the perspective of GOS management, Particularly for spatial utilization to look the connection between GOS provision which refers to area and population growth and variable (X) in terms of; ecology, economic, social and and variable (Y) policy.

The Policy, specially : "optimizing coordination between department / agency based on Standard Operating Procedure (SOP) and guidelines, the completion of land status/ provision land of GOS ", while the strategy is: "Commitment, executive and legislative consensus in budgeting allocation and financing for the completion of green space conflict according to standard operating Procedure (SOP) and guidelines about violations and law enforcement ".

Suggestion

It is Suggested that the government of Palu need to improve the knowledge and understanding of the society to conduct socialization / dissemination of GOS information through counseling, forming community group which concerned on spatial planning and provision complaint unit, direct/face-to-face method, electronic media (Dialog at and media methods electronic through (Having dialogue at Indonesia Radio Station (RRI) and Television of The Republic of Indonesia TVRI) and Print Media (newspapers, magazines, leaflets, banners / billboards, etc.).

It is recommended that the local government have actions in order to increase the number and wide area of GOS both public or private, based on the public GOS index and balance index of private GOS of City, Village, and Sub district.

It is suggested to the researchers, both beginners and professionals that it is necessary needed advance study to determine the amount of the capacity of assistance and collecting for environmentally sustainable.

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