Landusesim Analysis that Results in Land Suitability of Fishing Settlements Open Space

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Abstract. In the coastal area, Brondong Lamongan is one of the Archipelago Fishing Port (AFP) areas on the North coast of East Java, Indonesia, with environmental conditions that require the arrangement of open space for fishing settlements. With socio-cultural aspects in coastal communities and their relationship to the existence of open space. As well as formulating the socio-culture of the community, then with landusesim analysis. Landusesim analysis method, the initial stage is the analysis of the determinants of open space development carried out by the process of weighting the factors that allow it to be used, the Analytical Hierarchy Process method and expert judgment analysis. This analysis is used to identify land that can be used as open space based on the value of each determining factor. This research material was determined through a literature review related to the influence of determining factors of space availability by type. In the next stage, an analysis of the formulation of the concept of open space will be produced. It is expected to produce an open spatial planning model for fishing settlements which is the basis for the arrangement of settlements, by considering laws and regulations regarding sustainable management of coastal areas.

Keywords: Open Space, Landusesim, Land Suitability

1 Introduction

The location observed is the coastal area of Brondong Lamongan, which is the North coast in East Java Indonesia. In this location, it is necessary to manage the area, according to [1], coastal area management aims to avoid conflicts in the use of resources and conflicts of interest, so that optimal benefits can be obtained, sustainable for the prosperity of the people. It is a process that is sustainable in the long term, and is dynamic so that it often requires adjustment and improvement of programs and plans. This includes the need for the arrangement of open space of fishing settlements.

In open spatial arrangement, the shape varies depending on the needs, which the general public can use for various activities. An area that is used daily or weekly and can facilitate activities for users and stay directly connected, interacting with other users is an open space [2]. In fishing settlements, most of the conditions of open space concentration are inadequate with the needs of coastal communities. Open space, particularly a public open space, has an impact on the daily lives of inhabitants who use it for activities, and it undoubtedly plays a significant role in the social development of the community [3].

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Fishermen's settlements have characteristics, environmental adaptation is a strategic means of optimizing life chances, communities that have an orientation to the sea. This adaptive behavior over a long period of time can symptom, then it became a tradition of the community's socio-economic life. Over time, those who need more and more, even though the area is very limited, so that in fishing settlements there are often conflicts of interest between parties who need it. This is supported by the results of previous studies which stated that re-settlement by the government actually made a decrease in the development stage of a fishing village. Fishermen's environmental conditions have a certain pattern of open space arrangement with the main elements in the form of open space for drying caught fish, for boat moorings, for fish sales or fish auctions, and places for fishing community settlements [4].

2 Method

To obtain a model of open space arrangement in fishing settlements in Brondong Lamongan, East Java, Indonesia, using a phenomenological approach, with qualitative methods, then modelling analysis was carried out with landusesim analysis. Landusesim analysis method, with the initial step using factor analysis driving the development of open space, a process of weighting the driving factors was carried out with the AHP (Analytical Hierarchy Process) method with Expert Judgment analysis. Producing a model of settlement open space, this is the basis for the preparation of the concept of open space in coastal settlements, considering the law on sustainable coastal area management.

3 Results and Discussion

The open space arrangement model can be through landusesim analysis, with the initial stage of analysis of factors driving the development of open space, this analysis is used to determine land that is potentially used as open space based on the values that exist in each driving factor. The driving factors used at this stage are physical driving factors that can be displayed in the spatial form of maps. This factor analysis was obtained from a literature review related to the influence of determining the driving factors of open space based on their respective types. The driving factors in question can be seen in Table 1 as follows:

Table 1. Criteria of Driving Factors

No	Types of Open Space	Driving Factors
1	Religion	• Proximity to the Road • Proximity to Settlements • Proximity to Open Areas • Proximity to Existing Open Space
2	Livelihood	
3	Community Organization	
4	Education	
5	Technology and Equipment	
6	Socio-Cultural	

After classification is carried out on the land according to the related driving factors, the weighting process will be carried out. The process of weighting the driving factors is carried out using the AHP (Analytical Hierarchy Process) method using Expert Judgment. From the analysis of AHP Expert Judgment, the results of the weighting of each driving factor for the determination of potential open space land are obtained. So it can be known that the highest criterion is each type of open space with a weight of 0.353, while for each driving factor a weight is obtained as in Table 2 below.

Table 2. Weighting of Driving Factors

No.	Criteria/Driving factors	Weight
Religious Open Space		
1	Proximity to the Road	0.247
2	Proximity to Settlements	0.210
3	Proximity to Open Areas	0.190
4	Proximity to Existing Religious Open Space	0.353
Total		1
Livelihood Open Space		
1	Proximity to the Road	0.251
2	Proximity to Settlements	0.209
3	Proximity to Open Areas	0.192
4	Proximity to Existing Livelihoods Open Space	0.348
Total		1
Community Organizations Open Space		
1	Proximity to the Road	0.245
2	Proximity to Settlements	0.212
3	Proximity to Open Areas	0.189
4	Proximity to Existing Community Organizations Open Space	0.354
Total		1
Educational Open Space		
1	Proximity to the Road	0.254
2	Proximity to Settlements	0.208
3	Proximity to Open Areas	0.190
4	Proximity to Existing Educational Open Space	0.347
Total		1
Technology and Equipment Open Space		
1	Proximity to the Road	0.246
2	Proximity to Settlements	0.207
3	Proximity to Open Areas	0.201
4	Proximity to Existing Technology and Equipment Open Space	0.346
Total		1
Socio-Cultural Open Space		
1	Proximity to the Road	0.249
2	Proximity to Settlements	0.214
3	Proximity to Open Areas	0.186
4	Proximity to Existing Socio-Cultural Open Space	0.351
Total		1

The above weighting is calculated through the Expert Choice program with Expert Judgment analysis. Expert Judgement is the prioritization of variables or the weight of

variables based on the researchers' own assessments. Because it is considered that researchers have the ability to judge variables.

Then an analysis of the ability of open space land is carried out, with this analysis using the Weight Sum method, which is an overlay calculation of each land value in each driving factor multiplied by the weight that has been obtained. Input driving factors include roads, settlements, open areas, and existing open spaces. With *Euclidean distance* analysis, each variable is selected, then a multiplication process is carried out with the weight obtained from the AHP Expert Judgment analysis. For analysis of land capabilities in religious open space, livelihoods, community organizations, education, technology and equipment, and socio-culture, namely as follows:

3.1 Land Suitability of Religious Open Space

Based on the data obtained, the next step is to analyze the ability of religious open space land in Brondong Lamongan, so that the results of the analysis are obtained in the form of maps, as follows (Figure 1):

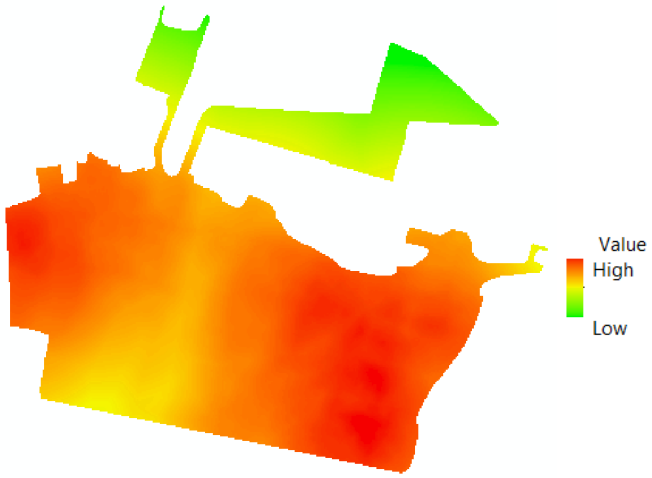

Figure 1. Map of Religious Open Space Land Capability in Brondong

From the map data above, it is stated that the redder, the higher the value. For settlements in Brondong Lamongan, there is a tendency towards denser settlements, the higher the value of the ability of religious open space land.

3.2 Land Suitability of Livelihood Open Space

Based on the data obtained, the next step is to analyze the ability of livelihoods' open space land in Brondong Lamongan, so that the results of analysis in the form of a map are obtained, as follows (Figure 2):

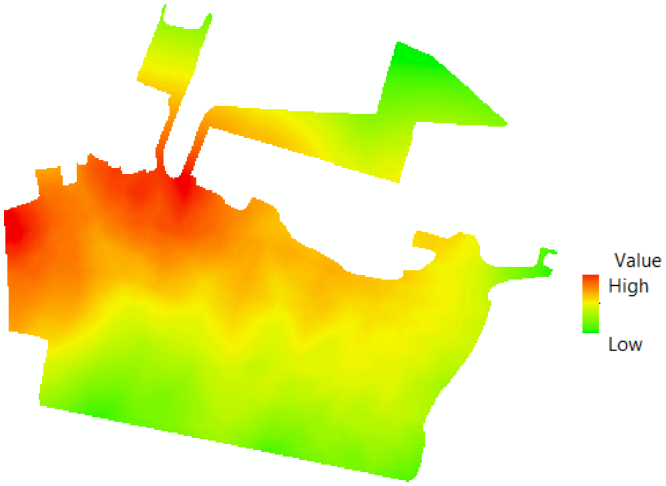

Figure 2. Map of Land Capability of Livelihood Open Space in Brondong

From the map data above, it is stated that the redder, the higher the value. For the ability of livelihood open space land, the more towards the seaside, the higher the value of the land capability in Brondong Lamongan.

3.3 Land Suitability of Community Organizations' Open Space

Based on the data obtained, the next step is to analyze the ability of open space land of community organizations in Brondong Lamongan, so that the results of the analysis are obtained in the form of maps, as follows (Figure 3) :

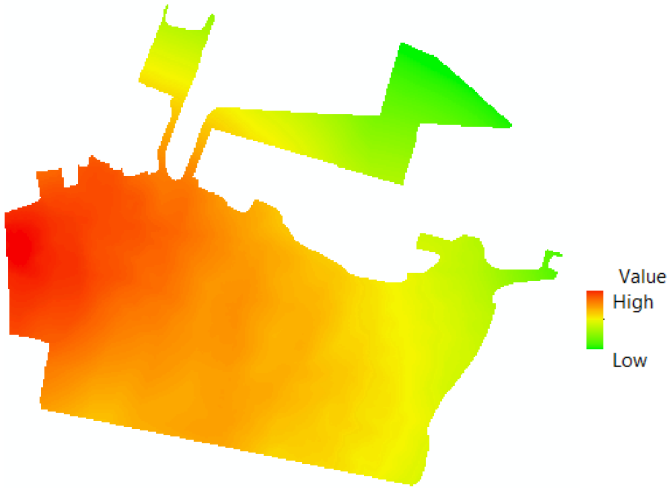

Figure 3. Map of Land Capability of Community Organizations' Open Space in Brondong

From the map data above, it is stated that the redder, the higher the value. For settlements in Brondong Lamongan, there is a tendency to increase the value of the ability of open space land for community organizations to exist.

3.4 Land Suitability of Education Open Space

Based on the data obtained, the next step is to analyze the ability of educational open space land in Brondong Lamongan, so that the results of the analysis are obtained in the form of maps, as follows (Figure 4):

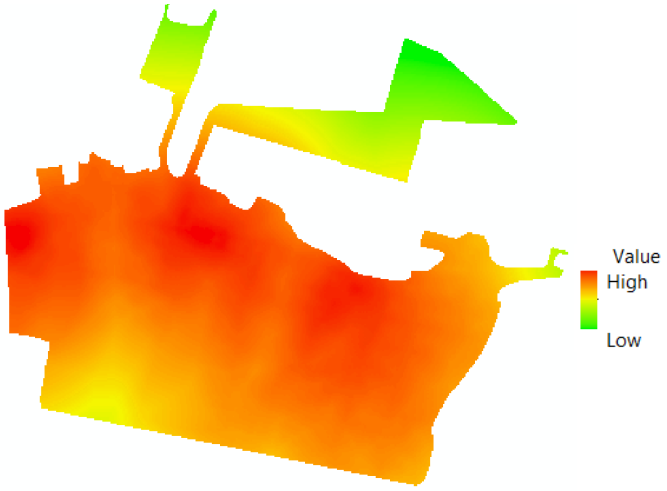

Figure 4. Map of Land Capability of Educational Open Space in Brondong

From the map data above, it is stated that the redder, the higher the value. For settlements in Brondong Lamongan, the tendency of the value of the ability of educational open space land is getting higher along the main road of the settlement.

3.5 Land Suitability of Technology and Equipment Open Space

Based on the data obtained, the next step is to analyze the ability of technology and equipment open space land in Brondong Lamongan, so that the results of the analysis are obtained in the form of maps, as follows (Figure 5) :

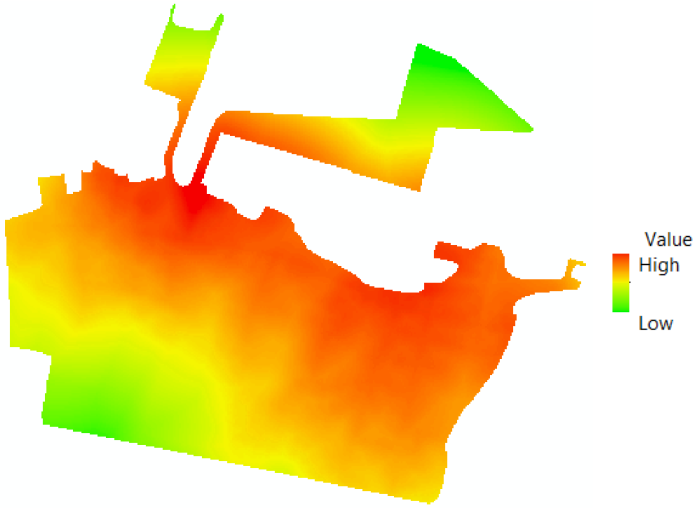

Figure 5. Map of Land Capability of Technology and Equipment Open Space in Brondong

From the map data above, it is stated that the redder, the higher the value. For open space land capabilities, technology and equipment, in Brondong Lamongan, the more towards the seaside, the higher the value of land capabilities.

3.6 Land Suitability of Socio-Cultural Open Space

Based on the data obtained, the next step is to analyze the ability of socio-cultural open space land in Brondong Lamongan, so that the results of the analysis are obtained in the form of maps, as follows (Figure 6):

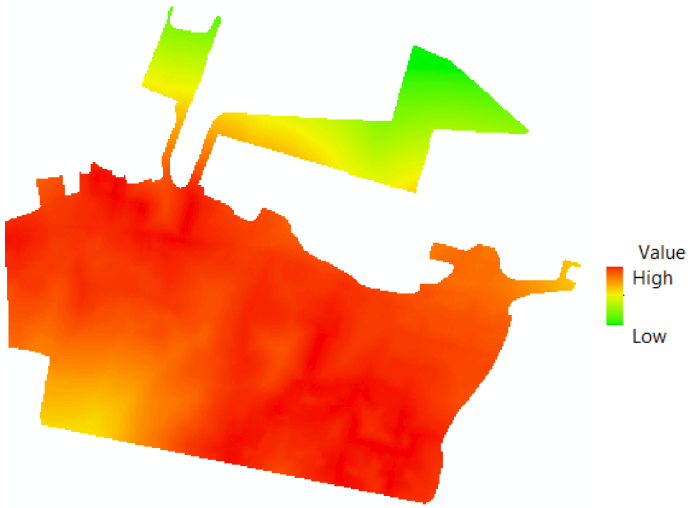

Figure 6. Map of Land Capability of Socio-Cultural Open Space in Brondong

From the map data above, it is stated that the redder, the higher the value. For settlements in Brondong Lamongan, the tendency of land capabilities of socio-cultural open space with high value spreads in residential areas, as well as along the coast.

3.7 Open Space Planning Model

To produce an open space arrangement model in a fishing settlement area in Brondong Lamongan, East Java, there is an advanced stage analysis as follows :

a. Cellular automata analysis, using cellular automata methods, is a prediction of open space, including :
    1) Land Potential Analysis,
    2) Analysis of neighborhood calculations (neighborhood filter) and
    3) Potential Growth Analysis, producing a map of land potential values, a potential map of land development.
b. Analysis of open space modeling using cellular automata method, producing open space model maps based on the needs of fishing communities and based on SNI.

Analysis of the formulation of open space concept in fishing settlements. in the coastal area of Brondong Lamongan.

4 Conclusion

With the analysis of the ability of open space land, a map of the suitability of open space land will be produced according to the type of activity needed. For the analysis of land capabilities in religious open space, livelihoods, community organizations, education, technology and equipment, and socio-culture to produce a map of the suitability of different open space lands, influenced by factors of proximity to roads, proximity to settlements, proximity to open areas, and proximity to existing open space.

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