

# Study of Public Green Open Space in Lima Puluh District, Batu Bara Regency With Remote Sensing Method

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Abstract. This research focuses on the Study of Public Green Open Space in Lima Puluh District, Batu Bara Regency with the Remote Sensing Method. This research is included in the type of practical research. Qualitative research method is a research method based on the philosophy of post positivism, used to research on natural object conditions, Data analysis is the process of systematically searching for and compiling data obtained from the results of interviews, field notes, and documentation. Data Reduction Analysis Method, Data Presentation and Drawing Conclusions. The results of the research Green open space are an essential element of a city, in creating city development is required to be environmentally friendly. Environmentally friendly development is mandatory, as a fulfillment of sustainability principles. The natural resources that are owned today must also be felt by future generations. Being in a tropical climate makes Indonesia have abundant natural resources. This is a good thing for the Indonesian state. Many countries are experiencing a natural resource crisis, Indonesia can increase foreign exchange by trading natural resources products to other countries.

Keywords: Public Green Open Space, Remote Sensing Method, Foreign exchange

## 1. INTRODUCTION

Green open space or RTH based on the Minister of Public Works Regulation number 5 of 2008 is an elongated area/path and/or grouped its use is more open, a place where plants grow, either grown naturally or deliberately planted. Green open spaces (RTH) can be classified based on their ownership, function, pattern and structure. Based on article 29 of the Spatial Planning Law, green open spaces are differentiated based on the class of ownership, divided into Public RTH and Private RTH. In the procurement or provision of RTH in a district/city, it must also pay attention to the applicable regional spatial plan (RTRW). RTRW is a general spatial plan of a city area. Based on Law No. 26, concerning Spatial Planning 2007, it is an elaboration of the provincial RTRW, which also contains policies, objectives, strategies for urban spatial planning, urban spatial structure plans, directions for the use of urban space, urban spatial pattern plans, determination of urban strategic areas, and provisions for controlling the use of urban space. In more detail, the district/city RTRW is regulated in the Minister of Public Works Regulation Number 16 of

<sup>2009</sup> concerning guidelines for the preparation of district spatial plans. The provision of *Received December 09, 2024; Revised December 23, 2024; Accepted Januart 07, 2025; Published: Janjuari 09, 2025* 

RTH that refers to RTRW will create balanced development and provide benefits to the surrounding community.

Based on the results of image interpretation, the availability of public RTH in Lima Puluh District covers an area of 8,048 ha in the form of urban forests, cemeteries, sports fields, green lanes, roads and rivers. When compared to the area of Fifty District which is only 5.6%, of course it has not met the provisions as hinted at in the law that urban areas should have a minimum area of public RTH of 20%. In fact, in Lima Puluh District, there is no city park that functions as a playground and socialize between residents. Therefore, Lima Puluh District still lacks the area of public RTH. Ironically, even though its existence is minimal, still part of the RTH land has been converted into built land.

No	Subdistrict	Subdistrict Capital	Total			Area to Batio
			Small SubDistrict	Village	Area (Ha)	(%)
1	Sei Suka	Kel. Perkebunan Sipare-pare	1	9	7.596,56	9,30
2	Laut Tador	Perkebunan Tanjung Kasau Village		10	8.232,28	6,18
3	Lima Puluh	Kel. Lima Puluh Kota	1	11	10.220,16	9,06
4	Lima Puluh Pesisir	Perupuk Village		13	8.049,71	11,48
5	Datuk lima Puluh	Simpang Dolok Village		10	5.461,96	9,30
6	Talawi	Kel. Labuhan Ruku	1	9	4.924,24	8,51
7	Datuk Tanah Datar	Karang Baru Village		10	5.061,21	5,56
8	Tanjung Tiram	Kel. Tanjung Tiram	2	8	1.077,18	5,69
9	Nibung Hangus	Ujung Kubu Village		12	13.150,80	1,23
10	Sei Balai	Sei Balai Villlage		14	8.576,39	14,75
11	Air Putih	Kel. Indrapura	1	18	8.259,08	9,30
12	Medang Deras	Kel. Pangkalan Dodek		21	8.257,52	9,64
Batu Bara			6	145	88.866	100

Table 1. Area of Batu Bara Regency

### Source: Analysis, 2024

The decrease in the quantity of RTH is in line with the increase in the population in Lima Puluh District. Based on the results of analysis from BPS data, Lima Puluh District in the last four years has experienced very rapid development, because this area has become a center for education and industry and housing has resulted in an increase in the population of 20,080 people. This is due to the high flow of migration from outside the region. So that people from outside the region flock to Lima Puluh District to receive education and find jobs in the industrial sector. In addition, the distance from Lima Puluh District is closer to the coal district, resulting in people wanting to have a place to live in this area. The impact of this development will have an impact on the informal sector which of course needs space in its activities. If this is not anticipated as early as possible, it is not impossible that the Lima Puluh District area will become an unorganized urban area so that it becomes

uncomfortable to live in. It is possible that the functions that should be used in city parks, pedestrians, river borders and open spaces will not be in accordance with their use.

The government's openness in the process of urban forest development is a solution to the obstacles faced by the government so far. The synergy that will be carried out by the community can be in the form of providing land rights or the role of knowledge, manpower, funds and others. Non-productive land or other land owned by the community can be requested by the government to be used as a location for urban forest development. Communities that do not have land rights can also synergize through their roles in the development and management process. If the community wants to take part in the process of urban forest development, the government's obstacles will be lighter. Public spaces need to meet the design criteria in order to function optimally. The general criteria for outdoor public spaces are to be able to provide protection, comfort, be able to adjust the scale to the surrounding buildings and users, be able to adjust to the climate of the site, and have aesthetic value related to local culture (Gehl, 2011; Nuraini, 2024; Nuraini, 2019). There are many factors that cause Lima Puluh District to date has not met the minimum number of green open spaces of 30%, these factors are technical, economic, and political policy factors. However, the most dominating factor is the factor of land conversion which is not a priority. This land conversion is caused by the increasing population growth, causing demands for additional land for settlements and other community facilities, thus displacing the use plan that should be intended for green open space (Prakoso & Herdiansyah, 2019; Wardani et al, 2024; Satrya et al, 2023).

To overcome the environmental conditions of Lima Puluh sub-district like this, RTH is needed as a bioengineering technique and the formation of biofilters that are relatively cheaper, safer, more comfortable, and healthier. Urban spatial planning is important in an effort for the efficiency of city resources and also the effectiveness of their use, both natural resources and other resources. These interconnected and interconnected urban spaces have various approaches in planning and development. The park is one of the city facilities provided and maintained by the Fifty sub-district government to meet the needs of its residents in obtaining recreational needs such as relaxation, fun, rest, sports, games, scenery, education and environmental ecological functions. These city parks can be in the form of sports fields, urban forests, parks for sitting, parks for pedestrians or urban decorative gardens that are diverse in size and beauty (Simond, 2014). Urban parks are part of the natural landscape of a city that can provide various functions such as passive and active recreation, environmental benefits and wildlife habitats (Rustam Hakim, 2015;

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Mujahiddin, 2022). Frick (2016 in Pane et al, 2022) stated that a city park is a place in an urban area that has a function as the lungs of the city and as a resting place for humans. In order for a city park to meet its demands as a comfortable place, it is necessary to have the availability of vegetation and facilities, as well as the maintenance of both.

Often the policies that have been made by the government experience several obstacles or are less successful at the stage of implementing the policy itself. However, in the implementation of these policies, the hope of the government and also the community is actually to be able to realize sustainable development from various policies that have been carried out. Especially at the intensification stage, which does not only require once or twice in the maintenance and utilization of the park but must be regular, where they must pay attention to the use of land such as the availability of running tracks, toilets, prayer rooms, seating, breastfeeding rooms, and also plant fertility and cleanliness of the park for visitors who come. In its implementation. The Batu Bara Regency Government as the main implementer, does not have a special regulation that explains this intensification, they intensify if there is a proposal from the community and observations in the field. There is also routine and incidental maintenance where routine maintenance is to maintain cleanliness that is carried out every day, and incidental maintenance according to needs if anyone needs repairs or additions. The provision of RTH requires a plan that can be in the form of participatory planning. The significance of participatory planning in RTH planning is to complement planners' knowledge with local knowledge and maximize the benefits of green land in urban areas (Javaid and Habeeb, 2018; Aris et al, 2024). In addition, according to Law Number 25 of 2004 concerning the National Development Planning System, in preparing the draft of the Regional Long-Term Development Plan (RPJP-D), it is necessary to hold a Development Planning Conference (Musrembang) which is carried out by involving all stakeholders in development. Therefore, stakeholders have an important role in the development planning process (Pohan et al, 2024).

Sustainable urban areas can be seen from the balanced interaction between humans and nature. Urban environments with high density balance are disturbed due to the reduction of Green Open Space. Green Open Space is needed to improve the quality of the environment in urban areas. The function of the city's Green Open Space (RTH) is as the lungs of the city which is one of the aspects of the recycling function between Carbon dioxide (CO2) and Oxygen (O2) gases, the result of photosynthesis, especially in leaves. This green open space functions as indoor air ventilation. Apart from that, there are still many functions of green open space such as aesthetic functions that are useful as a source of public recreation, actively or passively, which are manifested in the green corridor system as a tool to control spatial planning or land planning in a city green open space system. Green open space also functions as a source of water storage and regulates a hot and humid tropical climate, therefore Green Open Space (RTH) is very important for its existence in urban areas. Planning, development, and management of urban green open spaces are an important part of the planning, development, and management of fostered areas (cultivation) and natural areas in urban areas based on the General Plan of Urban Spatial Planning (RUTRK). In the implementation of urban development, stakeholders have their respective roles that are mutually sustainable. The management of Urban Green Open Space (RTHK) can be improved if communication between stakeholders is more intensive and stakeholders receive more holistic information that can be updated continuously.

#### 2. RESEARCH METHOD(S)

This research is included in the type of practical research. According to Suriasumantri (Sugiyono, 2012; Moloeng, 2002 in Sugiarto, et al, 2023) basic or pure research is research that aims to discover new knowledge that has never been known before, while applied research aims to solve practical life problems. Qualitative research methods are research methods based on the philosophy of postpositivism, used to research on natural object conditions, (as opposed to experiments) where the researcher is the key instrument, data collection techniques are carried out by triangulation (combined), data analysis is inductive/qualitative, and qualitative research results emphasize the meaning of generasilization (Sugiyono; 2016, Moleong, 2002 in Sugiarto and Ramadania, 2023b).

To conduct this research, it is necessary to know the source of data in obtaining good data and information, the author uses the following methods: Primary data is data obtained directly from the results of interviews and research results in the field, namely data from the results of interviews and data obtained directly from respondents at the researcher's location which includes the problem being researched (Moleong, 2002 Hidayat et al, 2923; Sugiarto and Ramadania, 2023). Data on the Effectiveness of Green Open Space Development (RTH) in Lima Puluh District. Information on the effectiveness of the development of green open space (RTH) in Lima Puluh District. Secondary data as data that strengthens this research is obtained to complement the primary data obtained, such as reports, literature, and appendices of other published data which can support and explain the problem (Yin, 2001 in Marwazi et al, 2023; Milanie et al, 2019).

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Data analysis is the process of systematically searching for and compiling data obtained from the results of interviews, field notes, and documentation, by organizing data into categories, describing them into units, synthesizing, arranging them into patterns, choosing which ones are important and what will be studied, and making conclusions so that they are easy to understand by yourself and others (Sugiyono 2016; Nuraini & Suprayetno, 2021).

- a. Data Reduction is part of the analysis process that emphasizes, shortens, creates focus, removes unimportant things and organizes the data in such a way that the researcher's conclusions can be made.
- b. Data Presentation is a series of information that provides the possibility of drawing conclusions and taking actions. With the presentation of data, it can be known what is happening and it is possible to analyze and take other actions.

Drawing conclusions from the data presentation that is then arranged, the author can draw a final conclusion. The three components above will interact with the data collection process as a cyclical process. In this study, the author remains in the interaction environment until the data collection moves to data reduction, data presentation and conclusion drawing.

#### 3. FINDINGS AND DUSCUSSION

#### Study of Public Green Open Space with Remote Sensing Method

The strategic area of the sub-district is an area whose spatial arrangement is prioritized, because it has a very important influence in the scope of the district on the economy, social, cultural and/or environmental. The determination of district strategic areas is more indicative. The physical boundaries of the district's strategic area will be further determined in the spatial plan of the strategic area. The spatial structure plan for the North Sumatra Province region has stipulated the division of urban system functions in a tiered and integrated manner in order to realize equitable distribution and acceleration of physical, social and economic development of the region. The planned transportation system clearly supports efforts to develop urban centers and production centers in the North Sumatra Province area. However, the spatial structure plan for the North Sumatra Province does not seem to provide support for efforts to accelerate and equitably distribute the development of the Batu Bara Regency area. The spatial structure formed tends to support the development of the urban system in Asahan Regency as the parent district.



Figure 1. Map of the Spatial Structure of Batu Bara Regency

Fifty Urban as the Capital of Batu Bara Regency is determined to function as a Local Activity Center oriented to the Range Urban. The division of functions of the urban center system and the development of the transportation system that serves the Batu Bara Regency area currently do not seem to support efforts to accelerate regional development, both in the local and regional contexts of the Batu Bara Regency area. Therefore, to realize the acceleration of economic development in the Batu Bara Regency area in the future, strategic steps are needed through the rearrangement of the urban center system and optimal transportation system services. The Batu Bara Regency RTRW must be able to take advantage of the strategic role of the district in the local, regional and global scope by relying on the geographical potential and potential natural resources available in the land, coastal and sea areas as well as small islands (Salah Namo Island and Pandang Island).

- a. The steps that need to be formulated to optimize the strategic role of the Batu Bara Regency area are;
- b. Creating location advantages and regional competitiveness through the utilization of the potential natural resources available in the land, coastal and sea areas as well as small islands (Salah Namo Island and Pandang Island);
- c. Accelerating the development of regional functions in the Indrapura and Sei Suka Urban Areas, such as trade and service centers, and the development of urban facilities with a district service scale and encouraging the development of urban functions around it;
- d. Re-optimizing the development of the Tanjung Tiram urban area as a trade and service center, fisheries center and urban settlement;
- e. Optimizing the development plan of the Sei Mangkei SEZ corridor and the Kuala Tanjung Industrial Estate which is supported by the development of the national and regional feeder ports of Kuala Tanjung in one Belawan-Medan port system. The port is an outlet for the distribution of production goods from the Batu Bara Regency area and

its surroundings to growth centers on the islands of Sumatra, Java and Kalimantan as well as to growth centers on the west coast of Malaysia and other Asean regions;

- f. Accelerating the development of agricultural and marine product production centers; and
- g. Rearrange regional transportation system services, related to the integration of intermodal (road and railway networks), energy infrastructure, clean water, telecommunications and other infrastructure, in order to support efforts to accelerate the development of regional economic activity functions.
- h. Accelerate the planning for the structuring and development of independent cities around Kuala Tanjung to develop a growth buffer area that is in harmony and integrated with the Kuala Tanjung KI.

The development of the above economic clusters is planned with a corridor system, namely: The Northern/coastal Economic Corridor (Tanjung Tiram - Labuhan Ruku - Kuala Tanjung - Pangkalan Dodek), the Southern Economic Corridor as part of the Sumatra Economic Corridor (Tanjung Kasau - Indrapura - Lima Puluh - Sei Balai) and the Indrapura-Kuala Tanjung Economic Corridor. Through this cluster and corridor system, it is hoped that it can facilitate efforts to accelerate economic development and increase regional competitiveness supported by the ease of development of regional transportation systems with intermodal integration, optimization of the development of production pockets and superior commodities (in land, coastal and sea areas), development of industrial and port locations, development of settlements and urban facilities/infrastructure in stages.



Figure 2. Map of the Coal Economic Cluster

In the regional and global context, the development of the urban system in the Batu Bara Regency area needs to be oriented outward (outward looking), namely to the city of Medan and to other regional growth centers on the island of Java, Kalimantan as well as to growth centers on the west coast of Malaysia and other ASEAN regions. Meanwhile, in the local context, the development of urban systems is oriented inward (inward looking). The development of the system of urban centers in Batu Bara Regency is encouraged as an orientation center for the development of urban centers in the border districts, namely Simalungun district (especially the industrial area/SEZ of Sei Mangkei and Pematang Siantar), Tebing Tinggi, Asahan (Range) and Serdang Bedagai.

The spatial pattern plan in the RDTR is a distribution plan for sub-zones which includes, among others, protected forests, zones that provide protection for the zones under it, local protection zones, housing, trade and services, offices, industries, and RTH into blocks. The Spatial Pattern Plan is contained in a map that also serves as a zoning map for zoning regulations.



Figure 3. Green Open Space Pattern Plan of Lima Puluh District, Batu Bara Regency

Urban green open space is part of the urban spatial arrangement that functions as a protected area. The urban green area consists of urban landscaping, urban forest green area, urban recreational green area, sports activity green area, yard green area. Green open spaces are classified based on the status of the area, not based on the shape and structure of the vegetation (Fandeli, 2014). Until now, the use of space is still not in accordance with expectations, namely the realization of a comfortable, productive and sustainable space. The decline in the quality of urban settlements can be seen from the worsening congestion, the development of slums that are vulnerable to floods/landslides, and the increasing loss of open space (Openspace) for articulation and public health.



Figure 4. Detailed Plan of Green Open Space Pattern of Lima Puluh District, Batu Bara Regency

The government is striving for public RTH, especially in the form of parks and fields and river borders, to increase the area of public RTH. Programs are carried out with the acquisition of land that should be used for RTH, the premaintenance of city parks and sports fields, and the arrangement of river borders by planting trees and other plants. These efforts can certainly increase the area of RTH but cannot be said to be successful because the planned policy targets have not been fully achieved. This can be seen from the number of parks in Lima Puluh District that are poorly maintained due to the limited number of field officers who take care of the parks and the number of lands that has been changed to change functions without the knowledge of the government. The government also has difficulty in regulating private RTH because the ownership lies with individuals. The process of controlling is quite difficult even though the area of Private RTH is quite large, it is said that it has not been successful due to the lack of RTH arrangement in Lima Puluh District. Many people do not know what RTH means, they only know about reforestation. In addition to the limited information provided by the government, another problem that results in the non-implementation of the RTH policy is the limited land owned by the community and the public. Lima Puluh District is filled with residential and residential areas and other buildings.

## 4. CONCLUSION AND RECOMMENDATION

Green open space is an essential element of a city, in creating city development is required to be environmentally friendly. Environmentally friendly development is mandatory, as a fulfillment of sustainability principles. The natural resources that are owned today must also be felt by future generations. Being in a tropical climate makes Indonesia have abundant natural resources. This is a good thing for the Indonesian state. Many countries are experiencing a natural resource crisis, Indonesia can increase foreign exchange by trading natural resources products to other countries. Having a good climate makes it easy for Indonesia to create green areas, the development of green areas has been regulated in Law Number 26/2007 concerning Spatial Planning, based on the 1992 Rio Declaration of the Spatial Planning Law. Green areas are synonymous with city parks, but based on Permendagri Number 1 of 2007, not only city parks are classified as RTH. Development related to the environment is based on the principle of sustainability. Do not let the Batu Bara Regency Government be considered dysfunctional due to not building RTH. The existence of administrative sanctions or reprimands is felt necessary so that every region does not bail out environmentally friendly development.

## Recommendations

The fulfillment of public RTH is indeed the responsibility of the government, therefore in addition to developing RTH in the Lima Puluh District, Batu Bara Regency, in terms of intensification, extensification and mitigation, it is necessary to develop socialization to the community. This needs to be done because if all development programs are implemented, but there is a lack of public support and awareness, it is feared that the function of the public RTH that has been built will not run in terms of its function.

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