Study of regulation development of settlements in the edge of water in Pangururan Samosir District

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Abstract. In Indonesia, the incremental of settlements can develop naturally due to social and cultural influences. This settlement emergence from the need for a place to live and the community's activities. Therefore it can not be separated from the effect of internal and external factors that grow in society. People living in waterfront areas tend to build unplanned settlements against government regulations. The incremental of settlements does not support the development process of the Indonesia archipelago, which is divided into long-term, short-term, and annual. This research purpose is to find out the concept of proper regulation for settlements that developed naturally. Furthermore, the concept has preferential values in people's lives will be a government regulation that is more easily accepted by people in urban villages. This research will carry out by examining the regulation for building waterfront settlements. Besides, observations will also make to pay attention to cultural values, potentials, and characteristics in settlements that have characteristics as naturally incremental settlements.

In terms of aspects of the development of science, this research will contribute to the field of settlement morphology. The findings of this research will be a recommendation in waterfront development planning that reflects the social and cultural values that develop in the community.

1. Introduction

Settlement areas are environments outside protected areas, both in the form of urban and rural areas that function as residential environments or residential environments and places of activities that support the lives of these communities [10]. Settlement planning is expected to be able to realize the harmony of environmental spatial quality with the morphology of the area to achieve a balance between spatial, functional, aesthetic, and social integration. Pangururan Subdistrict, located in Samosir Regency, North Sumatra, is a region that has a high enough potential to manage and build settlements that are compatible with lakeside tourism and community culture. The village structure in Pangururan District is influenced by culture, so that settlement construction has cultural images and characteristics that are directly related to local rituals and ideology. The concept of settlement construction in Pangururan Subdistrict was formed naturally over time so that its growth was not following regulations and closed the opportunity to become a residential area that supports lakeside tourism. Regulations that have been set by the government accompanied by culture can be a reference in developing the growth and development of settlements in Pangururan District. Besides being able to bring out the soul of Pangururan, regulations, and culture, which are the basis for consideration of settlement development also play a role in developing the regional economy from the tourism sector.
The regulations examined in the construction of settlements in Pangururan must also be adapted to other similar areas in highlighting the life and economic activities of the community. In controlling settlement development, not only pay attention to functions, but the form of buildings and public spaces must have visuals and cultural values to become a tourist attraction.

2. Literature Review

Settlements are formed through a long process continuously in a functional place based on patterns of human activity both caused by the influence of physical and non-physical conditions [13]. The physical condition can be in the form of an environment inhabited by humans in carrying out their activities or the topography of a region. Whereas non-physical conditions are influences arising from the existence of individuals or communities that have value to be trusted in forming settlements.

2.1. Form of Settlements

The formation of settlements is certainly inseparable from the natural physicality of the topography and geology of nature. Humans are social beings who must survive, so they need a place to live and the environment in carrying out various activities. These social groups create dwellings which then develop into large and increasingly complex so that the creation of settlements that synergize between humans, the environment, and nature [2]. Forms of settlements that have developed will form settlement patterns through the spread of dwellings due to geographic conditions [5]. The development of settlements is also influenced by the people who occupy these settlements. With the increase in population, the need for housing and settlements is getting bigger. Along with the mount in residences, the growth of settlements will adjust to the conditions of nature, customs and culture, and the prevailing norms. Organic settlements are settlements that grow by chance and are produced without the role of a planner and a designer but through the space of time passed by the layout of the land and the daily life of the community [6]. The growth of settlements organically does not mean uncoordinated or uncontrolled growth. The establishment of a settlement pattern is based on several aspects such as the level of security, mutual need, relations between groups, politics, religion, ideology, culture and physical forms of nature [1]. In areas that are on the edge of the water such as lakes or sea more often found settlement patterns that tend to be irregular, cluster and grow naturally. Initially, the development of settlements on the waterfront originated from the existence of a group of ethnic groups who settled on the water's edge and developed naturally from generation to generation [16]. So that it is often found that people living on the waterfront are homogeneous, closed societies and develop traditions and values or norms that apply to these ethnic groups. The form of settlements on the water's edge generally uses grouping patterns (compact settlements) which consist of community subgroups (clusters) in the shape of concentrating or surrounding important spaces, both artificial space or space from natural topography.

2.2. The Influence of Culture in the Establishment of Incremental Settlements

In ethnic groups, cultural values can be found as a concept of life in the human mind. The concept has the potential to realize the values of life and culture. Certain conditions of society at one time reflected the lifestyle of civilization, especially in everyday life, family life, social interaction, art, literature, and other elements [4]. The culture of living is one of life in an area that produces historical values as a physical form of activities that have been carried out [3]. Cultural activities in settling are very closely related to places that are manifested by humans to carry out their life activities. Cultural activities inherited from generation to generation are one of the traditions of living so that there is often an informal leader from a community in a settlement. Traditional settlements are changes in the form of socio-cultural values of the community that are related to traditional norms in the process of development [15]. Traditional settlements are often regarded as a place that has traditional and cultural values and has a relationship with the value of unique community beliefs as the origin of a settlement. Culture in forming settlements according to, can be identified through (1) Location, physical presence in a place; (2) Relating to landscapes; (3) Having special elements such as special physical elements
that become distinctive characteristics; (4) Having a specific layout, such as the placement of space that has an implicit intention; (5) Having space with special functions; (6) Name in a unique way in a residential area; (7) Utilizing a specific orientation; (8) Using colors, textures and other special dimensions as physical characters; (9) Has sound, smell, temperature, and air movement; (10) Having a community with special skills in attracting attention [12].

2.3. Regulation on the Development of Water Edge Settlements in Indonesia

Settlement areas in their plans must meet: (1) Increasing urban or rural resources; (2) Response to disasters; (3) Providing facilities and infrastructure as well as public utilities. In the process of developing settlements, there needs to be supervision and control so that the implementation of residential areas can be realized according to the plan [10]. Written on [14] (1) The borderline of a sloping water edge with a slope of 0°-15 ° minimum 20 meters measured from the highest tide to the land; (2) The borderline of steep water edges with a slope of 15 °-40 ° minimum of 35 meters is measured from the highest tide to the land; (3) The borderline of a steep water edge with a slope above 40 ° minimum of 100 meters is measured from the highest tide to the land. The distance from this minimum measurement is sought to preserve the beach and make the building, not in dangerous conditions. Measured in terms of access to structuring waterfront settlements, access must pay attention to: (1) Access to the vehicle lane must be located at the outermost boundary of the water edge with the building area; (2) The distance between access to the water's edge from a secondary or tertiary highway is a minimum of 300 meters; (3) Road networks may not be used for parking of four-wheeled vehicles; (4) The minimum width of the pedestrian along the water's edge is 3 meters [14].

Arrangements in terms of land use or use are as follows: (1) Land use as a building takes precedence over the use of water-dependent uses, water-related uses and land use without relating to water (Independent and unrelated to water uses); (2) For the development of public areas, the slope of the land is more recommended 0-15%. Whereas the slope of the land with more than 15% needs additional handling; (3) The distance of one public facility with other public facilities is a maximum of 2 km [14]. As for building a building, you must pay attention to (1) the density of buildings in the waterfront area is a maximum of 25%; (2) The maximum building height of 15 meters is calculated from the surface of the land; (3) Direction of building orientation must consider the position of the sun and wind direction; (4) Buildings that can be developed in commensurate waterfront areas in the form of open spaces such as parks or recreation spaces as public facilities, seating and sports facilities; (5) Buildings that are permitted to stand in the watershed border area in the form of places of worship, coast guard buildings, public facilities buildings, and buildings without walls with a maximum area of 50 m2 / unit [14]. Usually, non-permanent buildings are also often found around the waterfront border area, in the form of small kiosks, huts, and resting places. The building is present to facilitate visitors to a tourist area.

2.4. Regulations for Development of Waterfront Settlements in Pangururan, Samosir Regency

The Lake Toba area needs to be arranged so that it can realize: (1) Community water (Aek Natio) through the preservation of the Lake Toba Area, ecosystems, neighborhoods and village areas of the Batak indigenous people; (2) Development of international scale tourism areas through controlling areas of cultivation and response to natural disasters [10]. The arrangement of the Lake Toba area in the ecosystem and environmental preservation sector begins with making open spaces on the edge of the lake. Open space in question is a public facility that does not damage natural conditions. Cleaning of lake water is also done by transferring community waste and managing livelihoods from lake water. Settlement of settlements through a centralized settlement system as a regional service center system that aims to develop and improve the function and reach of service facilities to encourage the Lake Toba area as a tourist area on a world scale [10]. The centralized settlement system applied to the Lake Toba area intending to improve community welfare and push the lake's waterfront area into a location that has the potential to improve the economy through tourism and cultivation. Planning for the Lake Toba region begins with facilities and infrastructure as infrastructure in the community. The directions
for the development of residential areas in the Lake Toba area include: (1) Relations between functional areas so that people are more easily reaching facilities; (2) The interconnection of urban residential environments with rural residential environments in order to be mutually integrated; (3) The relationship of settlement development in the form of urban residential environment and regional development that occurs in urban areas; (4) The relationship of environmental development in the form of rural housing and development of rural areas; (5) Continuity between the systems of human life and the environment; (6) Balance between public interests and individual interests; and (7) Institutions or organizations that direct the development of the Settlement area [10]. Control in the planning and development of the Lake Toba area provides an opportunity for the local community to work together with the government through an institution in preserving the village area of the Batak indigenous people and other areas to become cultural and natural tourism that has diversity.

2.5. The linkage between Development Regulations and Settlements Formed Incremental One of the requirements in planning the development of a settlement must identify ownership and use of land. The construction of settlements formed incrementally originated from settlements that grew organically and irregularly because the process was fully handed over to the community [10]. Land ownership that is passed down generation after generation allows the community to develop settlements based on needs, lifestyle, and culture. The division of spatial planning in the implementation of realizing national development encourages people to utilize land under regulations. But in its implementation, the community often builds buildings that are not designated as residential areas. This is due to the economic inability of certain communities so that settlements emerge that grow naturally and are not organized by applicable regulations. Initially, the growth of unplanned settlements will have a chaotic impact on urban areas. After some time, people in organic settlements have land acquired from generation to generation to improve and preserve socio-cultural and economic aspects, then build settlements tailored to planned settlements from the government [11]. The development of organic settlement patterns has the potential to follow formal and planned settlement patterns from the government.

3. Methodology Researchers conducted a study of the regulation of waterfront settlements and customary regulations to find appropriate and acceptable regulations at the research site. The study was conducted using a qualitative descriptive approach. In its implementation, researcher data is obtained through observation at the research location and data obtained directly from the community or the local government through interviews. The researcher looked at the location of the study in terms of the application of regulations as well as the development of the prevailing cultural or customary regulations. Then the results of these observations are linked to the theory of the growth of settlements on the water's edge. So that it can produce the discovery of appropriate regulations to develop waterfront residential areas.

4. Results and Discussions

4.1. Growth in the Development of Settlements on the Waterfront of Pangururan, Samosir Regency Starting from the Batak tribe who landed at the Sorkam River Estuary, the Batak people decided to establish a village at the foot of the Pusuk Buhit hill, better known as Sianjur Sagala Limbong Mulana. Over time, the Batak people began to dominate the area of Lake Toba to Samosir Island. Batak community settlements are formed incrementally on social and cultural needs. The form of development is also influenced by the belief in the ancestors. The Batak community believes that the direction of home orientation should lead to sunrise and have the main reference, Pusuk Buhit. This is because the Batak people respect their ancestors, which originated from Sianjur, which was originally located in Pusuk Buhit. So Pusuk Buhit is considered very sacred in building a place to live. Whereas the sun is considered a source of life, so it is highly sought for so that the residence does not turn back
to the sun to avoid difficulties. The Batak community in Pangururan Regency has the ideology of Padme Jumah (Kaki Ladang) which determines the land arising from the decline of Lake Toba water to become the foot of the field or the increase of fields for its owner. Even though according to the government, the land is communal land. This caused the government difficulty in managing land and the construction of settlements on the waterfront. As a result, the National Land Agency will not provide a certificate for a house built in the lake border area.

4.2. Factors Affecting the Growth of Development of Settlements on the Waterfront of Pangururan, Samosir Regency

The construction of settlements on the edge of Pangururan water in Samosir Regency is certainly inseparable from the way of life in the daily lives of its people. To build settlements, the community also adjusts to the physical forms of nature and culture. The topography is quite flat on the edge of the lake, with a height of 0-20m (± 10%). Whereas on the east side of the land, it can be seen that the sloping area reaches 2-150m (± 25%). This fairly flat topography is the most easily accessible area. So that in this area quite a lot of settlements and agriculture are managed by the community.

On the factors of religion and belief, the community believes in the existence of ancestors by giving the best at the funeral. This belief is believed to have a good impact on the lives of future generations. No wonder the Pangururan sub-district and other sub-districts on Samosir Island are always found in magnificent tombs and located not far from community settlements. The community usually builds the tombs of their ancestors on family-owned land and usually opposite the inhabited village. While on
cultural factors, the Batak people hold traditional ceremonies because of the existence of weddings, deaths, new traditional houses, and other festivals such as honoring ancestors. The activity was carried out on vacant land located in the village. It is not uncommon for people to make a common yard in front of their house the location of traditional ceremonies. Therefore, people who live in villages always make houses facing each other and have open spaces among them. In addition to traditional activities, the vacant land is also used by the community as a place to socialize, dry the crops, or raise animals. The growth of settlements begins with the existence of a village that is spread throughout almost all villages in the District of Pangururan. The closer to the District Capital, the higher the population density. The settlement pattern looks uneven in its development. In the urban village area, settlements tend to be filled with houses and are oriented towards the main route. Whereas in the village area, it is still dominated by forests and agricultural land inhabitants.

Figure 3 Distribution of waterfront settlements in Pangururan District.

4.3. Waterfront Settlement Development Regulations

To build a residential area, it must be located in the area of the environment. Some areas on the edge of the water are protected areas so that in using them, it is not justified to build settlements [10]. Settlement planning needs to pay attention to the aspects of location and land suitability [15]. Environmental areas that can be established for the development of public areas, the slope of the land is recommended at 0-15%. If more than 15%, additional handling is required. Besides that, the distance between public facilities is a maximum of 2 km. The government seeks to protect the environment through the determination of lake borders with a distance of 50 meters to 100 meters from the highest lake water tide [10]. In addition to aesthetic reasons, the border area along the banks of the lake is used as a boundary in building settlements to avoid disasters arising from natural damage. The direction of the development of settlements on the waterfront area in Pangururan has regulations that make it easier for people to reach facilities by making connections between functional areas [10]. In its arrangement also pay attention to the access of the vehicle lane or the main lane which must be located at the outermost boundary of the edge of the water. Then the main path may be made of small roads in the form of secondary or tertiary roads that connect the mainline with the edge of the water with a minimum distance of 300 meters [14]. Small roads that are secondary or tertiary roads are not permitted as parking lots, especially for four-wheeled vehicles. To support waterfront activities, pedestrians along the water's edge also have a minimum width of 3 meters. Neatly arranged access will make it easy to reach a location on the edge of the water and expand visibility to nature. The use of land to erect a building on the edge of water needs to be divided into a land that depends on the presence of water (water-dependent uses), land that depends on it (water-related uses) and land that
is not dependent on water (independent and unrelated to water uses) [14]. While the environmental area that can be established for the development of public areas, the slope of the land is recommended at 0-15%. If more than 15%, additional handling is required. Besides that, the distance between public facilities is a maximum of 2 km. In addition to paying attention to land use, buildings to be erected in the waterfront area must pay attention to building density in the waterfront area, which is a maximum of 25%. Buildings that are also built should not be more than 15 meters calculated from the ground so as not to disturb the physical condition of nature [14]. In the waterfront area, buildings that can be erected are only in the form of places of worship, coast guard buildings, public facilities buildings, and buildings without walls with a maximum area of 50 m2 / unit. While 75% of open space can be used as parks, recreation rooms, seating, and sports facilities, or similar public facilities.

4.4. Application of Settlement Regulations in the Waterfront Area in Pangururan, Samosir Regency
In 2019 it has entered the stage of the 3rd Regional Medium Term Development Plan, namely from 2016 to 2020 [9]. The implementation is a continuation of RPJMD I and RPJMD II in accelerating overall regional development in various fields of government. Development is managed with potentials that are based on religious, moral and local wisdom values on an ongoing basis [9]. The RPJMD stage is projected into five priorities: (1) Bureaucratic reform and governance; (2) Educational and health development; (3) Development of environment-based tourism industry; (4) populist economic development; (5) Infrastructure development [9]. In Phase III of the RPJMD, settlement development focuses on infrastructure development which prioritizes the development of transportation infrastructure networks, irrigation networks, the provision of clean water and sanitation as well as the construction of green open spaces and parks, especially on the water's edge. Pangururan District as one of the entrances to Samosir Island has freed land and will be planned to become a district-based park in Pasar Pangururan Sub-District. So that in stage IV of the upcoming RPJMD projected from 2021-2025, infrastructure development in settlement development will prioritize accessibility to and from Samosir Regency, production centers, and better residential areas. In structuring settlements also determine settlements that are in the Lake Toba area with a centralized settlement system [10]. The government hopes that with the implementation of a centralized settlement system, the community will be able to improve the welfare of the community and encourage waterfront areas to potentially improve the economy through the tourism sector and cultivation.

4.5. Potential of Pangururan Water Edge Area in Supporting Settlement Regulations
The development of waterfront settlements in the Panguruan District originated from the existence of a group of ethnic groups who settled and developed naturally. The growing settlements form clusters of clustered water edges as seen in the figure. The form of settlements can be one of the applications of regulations by forming settlements based on ethnic zoning which displays the traditional values of the people through Gorga at the entrance of settlements or buildings. As a form of realization, the ownership of land in the settlement zone can be a potential for local wisdom. Land arising from the decline in the volume of water in Lake Toba has resulted in communal land that directly becomes a permanent ethnic property. Communal land can be owned by the community, but in its management, it must follow the applicable rules regarding lake borders and other waterfront regulations. So that in its utilization it will be used as an open space that supports local wisdom and tourism. There is a philosophy as local wisdom obtained from the ancestors of the Batak tribe [9]. Argado bona ni pinasa, has meant about the value and significance of the ancestral land of the Batak ethnic group, so wherever the Batak people are, they always love their ancestral lands [9]. This philosophy can support the government in the implementation of development because people who gain knowledge in other regions will return and apply it to their ancestors' beloved land. This philosophy is strengthened by Anakhon hi do hamoraon di ahu, meaning that every parent always prioritizes higher education needs for his offspring than other needs, so that the Batak people believe in overseas children who will provide a better hometown development [9]. Whereas Dalihan natolu, the Sihal-sihal opat, which
means the Batak ethnic community system has been proven to maintain harmony in the internal and external relations of the Batak community for a very long time. In its rules, there are 3 (three) internal stakeholders, namely Hula-hula, Dongan Tubu, and Boru, while Sihal-sihal is an external stakeholder [9]. In simple terms, this philosophy regulates that one must respect the hula-hula (somba marhula-hula), be careful and considerate of dongan tubu (manat mardongan tubu), patient and full of understanding of boru (elek marboru), and being friendly and caring towards relatives or immigrants.

The kinship system of the Batak community is in line with the implementation of Good Governance and is considered the most democratic in implementing a democratic system. In the philosophy of Mula being Nabolon, it implies that all Samosir societies everywhere are always obedient and hopeful to the creator of God Almighty [9]. The community will strive to preserve the nature created by God Almighty so that in the formation of settlements it will always consider aspects and lead to government regulations. Besides that, there is also the philosophy of Soripa da Habonaran, Pansur Hangoluan (Manicured Earth, Water of life), is a mandate from the ancestors of the Batak ethnic group, that every person is obliged to care for the earth properly and properly in order to obtain proper water and life on earth and the hereafter.

5. Findings

Topographic factors, give influence on the form of settlements because it follows the contours of the soil. In conditions on the edge of the curved water, the soil contour has an average slope of 10%. Developments caused by topography under the form of settlements that developed, the form of settlement patterns and distribution due to geographic conditions [18]. Factors of trust in the ancestors influence the structure of the village-oriented towards Pusuk Buhit; besides that of the factor of the sun, people tend to establish a place to live with the orientation of the sun, because of the belief that the sun is the source of life. Trust in ancestors and Pusuk Buhit has an influence on the development of settlements, this is due to historical values and cultural settlements [3]. Cultural factors influence village settlements. In general, the chief will build the main traditional house, then be followed by relatives' houses. People always build houses that are opposite each other and there are pages for social activities, managing the economy, or traditional activities. The settling culture then spreads from one ethnic group and develops naturally from generation to generation [16]. The factor of population density, Batak people tend to establish new villages in the event of a marriage. Because of the Dalihan Na Tolu principle, one of the awards was land, which was later built into a new village [9]. The direction of organic settlement growth and growth by chance. In reality, the village was established by a tribal chief for tactics and trust in the ancestors without a planner [7]. In regulation, the regional government sets a lake border with a distance of 50 meters to 100 meters calculated from the highest tide point. To establish environmental zones, it is necessary to pay attention to groundwater sources, disaster-prone areas, not to railroad areas, safe areas of aviation and protected areas. Paying attention to building density in the waterfront area which is a maximum of 25%. Set up a building on the edge of the water not higher than 15 meters. Determination of these regulations is under the Presidential Decree of the Republic of Indonesia Number 32 of 1990 concerning the management of protected areas and follows the derivative regulations stipulated by the Minister of Public Works of the Directorate General of Cipta Karya (2000) which regulates the development of waterfront areas. The form of waterfront settlements in Pangururan Subdistrict follows the concept of waterfront settlements, namely clustered patterns scattered around lakes and clustered patterns [17]. The emergence of clustered settlements originates from an ethnic group that occupies the region and develops over time [17].

6. Conclusions

The construction of residential waterfront areas in Pangururan, Samosir Regency is inseparable from physical factors and non-physical factors that affect the growth of settlements. The physical factors in question are natural conditions that are the pride of the Batak people. At the waterfront area, the slope of the land reaches 0-25% to be the ideal choice of the residential area [14]. Topography on
the waterfront area supports access to certain facilities. While non-physical factors can be seen in settling cultures that grow incrementally in ancestral lands. While the form of settlements follows trust in the ancestors so that the orientation of settlements leads to Pusuk Buhit or sunrise. As a result, many rows of buildings are found facing each other and open spaces for cultural activities or daily necessities. The regulations used in waterfront settlements in Pangururan District are derivatives of regulations from the Government of Indonesia and the Provincial and District Governments. So that in its implementation, the government sets the slope of the land recommended to build settlements no more than 15%. Buildings erected on the edge of the water have a maximum density of 25% and the remainder becomes open space. The building also has a height limit reaching 15m, and in open spaces, only non-permanent buildings or public facilities can be established with a maximum area of 50m²/unit.

Cultural potentials such as placement of Gorga (patterns in Batak communities) in certain buildings and locations will grow the genius loci. Incremental growth of waterfront settlements can grow into traditional settlements by applicable regulations. In this case, the application of regulations can be developed with local wisdom through land distribution, ancestral philosophy, and settlement patterns to become a regulation that can be accepted by the community and become a regulatory concept.

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