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Strengthening Community Participation in Spatial Planning of Riverflow Regions in Medan City

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ABSTRACT

Due to the impact of the flooding issues in Medan City, which are driven by the occurrence of sedimentation, narrowing, and law enforcement, it is required to offer alternate options for watershed management through a strategy to increase community involvement in spatial design. This study uses a qualitative, descriptive methodology. Techniques for gathering data include documentation, holding FGDs with seven stakeholders, and conducting in-depth interviews with riverside communities. According to the study's findings, Medan City's watershed management has not been carried out to its full potential through community participation. The situation gets worse as a result, as evidenced by the growth of riverbank communities, deteriorating water quality, poor health, and extensive floods. The primary issue that has to be fixed is the lack of communication between the community and the government. Low public knowledge and ineffective law enforcement in policing and securing river borders are barriers to community participation in spatial planning. This study suggests that pertinent organizations set up a watershed management coordination forum and educate and engage the local population in watershed management. This study offers a thorough understanding of how the quantity and quality of watersheds in Medan City are worsened by poor community participation.

1. INTRODUCTION

The damage to the watershed has so far been too great for the Indonesian government to repair. Despite numerous government initiatives, watershed spatial planning has not significantly improved. A watershed is a section of land that is surrounded by a ridge and serves to collect nutrients, sediment, and rainwater before draining them through streams and outflowing at a single location [1]. Watershed elements are grouped into two categories: The physical environment comes first (area, land, water and vegetation or forest). Second, people (number of people living around the watershed and their needs). The physical environment of the watershed may be under pressure as a result of these negative factors. The environmental carrying capacity of the watershed will decline as the strain increases. As a result, it is crucial to manage watersheds well in terms of their purposes and advantages. Involvement of stakeholders is also necessary for long-term watershed management [2]. in order for the watershed to function as a socio-economic-political unit for the purposes of organizing the watershed region and planning, managing, and putting it into practice [3].

Meanwhile, the main concern of the Medan City Government is the problem of flooding, especially in the suburbs, which often directly affects everyone in the area [4]. Most of the natural and artificial drainage channels in Medan City are located downstream and have a lower elevation of the channel bottom than the riverbed. Serious sedimentation and deterioration of water quality is a result of this. The main drainage system is mostly not well defined. This situation makes it difficult to control and supervise buildings that violate the law along the banks of the watershed [5]. These changes are caused by different environmental behavior, which is one of the causes of flooding [6].

If only the drainage management in Medan City had been carried out correctly, the significant flood that happened there on December 4, 2020, should have been foreseen [4]. Flooding brought on by heavy rains upstream is a common occurrence, especially as December approaches. In actuality, Medan City has six rivers that pass it (Figure 1); if drainage management, particularly watershed management, is effective, these rivers can be helpful for flood control. Due to its six rivers, Medan is not vulnerable despite the heavy rainfall [7].

Figure 1. Medan city map shows the limitations of green open space in the watershed

Spatial planning should be given top importance due to Medan City's situation as a flood-prone area with low-lying terrain. This is made worse by the growth and improper management of urban development and construction. The majority of the structures were actually constructed along the river (Figure 2). Not to mention the underutilized flood control infrastructure and facilities. At the very least, recognize the significance of spatial planning because it will influence regional ecological harmony, the integration of development, and the accomplishment of high-quality regional spatial planning.

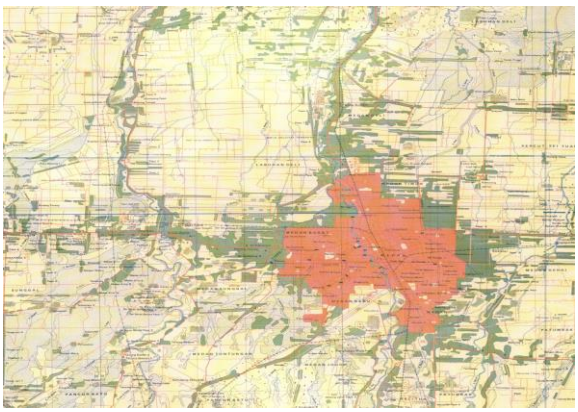

Figure 2. Medan city map shows the limitations of green open space in the watershed

Actually a number of regulations have been issued in an effort to overcome the flood problem in Medan. With reference to Law Number 26 of 2007 concerning Spatial Planning, in which the city is required to have a minimum of 30% green open space. However, until now the availability of green open space in Medan City is still below 8%. Furthermore, the Medan City Government has also issued Regional Regulation Number 2 of 2015 concerning Detailed Spatial Planning and Zoning Regulations for Medan City, where this policy also explicitly states that the availability of green open space is at least 30%. This green space serves to secure the city's protected areas, control damage to land, water and air, including assisting in flood control. Therefore, it is interesting to examine the role of the community in watershed spatial planning in Medan City [8].

Ismail's research on participatory mapping of community-based watersheds demonstrated that spatial planning may be created jointly by the community by taking into account earlier studies [2]. Additionally, Surya's research demonstrates a favorable correlation between boosting community economic business productivity and watershed ecosystem sustainability as well as conservation of natural resources, economic empowerment, and community capacity building [9]. Furthermore, Mengistu's research shows that the largest barriers to long-term sustainable watershed management are a lack of knowledge and extension services, a lack of funding, and interest in immediate agricultural productivity [3]. Furthermore, Salempessy's research demonstrates how society, business, and government depend on one another in order to use watershed resources [10].

According to Upandani's research, the management of the watershed environment does not integrate sectors or regions, and as a result, the watershed is not in the best possible condition [11] Sofyan's research demonstrates that the community's involvement and attention in environmental conservation around the Tapung Kanan sub-watershed are still poor [12]. Additionally, the research by Fatahilah demonstrates that the integrated strategy entails the creation of an integrated watershed management plan, matching the limits of the watershed with the administrative areas, and distribution to stakeholders [13]. Additionally, Kristiyanto's research demonstrates that local knowledge can contribute to Indonesia's spatial planning process [14].

Numerous analyses have been conducted on the issue of enhancing community involvement in watershed spatial planning in Medan City in connection with earlier studies. However, the issue of floods brought on by the watershed's narrowing remains unaddressed. This study adopts a new methodology from other studies in a number of ways based on the literature on community involvement in watersheds. This study will probably add to earlier research because it has advantages over earlier studies. Although watershed management has been legislated by the center government and municipal governments, the authors contend that the city of Medan lacks the necessary mechanisms to carry out flood control, particularly when community engagement is involved. In practice, there are still certain obstacles to overcome. This study must be done in order to provide an overview of strengthening community participation in watershed spatial planning in Medan City.

2. METHODS

To examine the case, this study combines qualitative research with descriptive methods. The descriptive method was chosen because it is able to explain the data (written, spoken and behavioral) in an in-depth explanation [14]. The purpose of this research is to see how to increase community involvement in watershed spatial planning in Medan City. It is important to describe community participation in spatial planning and arrangement in Medan City in reducing watershed damage and community empowerment by reducing settlements along the river. The research locations are spread across 21 sub-districts in Medan.

The type of data used is primary and secondary data. Primary data was obtained from in-depth interviews with stakeholders through FGD activities attended by 7 informants. Consisting of the Secretary of the Medan City Flood Management Integrated Coordination Team, the Head of the North Sumatran National Disaster Management Agency, the North Sumatra Research and Development Agency apparatus, the North Sumatran Walhi Director, the Planning and Evaluation Division of the North Sumatra Walhi Program Evaluation and Planning, Environmental Experts, and Public Policy Experts were among the participants FGD. In addition, secondary data was collected through the use of citations from journals, books, documents, and internet media [15].

Data analysis is done by data reduction, data presentation, and drawing conclusions are all techniques used in data analysis [16]. Data reduction from in-depth interviews was used as the basis for conducting FGDs. Then the analysis of the presentation of the data was carried out with secondary data. This is important to do because of strengthening community participation in watershed spatial planning in the city of Medan as a solution for community development and involvement in watershed management. There is no doubt that community involvement is able to influence the reasons for solving flood problems from poor watershed governance.

3. RESULT AND DISCUSSION

3.1 The bad impact of watershed spatial planning in Medan City

Observing watershed spatial planning cannot be separated from Medan City Regional Regulation Number 13 of 2011 concerning Medan City's 2011-2031 Spatial Planning. Where in the sixth section on the water resources network system in Article 27 aims to provide equitable access to all Medan City people to obtain benefits from water sources. This condition cannot be separated from river areas and groundwater basins, the raw water network system for drinking water; and flood control systems. Furthermore, the river area is defined as the Belawan River, Snake River, Deli River, yetai River, Padang River, Martebing River, Kenang River, Serdang River, Percut River, Bedagai River and Belutu River as well as the Medan groundwater basin. Besides that, watershed spatial planning for the flood control system is intended for the construction of a polder system and a canal system. The polder system is established in large-scale residential areas and the Medan Industrial Estate. In addition, the canal system consists of: a flood way canal that diverts the Deli River to the Denai River in the Medan Johor and Medan Amplas sub-districts and a canal to drain the sewage flow from Sei Sikambing to the Belawan River in Medan Sunggal District.

Meanwhile, Medan Mayor Regulation Number 1 of 2013 concerning Technical Guidelines for Spatial Utilization in Medan City. The second part deals with local protected areas, one of which is river borders specifically for tourism support activities, river maintenance, open-air sports facilities and docks and inspection roads. In addition, river boundaries consist of large, medium and small rivers. Furthermore, the major river boundaries consisting of the Deli River, Babura River, Belawan River and Precut/Denai River are defined as 15 meters long. In addition, the border of the medium river which consists of the sikambing river, the selayang river, the white river, the badera river, is set to a 10-meter border line.

As the two regulations, in actualization the Medan City government did not carry out good spatial planning. As a result, the watershed does not function, which is influenced by the number of residential buildings. Thus, the flood problem is the main problem faced by the Medan city government, especially the suburbs of Medan City which often has a direct impact on all members of the community who are affected by the floods that hit their residential and residential areas. Most of the main drainage channels in the city of Medan, both natural and artificial, in the downstream area have a lower channel bed elevation than the river bed elevation. This causes serious sedimentation and causes siltation. The main drainage systems that exist, most of them do not have clear boundaries. efforts to manage and monitor illegal structures along river banks [17].

Until now, the flood problem still haunts 2.1 million people in the city of Medan. Because the current flood does not depend on rain falling in the upper Deli river alone, rain in Medan City can also cause Medan people to have problems with puddles everywhere. Likewise, a number of densely populated residential areas are subject to flooding, especially when heavy rains fall in the upper reaches of the rivers that cross Medan City. Therefore, residents of Medan City must be aware of flood-prone areas, including the Sembahe, Pancur Batu, Namu Rambe, and Deli Tua areas as hilly areas which are water catchment areas. Therefore, do not let the condition get worse due to exploitation of water catchment areas. Seeing the function of water catchment area is currently being converted into a housing complex as well as the construction of villas and bungalows. This is very dangerous because it can threaten the area below it from flooding at any time. Not to mention the area that has the capacity to absorb water in several open areas of the city is decreasing due to the construction of various properties in the city of Medan. The changes that occur are from various environmental behaviors which are one of the factors causing the flood disaster [18].

3.2 Community participation in watershed spatial planning in Medan City

According to Presidential Regulation No. 62 of 2011, water resource infrastructure is built for flood control systems, irrigation network systems, swamp network systems, and coastal security systems. The flood control system in the Mebidangro area also includes reservoirs, canals, and retention ponds. In addition, key drainage canals are built to help with flood management and reduce waterlogging. As a result, the drainage channel was designed to run through the main sewer and was linked with the flood control system. Table 1 lists the supporting regulations for flood prevention in Medan City, albeit their implementation has not been perfect, including:

Table 1. Supporting regulations for Medan City flood control

No	Regulation	About
1	Law No. 24 of 1956	Formation of the Autonomous Region of Atjeh Province and Amendment of Regulations for the Establishment of North Sumatra Province
2	Presidential Decree No. 62 of 2011	Plan System Room area City of Mebidangro
3	Law No. 23 of 2014	Local government
4	Regional Regulation No. 2 of 2017	About the RTRW of North Sumatra Province in 2017-2037
5	Governor Regulation No. 5 of 2016	Concerning the Establishment of an Institution for Cooperation in the Management of Urban Areas in Mebididangro
6	Medan City Regional Regulation Number 13 of 2011	About Medan City Spatial Plan 2011-2031
7	Medan Mayor Regulation Number 1 of 2013 concerning Technical Guidelines for Space Utilization in Medan city	About Guidelines Technical Utilization of Space in Medan City

Source: Data processed by the author, 2021

The phenomena of flooding is the city of Medan's biggest challenge, because flood disasters are impacted not only by significant rainfall but also by a number of other variables [18]. According to the Medan City Flood Management Integrated Coordination Team, there are four main causes of flooding: First, river overflow flooding due to reduced river capacity caused by sedimentation, as well as damage to watersheds and garbage dumping. Second, urban drainage is not optimal; this condition is influenced by poor urban drainage planning and management, as well as a lack of completely developed secondary drainage to the river. Third, ROB floods in the North Medan area are frequently caused by the inflow of sea

water during high tides (Belawan and its surroundings).

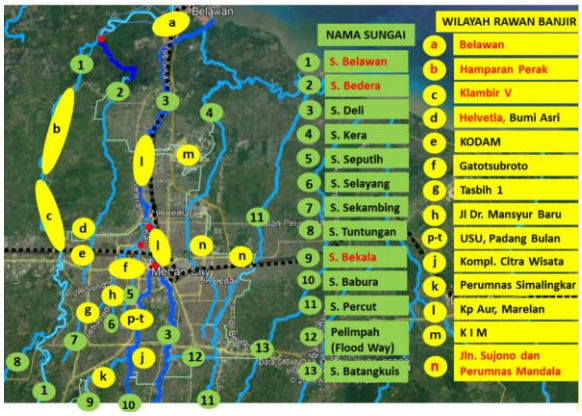

Figure 3. 14 points of Medan City flood prone areas

According to the research findings of the Medan City Flood Control Integrated Coordination Team (Figure 3), Medan City has 14 flood-prone locations. The 13 rivers that pass Medan City and surround Deli Serdang Regency are unable to handle the amount of water discharged in this area. Severe sedimentation caused the silting of multiple rivers in Medan City, resulting in this situation. Furthermore, the Sumatra II River Basin Center does not oversee or control unlawful buildings along riverbanks. "Several rivers in Medan City are not operating," according to JA, an environmental expert in North Sumatra, "as indicated by 95 percent of the Deli and Badera rivers that have experienced siltation and have been happening since 2011, in addition, which has affected several rivers." Since the Dutch era canals and ditches have never been dredged or controlled, this is the Sumatran II River Basin Center. They reinforced this river with buildings, so there is no more water infiltration and no function for Sumatra River Area Hall in floods.

Furthermore, several big rivers and tributaries pass through Medan City, although the Deli, Badera, and Babura rivers are among those that frequently flood. The amount of settlements along the riverside has an impact on the river's reduced capacity, exacerbating the flood problem. As a result, Sumatra II River Hall and the Medan City Government must be able to provide socialization and education on the importance of river watershed protection, as well as reallocate community settlements to Rusunawa or land compensation [19]. The viewpoint is consistent with ISH statement as the Balitbang Apparatus of the North Sumatra Provincial Government, which states: "The river basin is narrowing due to residential residents in water catchment areas. The North Sumatra Provincial Government has the Sumatra River Area Hall, but the normalization process is hampered by this agency's lack of understanding of its authority. Sumatra River Area Hall has full authority over river normalization; therefore, the Medan City flood management coordination team must be able to coordinate between Sumatra II River Hall and the Medan City Government so that several rivers can be normalized, as well as provide community socialization and education on the importance of watershed maintenance".

It is important to disseminate information to the community regarding the understanding of watershed management. It does not deny that the conversion of catchment areas into settlements has also increased the quantity of flooding in the city of Medan. Furthermore, increased population growth along riverbanks has the potential to restrict rivers. As a result, watershed spatial design for flood control in Medan City has not been carried out to its full potential. This situation is inextricably linked to a lack of community involvement in watershed maintenance, as well as a lack of agreement between the government and the community that it is critical to normalize rivers, establish, and maintain primary drainage channels in order to support flood prevention in Medan City.

3.3 Model for strengthening community participation in watershed spatial planning

Until date, the flooding problem in Medan City has not been addressed using a community-based strategy. Medan City is subjected to heavy flooding every year as a result of this circumstance. If the community participates in the maintenance of watersheds and urban drainage, Medan City should not be prone to flooding. As a result, the Central Government, the North Sumatra Provincial Government, the Medan City Government, and the inhabitants of Medan City must work together to plan watersheds for flood control in Medan City and its environs. The author's viewpoint is supported by RAL's statement as Secretary of the Integrated Coordination Team for Flood Management: "Mebidangro area flood management must be carried out in a participatory manner and in coordination between agencies and the people of Medan City, because this national strategic area is a national policy, but it has not been prioritized by the government until now".

Some efforts to increase community empowerment include increasing community participation by building dialogues and agreements with government agencies in watershed management, to support this effort it is necessary to link government agencies, NGOs and the community, while the expected output is that the community with their own awareness actively participates in preserving sustainability. Watershed is the assumption that underlies that the wider community understands the importance of watersheds for both economic, ecological, and socio-cultural functions. The second effort in the context of increasing community empowerment is to provide counseling, assistance, and training to the community in the utilization and preservation of natural watershed resources [20]. For the smooth running of this program, it is necessary to link the sectors of the Sumatra II River Basin Center, the Ministry of Environment and Forestry, the North Sumatra Provincial Government, Pemko Medan and the people of Medan City, as well as forming a coordination forum for watershed management [21]. The expected output in this research is to increase the knowledge and skills of the community in the use and conservation of watersheds, but what can be built is that the wider community understands the importance of watersheds for economic, ecological and socio-cultural functions in Medan City.

The following is Table 2 regarding the coordination model and the division of tasks to several related agencies, ecology and socio-culture in the city of Medan. The following is Table 2 regarding the coordination model and the division of tasks to several related agencies. ecology and socio-culture in the city of Medan. The following is Table 2 regarding the coordination model and the division of tasks to several related agencies.

Watershed planning must involve many parties, from government, private sector and community elements [22]. This is because there is a strong indication that the awareness and ability of the parties to preserve the watershed ecosystem is still low, for example, there is still a lot of land that should be

in the form of a protected area or water catchment area which is still used for cultivation functions that are processed intensively or built for settlements, both legally and illegally increase the risk of erosion, landslides and floods. In the river itself, garbage and waste from various sources is often encountered which causes silting, blockage, and pollution of river water so that the quality of water and riverbed becomes damaged which in turn harms the environment and people's lives [23]. Watershed managers and other aspects connected to education, training, and counseling to the residents of Medan City at large face a problem because of the low awareness, ability, and engagement of stakeholders in watershed management.

Table 2. Model of coordination and division of tasks to several agencies and community of Medan City

No	Agency	Coordination and Tasks
1	Hall Region River Sumatra II	1. River Management 2. Primary Drainage Construction
2	Ministry of Environment and Forestry	1. Land and Water Conservation 2. Watershed Management
3	North Sumatra Provincial Government	1. River Management and Inter-City Secondary Drainage Development 2. Coordination, Land Acquisition Support, Population relocation, Facilitation of Housing Provision housing 3. Land Use and Settlement Handling Social and Environmental Problems
4	Medan City Government	1. Urban Drainage Development (Secondary, Tertiary and Environment) 2. Community Outreach 3. Support for land acquisition for housing development 4. Land Use and Settlement 5. Handling Social and Environmental Problems
5	Establishing a Watershed Management Coordination Forum for the Community	1. Accommodating and channeling community aspirations regarding watershed management 2. Give donation thinking in watershed management 3. Growing role supervision community in watershed management
6	Society participation	1. Guard, look after and enjoy quality environment produced by watershed ecosystems 2. Obtain and provide information, advice and considerations in watershed management 3. Get training and counseling which related to watershed management

Source: Data Processed by the author

4. CONCLUSIONS

Watershed management requires cooperation from all relevant parties, both from the government and the community. Active involvement of the parties (stakeholders) will build a sense of ownership, use wisely, and maintain shared resources. In watershed management, human capital, in this case the community, is a component that has a stake in watershed conservation efforts. Observing community problems that are affected by the lack of public awareness of the cleanliness of rivers and the environment, as well as the lack of supervision and security along river borders. In addition, the increase in population settlements along riverbanks and riverbanks has a negative impact on the quality and quantity of watersheds in Medan City. The lack of attention from stakeholders in the form of socialization and placing the community as an important part in watershed management is a factor in which community participation is not optimal.

Public perception still considers watershed management to be carried out by the government and assesses that settlement management can threaten the place of residence. This study places the influence of community participation as an important part of watershed management in Medan City which is often forgotten. Scientifically, it is necessary to examine and know the relationship between community participation, watershed management and community development. Practically, it provides an overview, knowledge and encouragement of involvement to the people who live in the watershed area in understanding the problem. So that it allows the community to care in order to reduce disaster risk in the watershed area.

There are some limitations that need to be explained in this study. First, this study does not investigate the historical and cultural aspects of the people living in the watershed area, as one of the aspects behind the emergence of settlements. Second, it does not look at the individual knowledge and education of the community about the watershed area which affects the level of awareness. Although the results of the research consistently mention that there is minimal awareness and knowledge about the impact of watershed erosion, the results still need to be reflected in an effort to find out the model of community participation. Third, it does not specifically focus on issues of policy and regulatory aspects from stakeholders, both central and local governments. This can determine the level of seriousness in involving the community in handling watersheds. Therefore, future research should replicate this research in other contexts and by looking at regulatory, educational, historical and cultural aspects. It is important to place research attention on the use of technology as an aspect of watershed management as a means of handling and coordinating with the community.

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