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Community-Based Flood Disaster Risk Mitigation Strategy on the Sugi River Banks Tarempa Village Siantan District

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Abstract - Anambas Islands Regency is an area that is far from the center of regional government and the center of state government, making it difficult to get a quick response to disaster management and assistance. One of the disasters that often occurs in this area is flooding. The Anambas Islands Regency Government has made various efforts to increase the capacity of communities affected by flood disasters, but there is still a lack of community participation so awareness of the importance of disaster mitigation knowledge is still low. The central government through BNPB is encouraging the creation of a strategy for the formation of Disaster Resilient Villages (Destana). This research was conducted to answer the question of how to formulate a strategy for community-based disaster risk reduction based on the capacity of the community on the banks of the Sugi River, Tarempa Village, Siantan District? To answer this question, researchers collected primary data and secondary data which was carried out for 3 months from July 2023 to September 2023 in the area. The data analysis procedures in this research are identification of preparedness and community-based flood disaster risk reduction efforts on the banks of the Sugi River, community perceptions of the efforts of the local government of Anambas Islands Regency in managing flood disasters, perception data analysis method using a Likert scale, preparation of risk reduction strategies Community-Based Disaster Based on Community Capacity on the Sugi River Banks. Destana was chosen as the highest alternative because Destana can be a broad enough forum for the preparation and implementation of comprehensive community-based mitigation strategies.

Keyword: Anambas Islands Regency, Destana, Floods, Sugi River, Community-Based Disaster Risk Reduction

I. INTRODUCTION

Indonesia is one of the disaster-prone countries. The meeting between continental plates is one of the main factors of various disaster events in Indonesia such as earthquakes, tsunamis, erupting mountains and so on. Disaster events in Indonesia are of two types, namely geological disasters (volcanoes, earthquakes, tsunamis, landslides) and hydrometeorological disasters (floods, extreme waves, land and forest fires, droughts and extreme weather) [11].

The climate in Indonesia is strongly influenced by the location and geographical characteristics that stretch between the Pacific Ocean and the Indian Ocean. Indonesia has 3 basic climate patterns: monsoonal, equatorial, and local climate systems that cause dramatic differences in rainfall patterns. This condition is increasingly complex due to the challenges of the impact of global warming and the influence of climate change, such as rising temperatures and sea levels in the territory of Indonesia which is on the equator. This tends to lead to a high potential for various types of hydrometeorological disasters, such as floods, flash floods, droughts, extreme weather, extreme waves, abrasion, and forest and land fires [12].

Anambas Islands Regency is located on the northern border of Indonesia, directly adjacent to several countries such as Vietnam, Thailand, and Malaysia. The area of the Anambas Islands Regency is 46,700 km² with only 700 km² (1.3%) of the

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total area being land, the remaining 46,000 km² (98.7%) is ocean. The Anambas Islands are a considerable distance from other administrative regions. The distance between Anambas Islands and the capital of Riau Islands Province in Tanjungpinang is 276 km, the distance between Anambas and Natuna Regency is 305 km, while the distance between Anambas and the center of state government in Jakarta is 1,043 km. Based on this fact, if a disaster occurs in the Anambas Islands District, it is difficult to get a quick response to disaster management and assistance.

Floods are one of the annual disasters that always occur in various regions in Indonesia. This hydrometeorological disaster occurs due to static natural conditions such as geographical, topographical, and geometric river channels. Dynamic natural events such as high rainfall, damming of the sea/tides in the mother river, soil subsidence and siltation due to sedimentation, as well as dynamic human activities such as inappropriate use of floodplain land, namely: by establishing settlements on river banks, lack of flood control infrastructure, land subsidence and sea level rise due to global warming [6].

According to data from BPBD Anambas Islands Regency, one of the disasters that often occurs is flooding. Sugi River located in Tarempa Village is an area with high flood potential. The risk and threat of flooding on the banks of the Sugi River will be more dangerous when the tide (rob) occurs along with heavy rain with a long duration. The largest flood disaster ever occurred in Anambas in December 2018, where very heavy rainfall caused an increase in water discharge in the Sugi River Basin (DAS). The losses caused by the disaster are not small, including damage to public facilities and infrastructure, material losses such as dead livestock, damaged houses and disrupted community activities.

Sugi River is a watershed that crosses the city of Tarempa with a high population density. The level of vulnerability of the community to flood hazards will increase if the community's capacity is still low. The level of understanding of people on the banks of the Sugi River towards disaster risk is still low. This resulted in a higher number of losses and casualties. Sugi riverbank communities have not received maximum education regarding community-based disaster mitigation. One of the other factors is that there is still no forum that embraces disaster risk reduction efforts in flood-affected areas.

The Anambas Islands District Government has made various efforts to increase the capacity of people affected by floods, including by making various related programs, including making appeals for potential disasters, but direct programs to broaden people's horizons about potential disasters in their neighborhoods are still minimal. The manifestation of community-based disaster mitigation is that when a disaster occurs, people can save themselves and their families without having to wait for help from other parties (during emergencies). Mitigation programs also lack community participation, so awareness of the importance of disaster mitigation knowledge is still low.

The Sugi Riverbank community is still not disaster-resilient. The central government through BNPB encourages to make a strategy for the establishment of Disaster Resilient Villages as stated in BNPB Head Regulation Number 1 of 2012 [1]. Social values that exist in the community are the basic capital in building Destana (Disaster Resilient Village) [3]. Destana is a reflection of how important community-based disaster mitigation is. It is the community that best understands the character of their residence, potential and local wisdom that can be empowered as supporting aspects in efforts to reduce disaster risk.

AIM

The purpose of this study was to evaluate the community-based flood Risk Mitigation Strategy on the Sugi River Bank, Tarempa Village, Siantan District.

1. Identify community-based disaster risk reduction efforts that have been carried out and initiated by the Anambas Islands District government, especially related to flooding on the banks of the Sugi River;
2. Assess public perceptions of efforts made by local governments in flood disaster management;
3. Formulate a community-based disaster risk reduction strategy on the banks of the Sugi River.

II. RESEARCH METHODS

The research was conducted in Tarempa Village, Siantan District, Anambas Islands Regency, especially in residential areas on the banks of the Sugi River. The study was conducted for 3 months from July 2023 to September 2023. Data types and sources are grouped into two, namely primary data and secondary data. Primary data were obtained directly through visits to selected respondents/stakeholders with a sampling technique in this study purposive sampling. Secondary data is obtained from

various sources both internal and external. The data were analyzed by identification procedures for Community-Based Flood Risk Reduction and Preparedness and Efforts on the Sugi River Bank, Community Perception of the Anambas Islands District Government's Efforts on Flood Disaster Management, Perception Data Analysis Method with Likert Scale, Preparation of Community-Based Disaster Risk Reduction Strategy Based on Community Capacity on the Sugi River Bank

III. Results And Discussion

3.1 Identification of Community-Based Flood Risk Preparedness and Risk Reduction Efforts on the Banks of the Sugi River

The high potential for disasters in the community requires serious handling, important steps must be taken by the government with capacity building in disaster risk reduction. Activities and activities must certainly continue to be improved, especially in the aspect of capacity building at the grassroots level, namely the community at the village level. The program of empowerment of disaster-prone communities in the Sugi River is expected to increase awareness and capacity so that from the individual level understand how to deal with future disasters.

Disaster mitigation needs to be combined with disaster risk reduction efforts into development for sustainability and mainstreaming disaster risk reduction into planning government programs and activities. In other words, disaster risk analysis should be one of the foundations in sustainable development planning. In the table data above, there are already activities to prepare the Anambas Islands Regency Disaster Risk Assessment document which can later be used as a guideline in the implementation of disaster mitigation activities, including flooding on the banks of the Sugi River.

Disasters can cause damage to infrastructure, and even the worst thing if infrastructure development is not right can be a disaster for the area. Therefore, infrastructure development must pay attention to and adopt potential disasters in infrastructure areas and also have contingencies in the event of disasters and technological failures (non-disasters).

According to Law Number 24 of 2007, disaster management aims to: (1) Protect the community from the threat of disaster. (2) Harmonize existing laws and regulations. (3) Ensure the implementation of disaster management in a planned, integrated, coordinated and comprehensive manner. (4) Respect local culture. (5) Build public and private participation and partnerships. (7) Encourage the spirit of mutual assistance, solidarity and generosity. (8) Creating peace in the life of society, nation and state.

3.2 Public Perception of the Local Government of Anambas Islands District Towards Flood Disaster Management

Anambas Islands Regency, through the Regional Disaster Management Agency, has made various efforts to reduce disaster risk. Whether or not the programs carried out by the government are appropriate is closely related to the types of needs of communities affected by disaster risk. The flood disaster on the banks of the Sugi River is one of the disasters that requires various solutions from the government, prioritizing community-based mitigation. Several programs and activities carried out by the government at the pre-disaster (mitigation) stage are shown in the following table:

Table 1 Programs and activities carried out by the government at the pre-disaster stage

No	Activity Description	Year	Data Sources	Information
1	Extreme Weather Advisories and Precautionary Measures for the Community	2021	Prevention and Preparedness Sector	Pre-disaster
2	TRC Monitoring in Disaster-Prone Areas	2021	Emergency and Logistics Sector	Pre-disaster
3.	Regional SAR Training (BASARNAS)	2021	BPBD Secretariat	Pre-disaster
4.	Water Rescue Training	2021	Emergency and Logistics Sector	Pre-disaster

5.	BNPB Team Monitoring to BPBD Anambas Islands Regency	2021	BPBD Secretariat	Pre-disaster
6.	Monitoring of Disaster-Prone Areas in Districts of Anambas Islands Regency	2021	Emergency and Logistics Sector	Pre-disaster
7.	Establishment of Disaster Resilient Village in Balibak Village, Palmatak District	2022	Prevention and Preparedness Sector	Pre-disaster
8.	Workshop on Coordination and Rapid Assessment of Disasters in Lingga Regency	2022	Emergency and Logistics Sector	Pre-disaster
9.	Apple Holds Anambas Islands District Disaster Preparedness Day Squad	2022	Prevention and Preparedness Sector	Pre-disaster
10.	Initiation of Participants in the Coordination Workshop and Rapid Assessment of Disasters	2022	Emergency and Logistics Sector	Pre-disaster
11.	Underwater Rescue Training in Improving Rescue and Evacuation Competencies	2022	Emergency and Logistics Sector	Pre-disaster
12.	Mangrove Planting (Green Belt Project) in Siantan and East Siantan Districts	2022	Prevention and Preparedness Sector	Pre-disaster
13.	Weather Advisories and Disaster Anticipation Measures	2022	Prevention and Preparedness Sector	Pre-disaster
14.	FGD Regional Resilience Index of Anambas Islands District	2022	Prevention and Preparedness Sector	Pre-disaster
15.	Establishment of Disaster Risk Reduction Forum Region I of Anambas Islands Regency	2022	Prevention and Preparedness Sector	Pre-disaster
16.	Preparation of Anambas Islands District Disaster Risk Assessment	2022	Prevention and Preparedness Sector	Pre-disaster
17.	Socialization and Night Patrol for Disaster Preparedness in Siantan District Area	2022	Prevention and Preparedness Sector	Pre-disaster
18.	Community Water Tub Cleaning in East Tarempa Village, Siantan District	2022	Emergency and Logistics Sector	Pre-disaster

Table 1 Programs and activities carried out by the government at the pre-disaster stage (*advanced*)

No	Activity Description	Year	Data Sources	Information
19.	Apple Alert to Hydrometeorological Disasters (Extreme Weather)	2022	Prevention and Preparedness Sector	Pre-disaster
20.	TRC Monitoring in Disaster-Prone Areas	2022	Emergency and Logistics Sector	Pre-disaster
21.	Cleaning the Sugi River Flow in Siantan District	2022	Emergency and Logistics Sector	Pre-disaster
22.	Extreme Weather Advisories and Precautionary Measures for the Community	2023	Prevention and Preparedness Sector	Pre-disaster
23.	Vegetative Prevention of Planting Strongly Rooted Trees Landslide / Abrasion in the Baitul Ma'mur Anambas Grand Mosque Area	2023	Prevention and Preparedness Sector	Pre-disaster
24.	Assistance in the Preparation of Disaster Management RANPERDA	2023	Prevention and Preparedness Sector	Pre-disaster
25.	Penerimaan Bantuan Hibah Sea Reader (RIB) dari BNPB	2023	Emergency and Logistics Sector	Pre-disaster
26.	Apple Extreme Weather Disaster Preparedness	2023	Prevention and Preparedness Sector	Pre-disaster
27.	Socialization of Disaster Safe Education Unit (SPAB)	2023	Prevention and Preparedness Sector	Pre-disaster
28.	Extreme Weather and El Niño Advisories	2023	Prevention and Preparedness Sector	Pre-disaster

Source: BPBD KKA 2022

The disaster mitigation program programs carried out by the Anambas Islands district government are quite diverse in types and actions. Starting from socialization activities, projects, and development, to disaster-related training. However, of the many programs carried out, we must evaluate the effectiveness and accuracy of activities against threats that exist at the disaster site. Some activities still seem very general without specific objectives to the threat of flooding. From the table above, data on human resource improvement activities around disaster-prone areas are still very minimal. To realize good disaster preparedness in the community, education and socialization programs should be expanded.

Government programs and policies are one of the important elements in community-based disaster mitigation efforts on the banks of the Sugi River. However, an evaluation of the program must be carried out to ensure that the program is on target and effective. Evaluation is an important component to review the extent to which programs and activities provide benefits to the community. The author uses instruments in the questionnaire with variables that will answer the level of effectiveness of government programs on community-based flood disaster mitigation efforts on the banks of the Sugi River.

A. Respondent Characteristics

The characteristics of respondents (Table) in this study were obtained from identity data on the questionnaire. The total

number of respondents was 51 people. The data collected consists of occupation, age, gender, and address. The respondents were Tarempa village people who lived in RT/RW on the banks of the Sugi River. Five RTs closest to the banks of the Sugi River were selected as locations for the distribution of respondents. The youngest respondent was 15 years old and the oldest was 69 years old. The largest proportion of respondents' age was in the age range of 46-60 years, which was 41.18 percent and the lowest proportion in the age range of >60 years, which was 7.84 percent of the total number of respondents.

Table 2 Characteristics of sample respondents

Description of Respondents		Total (people)	(%)
Gender	Male	36	70,59
	Female	15	29,41
Age (year)	15-30	13	25,49
	31-45	13	25,49
	46-60	21	41,18
	> 60	4	7,84

Table 2 Characteristics of sample respondents (*advanced*)

Description of Respondents		Total (people)	(%)
Profession	Fishermen/farmers/laborers	5	9,8
	Civil servant/employee/PTT	16	31,37
	Private sector worker/entrepreneurs	24	47,06
	Students/college students	3	5,88
	Housewives	3	5,88
Address	RT Raden Saleh	15	29,41
	RT Patimura	21	41,18
	RT Sungai Sugi	4	7,84
	RT Dipenogoro	7	13,73
	RT Pemuda	4	7,84

The gender ratio of respondents was male at 70.59% and female at 29.41%. The livelihood that dominates the number of respondents is private sector worker/entrepreneurs, which is 47.06 and the smallest is students/college students, and housewives 5.88%. The largest respondent's residential address in RT Patimura was 41.18%. This is considering that this RT is the closest area to the banks of the Sugi River. The smallest address is RT Pemuda with a large 7.84%.

B. Community Perception of Flood Disaster Mitigation Efforts

The results of the Likert scale analysis of five variables Assessment of the level of community preparedness on the banks of Sugi, namely: (1) Preparedness of Knowledge and Attitudes (2) Preparedness of Government Policies; (3) Mitigation and post-disaster preparedness plans; (4) Disaster Warning System Preparedness; (5) Human Resource Preparedness. The results of the scoring of community perceptions related to flood disaster preparedness (table 3) will be used as consideration for the preparation of community-based mitigation strategies.

Table 3 Public perception regarding flood disaster preparedness

Variable	Total of Scores	Score Ideal	Result (%)	Interpretation
Preparedness of Knowledge and Community Attitudes	1289	1530	84,25	Totally agree
Preparedness of Government Policies;	521	1020	51,08	Disagree less
Mitigation and post-disaster plan preparedness in the community;	315	765	41,18	Disagree less
Government Disaster Warning System Preparedness	381	765	49,80	Disagree less
Human Resource Preparedness	195	510	38,24	Disagree

Knowledge Preparedness and Community Attitudes have a score of 84.25% with the interpretation of Strongly Agree. This variable aims to find information on the extent of respondents' understanding of basic knowledge about flood disasters, such as what is meant by flooding, causes, signs of flooding, frequency of floods, and the impact caused. In addition, the community measured the level of awareness of flood hazards when erecting buildings on the banks of the Sugi River. All components in this variable based on the results of respondents have a fairly high value. This means that people's understanding of the dangers of flooding in general is quite good.

Preparedness from Government Policy has a score of 51.08 (less agree). This variable measures how the government's efforts are related to community-based disaster mitigation policies that have been carried out on the banks of the Sugi River. The response to this variable is that there is no regular socialization from the government to the public about the danger of flooding. The government has not officially determined and agreed on the location of community evacuation when flooding is high enough. In addition, the government has not made evacuation instructions and signs and there is no map of disaster-prone areas at the village level, nor RT / RW. The use of social media groups (WA) has been operated for notification when signs of flood disasters appear but has not been maximally utilized.

Mitigation and post-disaster preparedness plans in the community get a score of 41.18 (disagree). This variable aims to determine mitigation plans that already exist in the Sugi riverbank environment such as how community efforts to reduce the impact of flooding. Elevating buildings is not necessarily the right option in reducing flood impacts. The increase in building construction in the watershed makes the overflow will be even greater. According to respondents, the drainage system has not met the standards to reduce the impact of flooding, and there are no dikes capable of reducing flood flow to residential areas.

The government's Disaster Warning System Preparedness scored 49.80 (disagree). This variable aims to determine mitigation plans that already exist in the Sugi riverbank environment such as how community efforts to reduce the impact of flooding. Elevating buildings is not necessarily the right option in reducing flood impacts. The increase in building construction in the watershed makes the overflow will be even greater. According to respondents, the drainage system has not met the standards to reduce the impact of flooding, and there are no dikes capable of reducing flood flow to residential areas.

Human Resource Preparedness scored 38.24 (disagree). This variable is used to identify the readiness of human resources during a flood. Have they ever been given socialization on how to evacuate when an emergency occurs. Many respondents have never participated in routine socialization related to flood disaster mitigation. This affects the capacity of the community itself.

C. Instrument Validity Test

The concept of valid contains the notion that the instrument used can measure things that should be measured [2]. A validity test is to test the accuracy or accuracy of an instrument in measuring what you want to measure [4]. This study used

Bivariate Pearson correlation (Product Moment Pearson) to conduct validity testing, with a two-sided test with a significance level of 0.05. The test criteria are as follows:

1. If r counts ≥ r table (2-sided test with sig. 0.05) then the instrument or item of the question item correlates significantly to the total score (declared valid).
2. If r counts < r table (2-sided test with sig. 0.05) then the instrument or item of the question item does not correlate significantly to the total score (declared invalid).

Furthermore, the r table is found at a significance of 0.05 with a 2-sided test and the amount of data N = 51, then the r table is 0.276. The r table obtained is compared with the magnitude of the r value of the results of statistical calculations or r calculations that can be seen in each variable by correlating each item score with the total score, which is as follows:

Table 4 Results of validity test of instrument items

Variable	Question Items	Respondent	r-count	r-table	Information
Preparedness of Knowledge and Attitude	6	51	0.347-0.784	0.276	Valid
Preparedness of Government Policies	4	51	0.594-0.766	0.276	Valid
Mitigation and post-disaster preparedness plans	3	51	0.883-0.944	0.276	Valid
Disaster Warning System Preparedness	3	51	0.672-0.853	0.276	Valid
Human Resource Preparedness	2	51	0.946-0.952	0.276	Valid

From the validity test data of the community response instrument, it was obtained that all variables had met valid criteria.

Instrument Reliability Test

The results of instrument reliability tests using the Alpha Cronbach technique can be seen in the Table below. An instrument is considered reliable if the reliability coefficient limit is at least 0.6 [7]. Based on the *case processing summary* output using SPSS 20, *valid cases* for all variables are 51. The percentage of valid data is 100 percent on each variable with no data output. This shows that the overall data provided by respondents to the instrument items on each variable is valid.

Table 4 Results of reliability test of instrument items

Variable	N Valid Cases	% Valid Cases	Cronbach's Alpha	N of Items	Information
Preparedness of Knowledge and Attitude	51	100	0.616	6	Reliabel
Preparedness of Government Policies	51	100	0.703	4	Reliabel
Mitigation and post-disaster preparedness plans	51	100	0.880	3	Reliabel
Disaster Warning System Preparedness	51	100	0.651	3	Reliabel
Human Resource Preparedness	51	100	0.889	2	Reliabel

The output value of Alpha Cronbach on all variables shows a value above the minimum Alpha Cronbach coefficient,

which is 0.6. The highest Cronbach Alpha coefficient is in the Human Resource Preparedness variable which is 0.889 and the lowest coefficient is in the Knowledge and Attitude Preparedness variable which is 0.616. The difference in the value of this coefficient can be influenced by several things, including the number of questions, validity value and subject taken. Low alpha values can be due to the low number of questions, lack of relationships between items and diversity of question constructions [9].

3.3 Preparation of community-based disaster risk reduction strategies based on the capacity of communities on the banks of the Sugi River

Based on disaster risk assessment data, data on mitigation efforts that have been carried out by the government, and perception data from questionnaires that have been obtained from the community, several strategies must be considered in improving community-based disaster mitigation on the banks of the Sugi River, Tarempa Village, Siantan District.

From the results of the strategy formulation that has been obtained by identifying existing problems and possible solutions, several alternatives can be applied to facilitate coordination of flood disaster mitigation in a comprehensive container on the banks of the Sugi River between the government and the community including; (1) Disaster Resilient Village (DESTANA), (2) Disaster Risk Reduction Forum (DRR), and (3) Community-Based Greening. The process of determining alternatives in this study uses the Analytical Hierarchy Process (AHP) method.

3.4 Analysis of Strategy Priorities with Methods

A. Analytical Hierarchy Process (AHP)

AHP is a decision support model developed by Thomas L. Saaty. This decision support model will break down complex multi-factor or multi-criteria problems into a hierarchy. Hierarchy is defined as a representation of a complex problem in a multi-level structure where the first level is the goal, followed by the level of factors, criteria, sub-criteria, and so on down to the last level of alternatives [5]. With hierarchy, a complex problem can be broken down into groups which are then arranged into a form of hierarchy so that the problem will appear more structured and systematic [8]. The following hierarchy will be used in alternative decision-making in this paper

The sampling technique chosen in this study is by determining samples based on certain considerations (purposive sampling). The judgment experts selected consisted of five people, namely the Secretary of BPBD, the Head of Emergency and Logistics at BPBD, the Head of Prevention and Preparedness at BPBD, the Young Expert Disaster Analyst at BPBD and the Disaster Management Analyst at BPBD Anambas Islands Regency.

Community-based flood mitigation on the banks of the Sugi River will be realized if the criteria of human resources are reliable and competent in executing existing work plans and have a sufficient budget for the implementation of community-based flood disaster mitigation activities. Human resources are the main criterion because, with good community capabilities, mitigation strategies will work well as well. But budget and cost factors also play an important role in achieving the main objectives of this strategy. All forms of activities require funds for operations. Project procurement and development also require a budget to be carried out properly. Human resources and cost are two inseparable criteria in mitigating flood disasters on the banks of the Sugi River.

Human resources in disaster mitigation efforts play an important role. Good quality is needed to implement the strategy that will be prepared by the government and the community. On the other hand, the quantity of human resources also cannot be ignored. The number of people participating in this strategy is very important, the more it is, the lighter the implementation of flood disaster mitigation strategies. The amount of resources must also be commensurate with the quality, the large number of human resources does not guarantee their quality. It needs a balance between these two criteria.

Budget and cost criteria are the main capital in implementing community-based flood mitigation efforts on the banks of the Sugi River. The implementation of physical projects to reduce and control floods certainly requires a lot of budget. The more the budget, the better and the risk of flooding can be reduced. Budgets and costs are also required for development activities. Development means updating the existing flood disaster mitigation system for the better and restoring its function as before.

Alternative strategies that can be used to accommodate community-based disaster mitigation programs include:

a. **Disaster Resilient Village (Destana)**

The specific objectives of Destana development in Tarempa Village are:

1. Protect communities in hazard-prone areas in the Tarempa sub-district from adverse impacts due to disasters.
2. Increase the participation of communities on the banks of the Sugi River and Tarempa Village, especially vulnerable groups, in resource management to reduce disaster risk.
3. Increase the institutional capacity of communities on the banks of the Sugi River and Tarempa Village in resource management and maintenance of local wisdom for disaster mitigation
4. Increase the government's capacity to provide resource and technical support for community-based disaster mitigation on the banks of the Sugi River and Tarempa Village
5. Increase cooperation between stakeholders in mitigation efforts, local governments, business institutions, universities, non-governmental organizations (NGOs), community organizations, and other concerned groups.

Destana is expected to be present in the community on the banks of the Sugi River and Tarempa Village and place community members living in disaster-prone areas as the main actors, as participating subjects and not objects, will be more sustainable and effective.

The Destana program on the banks of the Sugi River and Tarempa Village was developed to achieve the following principles: (1) Disasters are a joint affair, (2) DRR-based, (3) Fulfillment of community rights, (4) Communities are the main actors, (5) Carried out in a participatory manner, (6) Mobilization of local resources, (7) Inclusive, (8) Based on humanity, (9) Justice and gender equality, (10) Alignment with vulnerable groups, (11) Transparency and accountability, (12) Partnership, (13) Multi-threat, (14) Autonomy and decentralization of governance, (15) Integration into sustainable development, and (16) Organized cross-sectorally [10].

b. **Disaster Risk Reduction Forum (DRR)**

PRB Forum is a partner of BNPB and BPBD in disaster risk reduction in the regions. The presence of the DRR Forum on the banks of the Sugi River and Tarempa Village plays an important role as a forum for DRR activists who accommodate pentahelix elements to be involved in disaster management (Government, academics, business entities or actors, communities or communities, and the media

An important value that needs to be considered in the DRR Forum is the representation of each aspect both gender, age and diversity of backgrounds of its members. Furthermore, it is tailored to the needs of local DRR and local culture on the banks of the Sugi River and Tarempa Village, and focuses on increasing community resilience in disaster management.

c. **Community-Based Greening**

The area on the banks of the Sugi River and Tarempa Village is one of the areas with high-risk flooding events. One of the contributing factors is the alif function of the catchment area so that water overflows out of the proper path so that flooding occurs. One of the efforts to restore the absorption function is to carry out reforestation and reforestation in river-protected areas and catchment areas, so that hydrological functions in watersheds are restored.

Community-based reforestation which is planned to be a flood disaster mitigation strategy on the banks of the Sugi River and Tarempa Village is a program that adapts to the natural conditions of the Sugi River banks and the process involves people who understand the character of vegetation that used to exist on the banks of the Sugi River.

B. Alternative Selection with AHP Method

Based on Three Alternatives to achieve the objectives of a community-based disaster mitigation strategy on the banks of the Sugi River, Tarempa Sub-district, Siantan District, based on the AHP calculation, the following scores are obtained:

a. Community-Based Disaster Mitigation

	Human Resources	Budget
Human Resources	0,87	0,87
Budget	0,13	0,13
Total	1,00	1,00
HR Value	**Score**	
Quantity	0,13	
Quality	0,87	

b. Human Resources

	Quantity	Quality
Quantity	0,13	0,13
Quality	0,87	0,87
Total	1,00	1,00
Criterion value		
Human Resources	0,87	
Budget	0,13	

c. Cost/Budget

	Project	Development
Project	0,34	0,34
Development	0,66	0,66
Total	1,00	1,00
Budget	**Score**	
Project	0,34	
Development	0,66	

The final result of the AHP calculation is as follows:

Criteria and Sub Criteria	Weight	Alternative Weights			Alternative Weights		
		Destana	Forum	Greening	Destana	Forum	Greening
Human Resources	**0,87**						
Quantity	0,11	0,65	0,26	0,08	0,074	0,030	0,009

Quality	0,75	0,72	0,21	0,07	0,546	0,159	0,050
Budget	**0,13**						
Project	0,05	0,70	0,22	0,07	0,032	0,010	0,003
Development	0,09	0,72	0,21	0,07	0,063	0,018	0,006
		Total			**0,715**	**0,217**	**0,068**

The final values of the alternative weighting are as follows:

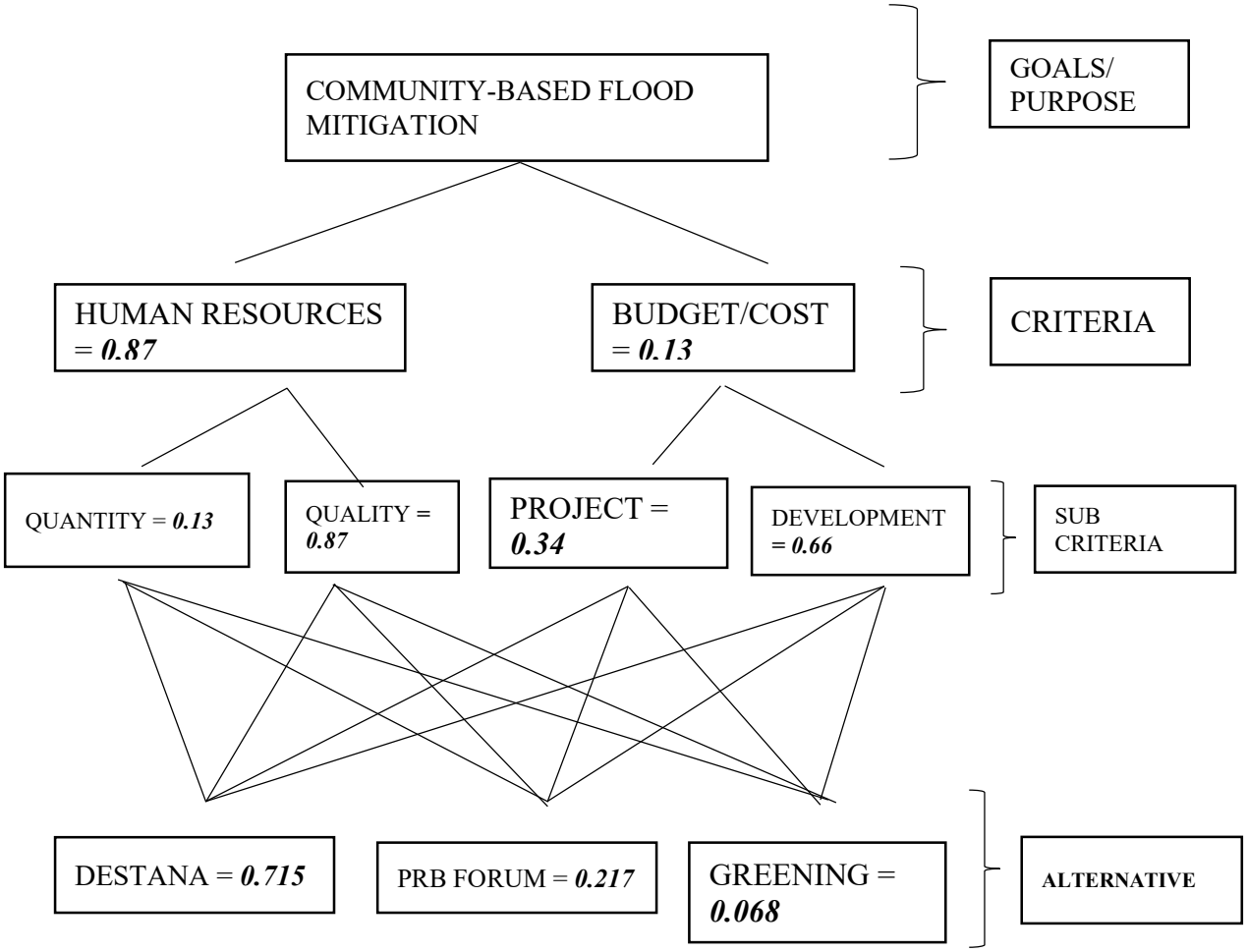

Figure 1 Hierarchy Chart with Community-Based Disaster Risk Mitigation Objectives with AHP method and assessment score

IV. CONCLUSION

Based on the results and discussions described earlier, several things can be concluded as follows:

1. Sharpen public understanding of basic knowledge of flood disasters, such as what is meant by flood, causes, signs of flooding, frequency of floods, and the impacts caused.
2. Increase public awareness that erecting buildings on the banks of the river without technical considerations will have an impact on silting the river which results in the danger of flooding.

3. Conduct regular socialization efforts from the government to the community about the dangers of flooding.
4. The government officially determines and agrees on the location of community evacuation during floods and makes evacuation signs and instructions around residential neighborhoods along the Sugi River with the potential for flood events.
5. Maximize the use of social media groups (WhatsApp groups) for disaster information sources that occur to minimize the risk of flood disasters.
6. The government together with the community formulates action plans that are more organized and sustainable with local wisdom and community habits for flood disaster mitigation.
7. Build an infrastructure system that is by existing problems in the community to overcome flooding. Improve drainage systems and create dikes that can reduce flood flow and inundation in residential areas. Involving the community in the project.
8. Build a flood hazard early warning system that is more accessible to the community or community-based.
9. Conducting socialization related to the Early Warning System to the community so that they can operate and read the information provided in the warning system.
10. Creating a river water level measuring instrument to increase public awareness of potential floods that may occur. It is easier for people to evacuate early when a river level measurement system is in place.
11. Identify human resource mitigation readiness in flood-prone areas
12. Rehabilitation of hydrological functions in watersheds, reforestation, river-protected areas and catchment areas.

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