

PREPARING COMMUNITY RESILIENCE IN SOCIAL SECTOR BASED ON CLIMATE AND DISASTER RESILIENCE INITIATIVE (CDRI) CONCEPT IN SUNGGUMINASA, GOWA REGENCY

Alif Dary Utomo¹, Risma Handayani²

^{1,2} Department of Urban and Regional Planning, Faculty of Science and Technology
Universitas Islam Negeri Makassar

¹ Email : daryutomo97@gmail.com

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ABSTRACT

The city of Sungguminasa is one of the areas affected by flooding due to the overflow of the Je'neberang River. This is due to urban locations characterized by high population growth and infrastructure as well as land use change around the Je'neberang River. After the flooding, the quality of the settlement environment has decreased, such as damage to the road network and drainage and waste problems. The community is the party most affected by the occurrence of floods, therefore it is very important to increase community resilience in dealing with disasters. Resilience measurement needs to be done to determine the direction of adaptation in accordance with the social conditions of the community in the study site to restore the quality of settlements after the flood disaster. The formulation of the problem in this research is how the social resilience of the community in the recovery of the quality of the post-flood environmental settlements along the River Jeeberang City Sungguminasa. In this study to answer the problem formulation the analytical method used is the Likert scale analysis and analysis of the resilience index value. So the results of the analysis can be concluded that the level of social resilience of the community in the recovery of the quality of the environment after the flooding along the River Jeeberang Sungguminasa City is 4.2 and is in the high category.

Keywords: *flood, community resilience, settlement*

A. INTRODUCTION

Indonesia is the largest archipelago country in the world with 37.1% of its land area being river areas (Kodoatie & Sjarief, 2010). Based on the Minister of Public Works Regulation No. 11 A / PRT / M / 2006, Indonesia is divided into 133 River Areas (WS) which cover 5,590 Watersheds. This can increase the potential and vulnerability to natural disasters, especially floods caused by overflowing river water. Besides being caused by nature, flooding can also be caused by human activities and can even be caused simultaneously by nature and humans (Kodoatie, 2013).

The city of Sungguminasa is one of the areas affected by flooding due to the overflow of the Je'neberang River. This is due to urban locations characterized by high population growth and infrastructure as well as land use change around the Je'neberang River. Sungguminasa City is one part of the Mamminasata Metropolitan National Activity Center whose role is vital to the spatial structure of South Sulawesi Province. Based on data accessed on the Detik site, in January 2019, the region was affected by flooding due to high rainfall for two consecutive

days and the flow of water from the Jenelata River and the Bili-Bili Dam caused the overflow of the Je'neberang River, resulting in 640 inhabitants in the City. Sungguminasa must evacuate. This flooding problem has become a routine disaster every year in Sungguminasa City. Seeing the geographical location of the area which is in the Je'angeberang River Basin, the threat of flooding due to overflowing river water is still very likely to occur.

After the flooding, the quality of the settlement environment has decreased, such as damage to the road network and drainage and waste problems. The community is the party most affected by the occurrence of floods, therefore it is very important to increase community resilience in dealing with disasters. So the researchers formulated the problem in this study, namely how the social resilience of the community in the recovery of the quality of the post-flood settlement environment along the Je'neberang River, Sungguminasa City. Resilience is defined as the ability of a system, community or community exposed to hazards to fight, absorb, accommodate and recover from the effects of a hazard quickly and efficiently, including preserving and restoring important basic structures and functions (UNISDR, 2009). This concept makes the community able to repair damage and adapt to disasters that they face better now and in the future. In addition, through increasing resilience it can save funds allocated for emergency response (United Nations, 2012 in Ciptaningrum, 2017).

Climate and Disaster Resilience Initiative (CDRI) is one of the tools to measure the resilience of cities in the Asia Pacific region specifically for hydrometeorological disasters (Sharma & Shaw, 2011 in Ciptaningrum, 2017). The measurement is through an approach to the physical, social, economic, institutional and natural dimensions. Resilience measurement needs to be done to determine the direction of adaptation in accordance with the social conditions of the community in the study site to restore the quality of settlements after the flood disaster. Shawn (2012) in Ciptaningrum (2017), states that a social approach (community or community) is the main key to disaster risk reduction efforts because disasters have a direct impact on people's survival. Therefore, the measurement of resilience in this study focuses on the resilience of the social dimension.

B. RESEARCH METHODOLOGY

A. Likert Scale

Likert scale is used to measure attitudes, opinions and perceptions of a person/group of people about social phenomena (Sugiyono, 2010). Likert scale is used to measure the variables in the study in order to assess the social resilience of the community against flooding using a questionnaire distributed to the research sample. Respondents give an assessment of the condition of each variable (x_1, x_2, x_3, x_4, x_5) with a choice of answers between 1 to 5. Then each variable is given a weight (w_1, w_2, w_3, w_4, w_5) between 1 and 5 according the relationship of these variables to the improvement of resilience in the area of the respondent lives. The results of the assessment and weighting of respondents will be used to assess social resilience to flood disasters (Joerin and Shaw, 2011).

B. Resilience Index Value Analysis

Analysis of Resilience Index Value is used to interpret the social security index value of the community. The resilience index value can be determined using:

$$\frac{\sum_{i=1}^n w_i x_i}{\sum_{i=1}^n w_i} = \frac{(w_1 \times x_1) + (w_2 \times x_2) + (w_3 \times x_3) + (w_4 \times x_4) + (w_5 \times x_5)}{w_1 + w_2 + w_3 + w_4 + w_5}$$

Information :

W ₁ = Weight 1	X1 = Value 1
W ₂ = Weight 2	X2 = Value 2
W ₃ = Weight 3	X3 = Value 3
W ₄ = Weight 4	X4 = Value 4
W ₅ = Weight 5	X5 = Value 5

C. RESULTS AND DISCUSSION

Regional resilience to flooding according to the social dimension is known to use the concept of the CDRI (Climate and Disaster Resilience Initiative). Assessment with the concept of CDRI uses a questionnaire that was developed by Sharma and Shaw (2011) in Ciptaningrum (2017). Resilience assessments are based on the accumulated scores of selected respondents through questionnaires that have been distributed. An assessment of the resilience of urban areas in facing flood disasters in Sungguminasa Village.

Completing the CDRI questionnaire is preferred to be guided by secondary data. But for some data that is not available secondary data, filling out the questionnaire is based on the perception of local stakeholders. Where local stakeholders are assumed to have a thorough knowledge of the conditions of the study area.

Defining the value given by the respondent is as follows:

1 = Very Low	4 = High
2 = Low	5 = Very High
3 = Medium	

The information regarding the respondents involved in the assessment is as follows:

G1 = Sungguminasa Urban Village	C1 = citizens Association
G2 = BPBD of Gowa Regency	C2=neighborhood
Association	

H1 = Somba Opu Community Health Center C3 = The Citizens

From a total of 25 variables, there are 16 variables that can be averaged directly by considering the weight given by respondents to each variable. These variables will then be calculated based on the formula that has been explained in the research method.

While 9 other variables cannot be averaged because other supporting data are needed to assess the variables. 9 variables that cannot be averaged include 2

variables from health indicators, 2 variables from education and awareness indicators of disaster, 2 variables from social capital indicators and 3 variables from indicators of social unity and disaster preparedness. For variables that cannot be averaged, the most possible value is chosen based on other supporting data. The following are the results of the social security assessment in Sungguminasa Urban Village.

Table 1. Respondent Assessment and Further Analysis Process

Variable	Respondent						Description of The Next Process
	G1	G2	H1	C1	C2	C3	
Population							
Population Growth	3	3	3	3	3	3	Can Be Averaged
Population under 14 years of age	4	4	4	4	4	4	Can Be Averaged
Population over 64 years old	5	5	5	5	5	5	Can Be Averaged
Population in informal settlements	5	5	5	5	5	5	Can Be Averaged
Population density	4	4	4	4	4	4	Can Be Averaged
Health							
Population experiencing illness due to flood water pollution (waterborne disease)	4	4	4	4	4	4	Can't Be Averaged
Access to the nearest health facility	5	3	5	4	5	3	Can Be Averaged
The functioning of health facilities after the disaster	5	4	5	4	4	5	Can Be Averaged
Capacity of health facilities during a disaster	5	5	5	5	5	5	Can't Be Averaged
The ability of the health service system to prepare for floods	4	4	5	4	4	4	Can Be Averaged
Disaster education and awareness							
Literacy Rate	5	5	5	5	5	5	Can Be Averaged
Total population aware of disasters	4	3	2	3	3	4	Can Be Averaged
Availability of disaster awareness programs or training	4	4	4	4	4	4	Can't Be Averaged
Internet access	5	5	5	5	5	5	Can't Be Averaged
The functioning of the school after the disaster	5	4	3	4	4	4	Can Be Averaged
Social Capital							
Number of residents in the community	4	4	4	4	4	4	Can't Be Averaged
Number of residents	3	3	3	3	3	3	Can't Be

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Variable	Respondent						Description of The Next Process
	G1	G2	H1	C1	C2	C3	
participating in social activities							Averaged
The ability of population communication to reach consensus	5	4	2	4	3	4	Can Be Averaged
The ability of the population in the decision making process (democratic level)	5	5	4	5	5	3	Can Be Averaged
Level of grouping due to differences	4	4	3	3	5	3	Can Be Averaged
Social unity and disaster preparedness							
Logistics, material, disaster management	5	3	3	3	3	4	Can Be Averaged
Total population participating in easing activities (volunteers)	5	5	2	4	4	4	Can Be Averaged
Availability of shelter for disaster affected communities	5	5	5	5	5	5	Can't Be Averaged
Support from NGOs / CBOs	4	4	4	4	4	4	Can't Be Averaged
Voluntary evacuated population	5	5	5	5	5	5	Can't Be Averaged

Source : Analysis Results, 2019

The next process of analysis of variables that can be averaged is presented in table 2 along with supporting data. While the analysis of variables that cannot be averaged is presented in table 2 along with supporting data.

Table 2. Respondent Assessment and Further Analysis Process

Variable	Assessment of Respondents												Final Score	Conclusion
	G1		G2		H1		C1		C2		C3			
	Value	Weight	Value	Weight	Value	Weight	Value	Weight	Value	Weight	Value	Weight		
Population														
Population Growth	3	5	3	5	3	4	3	3	3	4	3	5	3	Medium
Population under 14 years of age	4	1	4	2	4	3	4	4	4	3	4	2	4	High
Population over 64 years old	5	2	5	1	5	2	5	1	5	2	5	3	5	Very High
Population in informal settlements	5	3	5	4	5	1	5	2	5	5	5	1	5	Very High
Population density	4	4	4	3	4	5	4	5	4	1	4	4	4	High
Health														
Access to the nearest health facility	5	2	3	3	5	2	4	3	5	1	3	2	4	High
The functioning of	5	5	4	5	5	5	4	5	4	3	5	1	4,46	High

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Variable	Assessment of Respondents												Final	Concl
health facilities after the disaster														
The ability of the health service system to prepare for floods	4	1	4	1	5	1	4	1	4	2	4	3	4,11	High
Disaster education and awareness														
Literacy Rate	5	3	5	1	5	1	5	2	5	2	5	1	5	Very High
Total population aware of disasters	4	4	3	4	2	4	3	1	3	4	4	4	2,48	Low
The functioning of the school after the disaster	5	2	4	3	3	3	4	4	4	3	4	3	3,94	High
Social Capital														
The ability of population communication to reach consensus	5	1	4	2	2	4	4	3	3	2	4	2	3,36	Medium
The ability of the population in the decision making process (democratic level)	5	5	5	1	4	5	5	4	5	3	3	1	4,89	Very High
Level of grouping due to differences	4	2	4	5	3	1	3	5	5	1	3	3	3,53	High
Social unity and disaster preparedness														
Logistics, material, disaster management	5	5	3	5	3	5	3	3	3	4	4	5	3,56	High
Total population participating in easing activities (volunteers)	5	2	5	2	2	3	4	4	4	3	4	4	3,89	High

- Population growth variable gets a value of 3 (medium), the value is taken from the population growth of Sungguminasa Village is 3.42%.
- Variable population under the age of 14 years get a value of 4 (high), while the population above the age of 64 years get a value of 5 (very high) the value is taken from population data by age, it is known that the number of people aged under 14 years is as many as 1,114 inhabitants with a percentage of 19.20% so as to get a value of 4 (high) and a population aged over 64 years as many as 276 people with a percentage of 4.76% so as to get a value of 5 (very high).
- Variable population in informal settlements get a value of 5 (very high). Informal settlements or slums are non-habitable settlements due to irregularity in buildings, high building density, and the quality of buildings and facilities and infrastructure that do not meet the requirements (Law No. 1 of 2011). Based on the Profile of Slum Settlement Areas, there are 1 slum settlements in Sungguminasa Kelurahan that are currently being handled by the KOTAKU (City without Slum) program, it is known that

the number of residents living in informal settlements is 282 out of 5,801 people, so this variable get a value of 5 (very high).

- The population density variable gets a value of 4 (high), the value is taken from the data of the population and area, then it is known that the population density in Sungguminasa Urban Village is 3,973 people / km² in 2018, so it gets a value of 4 (high).
- Variable access to the nearest health facility gets a value of 4 (high), the value based on access to the Puskesmas can be reached easily because it is in the city center with good road conditions.
- Literacy number variable get a value of 5 (high), the value is based on data on the number of residents presented in table X, ages 5-75> considered to have been able to read in Sungguminasa Kelurahan, which amounted to 5,621 people.

Whereas 9 other variables, namely the functioning of health facilities after a disaster, the ability of health services in preparing for floods, the number of populations that are aware of disasters, the functioning of schools after a disaster, the ability of population communication to reach consensus, the level of democracy, the level of grouping due to differences, logistical, material and disaster management readiness, and the population that participated as volunteers received scores based on respondents ratings through filling out questionnaires.

Table 3. Respondent Assessment and Further Analysis Process

Variable	Assessment of Respondents												Final Score	Conclusion	
	G1		G2		H1		C1		C2		C3				
	Value	Weight	Value	Weight	Value	Weight	Value	Weight	Value	Weight	Value	Weight			
Population	-														
Health	Population experiencing illness due to flood water pollution (waterborne disease)														
	4	3	4	2	4	3	4	4	4	4	4	4	5	4	High
	Capacity of health facilities during a disaster														
	5	4	5	4	5	4	5	2	5	5	5	5	4	5	Very High
Disaster education and awareness	Availability of disaster awareness programs or training														
	4	5	4	5	4	5	4	3	4	5	4	5	4	4	High
	Internet access														
	5	1	5	2	5	2	5	5	5	1	5	2	5	5	Very High
Social Capital	Number of residents in the community														
	4	4	4	4	4	2	4	2	4	5	4	4	4	4	High
	Number of residents														
	3	3	3	3	3	3	3	1	3	4	3	5	3	3	Mediu

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Variable	Assessment of Respondents												Final	Concl
participating in social activities														m
Social unity and disaster preparedness														
Availability of shelter for disaster affected communities	5	1	5	4	5	2	5	2	5	2	5	3	5	Very High
Support from NGOs / CBOs	4	4	4	3	4	4	4	5	4	5	4	2	4	Very High
Voluntary evacuated population	5	3	5	1	5	1	5	1	5	1	5	1	5	Very High

Based on the results of the adjustment of supporting data, the values obtained for 9 variables that cannot be averaged get a value based on the respondents' assessment through filling out the questionnaire. Following are the reasons and supporting data for the selection of values for 9 variables which cannot be averaged.

1. The population variable that is experiencing illness due to water pollution (waterborne disease) gets a value of 4 (high), the value is given based on data from the Sanitation and Environmental Health Situation Assessment Form When Disaster belongs to the Somba Opu Public Health Center which shows that there are no residents who experience illness at when floods occur because sanitation and health have been addressed.
2. The capacity of health facilities during the flood disaster was considered good (value 5). In Sungguminasa Village, there is 1 Puskesmas, namely Somba Opu Puskesmas. The Somba Opu Community Health Center serves 8 urban villages in the Somba Opu District. It is known that the Somba Opu Puskesmas is included in the first level health facility with an inpatient Puskesmas type. The Emergency Unit (ER) has 3 beds and for this ward has 5 beds.
3. Variable availability of a program or training in disaster awareness gets a score of 4 (high). This is based on disaster awareness programs that have been carried out by the BPBD of Gowa Regency, such as the Contingency Plan (Renkon) and rehearsals about floods and earthquakes.
4. Internet access that can support the smooth dissemination of information gets a value of 5 (very high). This value is given based on the number of people of productive age (5-64 years) considered to be able to access the internet. Data from UPTD PP & KB of Somba Opu Subdistrict showed that the population aged 5-64 years in Sungguminasa Sub-District was 5,345 people or 92.13% of the total population. In addition there are 3 units of cellular communication towers / BTS in this area indicating that internet access has reached this area. This can support the selection of a value of 5 for internet access in Sungguminasa Kelurahan.
5. The number of residents who are members of a community group gets a value of 4 (high) and the number of people who participate in social activities gets a value of 3 (medium). This was also supported by the Muhammadiyah Da'wah Central Building at the study site as a means of supporting community

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religious activities, in addition there were also disaster posts created by community groups to help ease the burden of flood victims.

6. The number of residents who are members of a community group gets a value of 4 (high) and the number of people who participate in social activities gets a value of 3 (medium). This was also supported by the Muhammadiyah Da'wah Central Building at the study site as a means of supporting community religious activities, in addition there were also disaster posts created by community groups to help ease the burden of flood victims.
7. Support from NGOs / CBOs scored 4 (high). This is based on the amount of assistance from the private sector and the existence of aid posts made by community organizations in the Sungguminasa Village.
8. The population that was evacuated voluntarily got a value of 5. This flooding that just happened had made the community ready to conduct the evacuation voluntarily.

Based on the results of the assessment that has been carried out, the final value is obtained for each social defense variable as shown in Figure 1.

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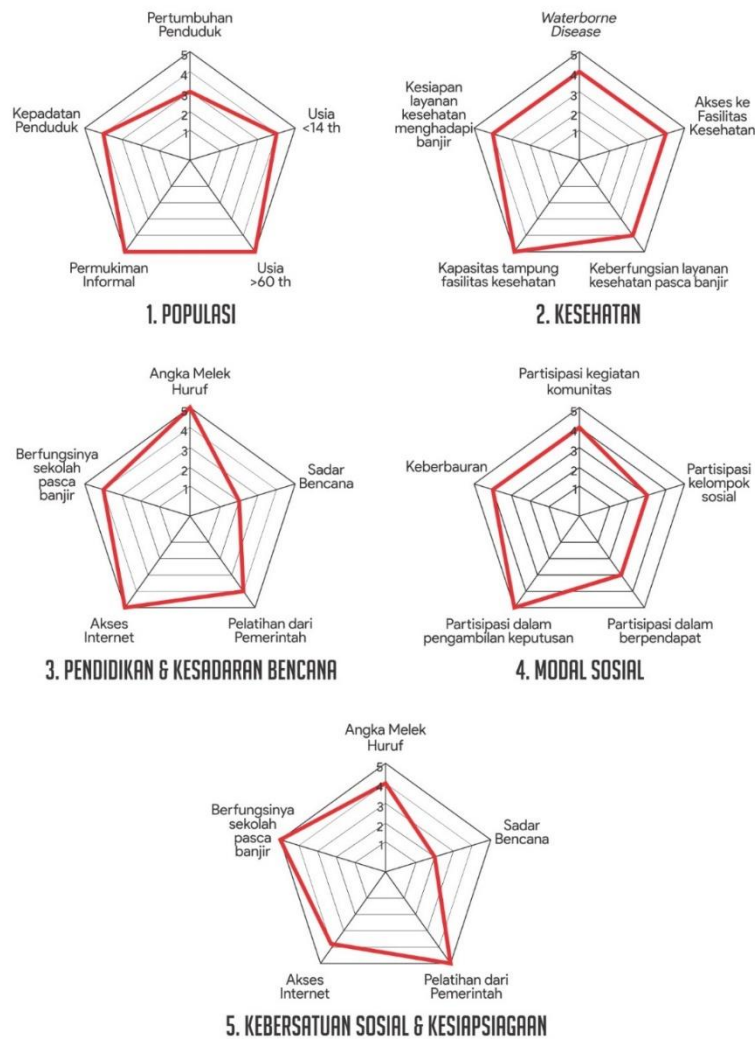


Figure 1. Variable Resilience Diagram Each Indicator (Source : Analysis 2019)

Based on results of analysis variables, it is obtained several variables that have been classified in the high to

Value for

Results,

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very high categories. These variables need to be maintained so as not to decrease in value. Conversely there are also some variables that are still in the category of very low to moderate. These variables require increased efforts to optimize community resilience in dealing with floods in Kelurahan Sungguminasa.

Table 4. Result

Variable	Value	Status	Information
Population			
Population Growth	3	Medium	Needs to be improved
Population under 14 years of age	4	High	Need to be maintained
Population over 64 years old	5	Very High	Need to be maintained
Population in informal settlements	5	Very High	Need to be maintained
Population density	4	High	Need to be maintained
Health			
Population experiencing illness due to flood water pollution (waterborne disease)	4	High	Need to be maintained
Access to the nearest health facility	4	High	Need to be maintained
The functioning of health facilities after the disaster	4,46	High	Need to be maintained
Capacity of health facilities during a disaster	5	Very High	Need to be maintained
The ability of the health service system to prepare for floods	4,11	High	Need to be maintained
Disaster education and awareness			
Literacy Rate	5	Very High	Need to be maintained
Total population aware of disasters	2,48	Low	Needs to be improved
Availability of disaster awareness programs or training	4	High	Need to be maintained
Internet access	5	Very High	Need to be maintained
The functioning of the school after the disaster	3,94	High	Need to be maintained
Social Capital			
Number of residents in the community	4	High	Need to be maintained
Number of residents participating in social activities	3	Medium	Needs to be improved
The ability of population communication to reach consensus	3,36	Medium	Needs to be improved
The ability of the population in the decision making process (democratic level)	4,89	Very High	Need to be maintained
Level of grouping due to differences	3,53	High	Need to be maintained
Social unity and disaster preparedness			
Logistics, material, disaster management	3,56	High	Need to be maintained
Total population participating in easing activities (volunteers)	3,89	High	Need to be maintained
Availability of shelter for disaster affected communities	5	Very High	Need to be maintained
Support from NGOs / CBOs	4	High	Need to be maintained
Voluntary evacuated population	5	Very High	Need to be maintained

Source : Analysis Results, 2019

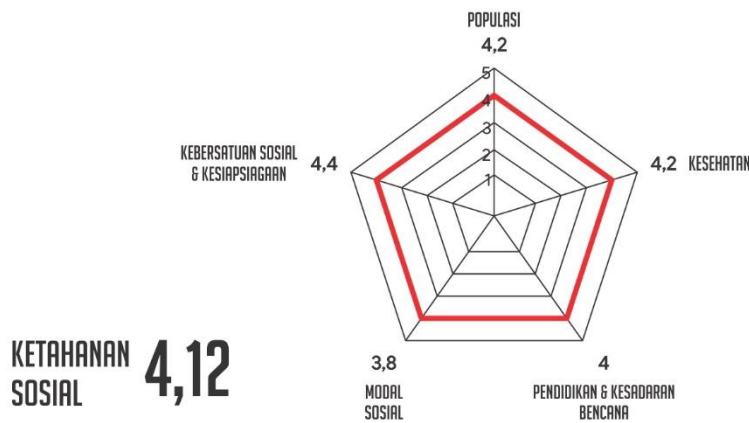


Figure 2. Kelurahan Sungguminasa
(Resouce: analysis, 2019)

Overall, the variables of social security in Sungguminasa Kelurahan are relatively high. So the final value of social security in Sungguminasa Village is 4.12 and is in the high category. If a table is divided into parts these should be labelled (a), (b), (c) etc but there should only be one caption for the whole table, not separate ones for each part.

D. CONCLUSION

The social resilience of the community in restoring the quality of the settlement environment after the flood along the River Jeeberang Sungguminasa City is 4.2 and is in the high category.

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