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Analysis Of Community Resilience Factors In One Area Against Flood Disasters

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ABSTRACT

Floods that hit residential areas can disrupt urban activities and have an impact on the lives of people living in flood-prone areas. Flamboyan Bawah settlement in Langkai village, Jekan Raya sub-district, Palangka Raya city is one of the areas that is often affected by flooding. However, despite this, people still choose to stay in the area. Thus, this research aims to analyze the factors that influence community resilience in one area against flood disasters, especially in Palangka Raya. A mixed-method design, integrating both quantitative and qualitative approaches, was employed. Data collection involved observations, interviews, questionnaires, and document studies, with a sample comprising 100 heads of families. Multiple linear regression was utilized for data analysis. The results of the study show that social aspects, economic aspects, physical aspects of housing, and policy aspects have a positive and significant influence on community resilience. This means that community resilience in flood-prone areas is not the result of a single factor, but rather the interaction of various dimensions. Communities tend to choose to survive because of strong social capital, economic adaptation that has been built, housing modifications that are in accordance with environmental conditions, and support from government policies. The implications of this study point to the need for more adaptive policy planning, improving housing quality, strengthening the local economy, and strengthening the social capacity of communities to increase resilience to flood disasters in flood-prone areas.

Keywords: Community Resilience, Flooding, Social, Economic, Physical Aspects Of Housing, And Policies.

INTRODUCTION

Across many regions, floods are a recurring natural disaster. Flood problems in residential areas affect the disruption of urban area activities (Scherzer et al., 2019), flooding in residential areas has a tangible impact on the well-being and activities of the affected populations (Feofilovs & Romagnoli, 2017). Naturally, floods are a part of the environment, but when they inundate land, they are bound to cause harm and create hazardous situations (Bertilsson et al., 2019). The disruption of these activities indicates the impact of floods experienced by the community (Qasim et al., 2016). These impacts and losses occur due to the high vulnerability of the community when facing flood disasters that occur (Mohanty et al., 2020).

Flood disaster is one of the disasters that often occurs in the world. Flood disasters have many causal factors, including high rainfall, tidal waves, very low plains, upstream deforestation, narrowing of the River Basin Area (DAS) and inappropriate land conversion (Svetlana et al., 2015). According to (Lee & Brody, 2018), floods aren't just natural disasters stemming from weather, human actions like unsuitable or unplanned land use, also contribute significantly to their occurrence (Bourenane et al., 2019).

Areas classified as flood-prone areas generally have flat topography and are located around rivers, making them highly susceptible to waterlogging during heavy rain or river overflows. Determination of the flood hazard class in this area is carried out by analyzing

the height of the inundation, which is then categorized into three risk levels. If the height of the inundation is less than or equal to 75 cm, the area is included in the low risk or hazard class category and is assumed not to cause significant damage. Meanwhile, inundation with a height of between 75 cm and 150 cm is categorized as a moderate risk or hazard class, with the assumption that 50% of public facilities experience minor damage assessed based on regional price units. Meanwhile, areas with a height of inundation above 150 cm are classified as a high risk or hazard class, where it is assumed that 50% of public facilities experience moderate damage and the other 50% experience severe damage, both of which are multiplied by the regional price unit as the basis for calculating the economic impact (BNPB, 2021).

Kelurahan Langkai, Jekan Raya Sub-district, is a flood-prone area. Flooding in Langkai Village in the Lower Flamboyan Residential Area can inundate almost all settlements and residents' homes with flood heights reaching 0.50 - 1.50 meters. Based on data from the Regional Disaster Management Agency (BPBD) of Palangka Raya City, Kompas Online Media and other online media, the occurrence of natural disasters such as floods in Jekan Raya District occurs every year due to very high levels of rainfall and flood submissions from upstream so that the Kahayan river overflows. In 2021 there was a flood disaster in September (Kota Palangka Raya Dalam Angka 2021, n.d.), in 2022 there was a flood disaster in September (Kota Palangka Raya Dalam Angka 2022, n.d., in 2023) there was a flood disaster in April (Kota Palangka Raya Dalam Angka 2023, n.d.) and in 2024 there was also a flood disaster in March (Kota Palangka Raya Dalam Angka 2024, n.d.), this was due to the high rainfall which resulted in flooding in the Lower Flamboyan residential area. Flood conditions in the Lower Flamboyan residential area during flooding can be seen in Figure 1. and Figure 2. below:

However, despite frequent flooding, the people of Kelurahan Langkai in the Flamboyan Bawah Settlement Area still choose to stay and live in the area. According to KBBI, survival comes from the basic word "survive" which can be interpreted as an effort to defend oneself (against attacks, temptations, and so on). More clearly (Juwono, 2009) distinguishes the meaning of resilience and resilience, where "resilience is something whose strength or ability is known. While resilience is still limited to phenomena whose strength or ability is not yet known". In addition, the use of the word resilience is also widely used in settlements to indicate the phenomenon of surviving a settlement and is related to the ability of the community to survive to continue living in a residential environment that is in poor condition, such as slums, degraded, or experiencing pressure due to urban development.,so this raises the question of what factors influence it.

The purpose of writing this research is to identify and analyze the factors that become the reasons why people, especially in the Flamboyan Bawah residential area of Langkai Village, still choose to live in areas classified as flood-prone. The results of this research are expected to help increase community awareness and preparedness for flood risk, as well as provide useful contributions to various parties. For the Palangka Raya City Government, this research is expected to be an important input in formulating policies related to the arrangement of settlements in flood-prone areas. For the community, this research is expected to increase understanding in determining the location of a safer place to live and in accordance with decent housing criteria. Meanwhile, in terms of science, this research can

be used as a case study that illustrates the various factors that cause people to continue to live in flood-prone areas in the context of urban areas.

RESEARCH METHOD

A mixed-methods methodology was applied in this study. Mixed methods combine quantitative and qualitative techniques to provide a comprehensive view of social issues. Researchers can use this approach to go beyond mere statistical analysis of numerical data, but also to dig deeply into the views, experiences, and perceptions of the community so that they can capture the social dynamics that exist in flood-prone residential areas.

This study examines the factors that influence community resilience to flood disasters by involving several independent variables from four main aspects, namely social, economic, physical housing, and policy. Social aspects include education levels, social ties and interactions, and the length of time people have lived in the area. Economic aspects are seen from the type of work, income level, and work location. Meanwhile, physical aspects of housing include the type and shape of the house, the availability of facilities, and the distance of the house from the river. The policy aspect focuses on the existence of government programs that support community resilience. All of these variables are analyzed against the dependent variable, which is the level of community resilience in the Flamboyan Bawah residential area against flood disasters.

The conceptual framework of the research is as follows:

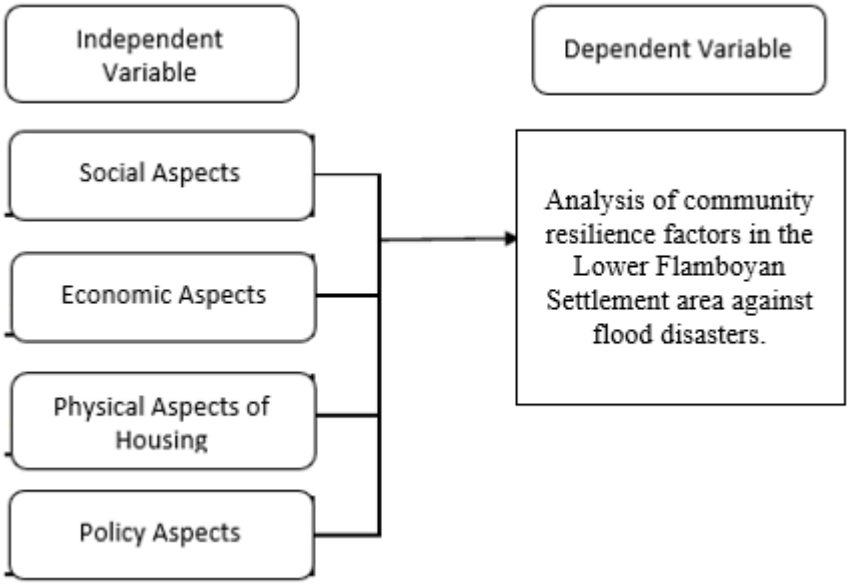

Figure 1. Research Concept Framework
Source: Researcher, 2024

This research was conducted in the Flamboyan Bawah residential area, Langkai Village, Jekan Raya Sub-district, Palangka Raya City, which is known as a flood-prone area. For the **qualitative part of the study**, we used both **primary and secondary data** (Sugiyono, 2020). **Direct field collection** yielded primary data, which involved observations, interviews, and

questionnaires administered to people in the area. Concurrently, secondary data were gathered from a range of **authoritative sources, including governmental bodies and affiliated institutions**, by submitting requests for documents pertinent to the research topic. Data was gathered using a combination of techniques, including **field observations, in-depth interviews, written questionnaires, and analysis of documents and audiovisual content** (such as images and sound).

Simple random sampling was the method used for sample selection in this study, which is a method of taking samples randomly from the entire population without considering certain characteristics. It ensures that each individual in the population has an even likelihood of being selected for the study. To determine the number of samples, the researcher used the Slovin formula, which provides a calculation of the number of respondents needed based on a specified error rate. The results of the calculation indicate that 100 heads of families (KK) are needed as research samples.

This study employed a descriptive statistical approach and regression analysis to analyze the data, especially multiple linear regression. The purpose of this analysis is to determine the relationship between independent variables such as social, economic, physical aspects of housing, and policies on the dependent variable, namely the level of community resilience to flooding. Multiple linear regression is used to see whether the relationship is positive or negative, and to estimate changes in community resilience variables if there is a change in one or more independent variables. Researchers use this approach to analyze the combined effect of each factor on the resilience of flood-prone communities.

RESULTH AND DISCUSSION

1. Descriptive Statistics

Descriptive statistics in this study began with sample selection using simple random sampling techniques, namely random sampling from the entire population without considering special characteristics, to guarantee each potential respondent in the population has an equal probability of selection. To determine the number of representative samples, the researcher used the Slovin formula which calculates sample requirements based on the desired error rate. Based on these calculations, a sample size of 100 heads of families (KK) was obtained as respondents in this study, ensuring that the data obtained accurately reflects the population conditions and can be used for further analysis.

Table 1. Summary of Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
X1	100	23	30	27.74	2,028
X2	100	20	30	25.71	2,952
X3	100	10	20	17.08	2.163
X4	100	9	15	13.30	1,446
Y	100	6	15	11.18	2.611
Valid N (listwise)	100				

Based on Table 1 descriptive statistics results, variable X1 has the highest average value of 27.74 with a score range between 23 to 30 and a standard deviation of 2.028, indicating relatively homogeneous data. Variable X2 has an average of 25.71 with a range of 20 to 30 and a standard deviation of 2.952, while X3 and X4 have lower averages of 17.08 and 13.30 respectively with a smaller score range and standard deviation, indicating more limited data variation. Variable Y has an average value of 11.18 with a range of 6 to 15 and a standard deviation of 2.611. Overall, the data from the five variables with a sample size of 100 shows a diverse but fairly consistent distribution of values, which is ready for further analysis.

2. Classical Assumption Test

a. Normality Test

A normality test is a statistical method that checks if data or a sample distribution fits a normal distribution (Gaussian distribution) (Ritonga et al., 2025). Below are the results of the normality test.

Table 2. Results of Normality Test

Tests of Normality						
	Kolmogorov-Smirnova			Shapiro Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
X1	.191	100	<.001	.877	100	<.001
X2	.141	100	<.001	.936	100	<.001
X3	.135	100	<.001	.935	100	<.001
X4	.176	100	<.001	.901	100	<.001
Y	.137	100	<.001	.930	100	<.001

a. Lilliefors Significance Correction

The normality test results as presented in Table 2, all variables (X1, X2, X3, X4, and Y) show a significance value (Sig.) of less than 0.001. Since the Sig. value is below 0.05, it shows that the data for all these variables does not follow a normal distribution. Thus, the normality assumption is not met, so further data analysis needs to consider non-parametric statistical methods or data transformation to meet the normality assumption.

b. Reliability Test

The purpose of reliability testing is to measure the consistency or stability inherent in research instrument in producing the same data if used repeatedly under similar conditions. Internal consistency is often measured using Cronbach's Alpha, where a score usually above 0.7 denotes instrument reliability (Subhaktiyasa, 2024). Below are the results of the reliability test.

Table 3. Reliability Test Outcomes

Reliability Statistics

Cronbach's Alpha	N of Items
.808	5

As shown in Table 3, the reliability test indicated a Cronbach's Alpha of 0.808 for the 5 items. This value indicates that the research instrument has a good level of internal consistency, because a Cronbach's Alpha value above 0.7 is generally considered quite

reliable. Thus, the data obtained from the instrument can be trusted for use in further analysis.

3. Hypothesis Testing

a. Multiple Linear Regression Test

Multiple linear regression is a statistical technique employed to quantify the concurrent influence exerted by multiple independent variables on a solitary dependent variable.

Table 4. Multiple Linear Regression Outcomes

Coefficientsa						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	1,500	3.210		.467	.641
	X1	.167	.139	.130	1.203	.032
	X2	.370	.115	.418	3.220	.002
	X3	.319	.143	.265	2.228	.028
	X4	.049	.210	.027	.233	.017

a. Dependent Variable: Y

Table 4 reveals that X1, X2, X3, and X4 each have a positive and statistically significant effect on Y, according to the multiple linear regression test, with each significance value below 0.05, namely X2 (0.002), X3 (0.028), X1 (0.032), and X4 (0.017). Variable X2 shows the strongest influence on Y, while the model constant is not significant (sig. 0.641), indicating that without the independent variables, the prediction of Y is not significantly different from zero. Overall, these results indicate that the aspects studied significantly affect the dependent variable positively.

b. F Test

This analysis seeks to determine the combined significant effect of the independent variables on the dependent variable. A p-value less than 0.05 in the F-test indicates that the regression model is viable and that the independent variables, as a group, significantly influence the dependent variable (Kurniawan & Yuniarto, 2016).

Table 5. F-Test Outcomes

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	194,051	4	48,513	9,587	<.001b
	Residual	480,709	95	5,060		
	Total	674,760	99			

a. Dependent Variable: Y

b. Predictors: (Constant), X4, X1, X3, X2

Table 5's F-test results (F = 9.587, Sig. < 0.001) confirm that independent variables X1, X2, X3, and X4 collectively have a significant impact on the dependent variable (Y). This means the multiple linear regression model is feasible for predicting Y.

c. Coefficient of Determination Test

Represented as R^2, the coefficient of determination indicates the proportion of dependent variable variation explained by the regression model. A high R^2 signifies strong explanatory power, whereas a low R^2 implies weak explanatory ability of the independent variables (Kurniawan & Yuniarto, 2016). This test helps assess the quality and fit of the overall regression model.

Table 6. Results of R-squared Test

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.536a	.288	.258	2.249

a. Predictors: (Constant), X4, X1, X3, X2

The test for the coefficient of determination revealed an R-squared value of 0.288, meaning that the independent variables (X1, X2, X3, and X4) jointly explain roughly 28.8% of the variability in the dependent variable (Y). The Adjusted R-squared value of 0.258 indicates that the model can explain roughly 25.8% of the variation in Y, even after adjustments for the number of variables and sample size. The unexplained portion of Y's variation comes from external factors. Essentially, this value shows how well the regression model aligns with the observed data.

Discussion

Social Aspects Have a Positive and Significant Influence on Community Resilience

The research indicates that social aspects significantly and positively influence community resilience. This means strong social ties, solidarity, and support networks among residents are crucial for a community's ability to cope with and recover from challenges, especially floods. Strong social capital creates a sense of togetherness, mutual assistance, and effective coordination so that the community can jointly manage risks and find adaptive solutions. With strong social support, the community becomes more resilient, able to minimize negative impacts, and accelerate recovery after facing pressure or crisis. This shows that the social aspect is a key factor in building community resilience as a whole.

This is corroborated by Satrio & Sukmawati et al., (2021) who stated that the slum conditions in RW 7 Turusan are influenced by physical factors or environmental topography as well as unhealthy community habits. Residents choose to stay in this flood-prone urban area despite the difficulties for various reasons, including its central location (crucial for their income), their established presence, and the strong social connections and shared values within the community. The most significant factor is social cohesion, which drives local initiatives aimed at improving the quality of their living environment in these dense settlements.

Furthermore, social elements are vital, with components such as respondents' education, neighborly bonds, community participation, and duration of residency in the area all

contributing to the formation of strong social capital (Santoso, 2020). This combination of economic strength and solid social networks strengthens community resilience, because in addition to having the financial resources to adapt, they are also supported by social relationships that allow for mutual assistance and coordination in dealing with disaster risks (Sudarmono, 2025).

Thus, strengthening social aspects through the development of communication networks, increasing solidarity, and empowering communities is very important to improve community resilience, especially in disaster-prone areas. This effort needs to be a focus in disaster management policy and program planning so that communities are not only able to survive physically, but also socially and psychologically, so that sustainable and effective resilience is created in facing various threats.

Economic Aspects Have a Positive and Significant Influence on Community Sustainability

The analysis revealed that economic stability significantly and positively impacts community resilience. This suggests that favorable economic conditions boost a community's capacity to withstand challenges like floods. When communities have adequate economic resources, they are better able to adapt, such as repairing housing, purchasing emergency supplies, or developing alternative businesses that support survival. In addition, a strong economy allows better access to services and assistance, thereby increasing overall resilience. Thus, improving the economic aspect is a key factor in strengthening community resilience to various environmental risks and pressures.

The results of this study are supported by the results of research conducted by Said (2023) which showed that the entire Simoet Hamlet area experienced seawater inundation, with the frequency of inundation influenced by the seasonal cycle and occurring according to the tidal pattern. In addition, the resilience of the Simoet Hamlet community to these conditions is influenced by social, economic, infrastructure, housing, and environmental aspects. In dealing with the tidal disaster, the Simoet Hamlet community showed various forms of resilience, such as building embankments in front of their doors, raising the floor of their houses, moving goods to higher places, carrying out community service, taking refuge, and seeking additional sources of income.

Stable and appropriate types of work allow people to obtain a consistent source of income, while adequate income provides financial capacity to meet daily needs and anticipate disaster risks. In addition, a job location that is close to home also facilitates mobility and reduces the burden of transportation costs, thereby increasing family economic efficiency (Hikam, 2024). With the combination of these three factors, people can build strong economic resilience, which ultimately strengthens their ability to survive and recover from disaster pressures more optimally.

Thus, strengthening the economic aspect of the community is a very important strategic step in efforts to improve their resilience, especially in disaster-prone areas. Policy support and economic empowerment programs must be directed at increasing income, access to capital, and economic skills of the community so that they are able to adapt and recover from the pressure of disasters independently and sustainably.

Physical Aspects of Housing Have a Positive and Significant Influence on Community Resilience

The analysis reveals that the physical aspects of housing have a strong, positive impact on community resilience, as better housing conditions directly support the community's ability to endure difficulties. Housing that is designed or modified according to the characteristics of a disaster-prone environment, such as a waterproof structure or adequate elevation, helps reduce the risk of damage and loss. Thus, communities that have adequate physical housing tend to be more prepared and able to maintain their lives, increasing social and economic resilience in difficult environmental conditions. This significant effect emphasizes the importance of attention to the physical aspect of housing in disaster mitigation planning and policies.

Family resilience from a physical aspect is influenced by location conditions and the area of land and buildings that are considered inadequate, even though accessibility to the place is relatively easy to reach. These factors are important considerations in assessing the extent to which families are able to face various physical challenges in their environment (Rinaldhi et al., 2023). In addition, the physical factors of the residence include the type of house (permanent, semi-permanent, or non-permanent), the shape of the house (stilt house or ordinary house), the availability of adequate facilities, and the distance of the house from the river as a potential source of flooding (Fajrin, 2024). The existence of sturdy housing, designs that are in accordance with flood-prone environments, complete facilities, and locations that are safe from river flows together strengthen community resilience to disaster risks, because they can reduce the impact of damage and facilitate the adaptation and recovery process.

Strengthening homes' physical integrity is vital for increasing the resilience of communities residing in areas susceptible to disasters. Improving and customizing housing based on environmental features is key. It helps protect people's property and safety while also making the community more resilient to survive and recover after a disaster. Therefore, development policies and programs should focus on improving the physical quality of housing as a major part of efforts to strengthen community resilience.

Policy Aspects That Have a Positive and Significant Influence on Community Resilience

Policies were found to have a strong, positive influence on community resilience. This highlights how well-crafted and responsive government policies can significantly boost a community's capacity to cope with challenges, especially in areas susceptible to disasters like floods. Supportive policies, such as providing assistance, providing supporting infrastructure, and flexible regulations, make it easier for communities to adapt and maintain their lives even in disaster risk conditions. Therefore, policies not only function as rules, but also as important capital that helps communities in preparedness, risk mitigation, and the recovery process after a disaster, thereby increasing overall social and economic resilience.

Policy aspects related to community resilience are closely related to government programs specifically designed to increase resilience. Government programs such as the provision of social assistance, development of disaster-resistant infrastructure, preparedness training, and socialization of risk mitigation are concrete implementations of existing policies (Rahmawati, 2024). Through these programs, the government not only sets regulations but also provides real support that enables communities to be better prepared and able to survive disasters (Yuliastanty et al., 2024). The success of government programs hinges on the quality

and effectiveness of their underlying policies, which directly boosts community resilience in disaster-prone areas.

Therefore, the role of policy is very crucial in increasing community resilience, especially in areas that are vulnerable to disasters such as floods. Well-designed and responsive policies not only act as formal rules, but also as tools that support communities in facing and overcoming the impacts of disasters. With supportive policies, communities can more easily make adjustments, reduce possible risks, and accelerate the recovery process after a disaster, so that their ability to survive and maintain overall well-being can increase significantly.

CONCLUSION

The results of the study show that community resilience in flood-prone areas is influenced by various aspects simultaneously, namely social, economic, physical housing, and government policy aspects. This confirms that community resilience does not only depend on one factor, but is the result of a complex interaction between strong social capital, developing economic adaptability, physical adjustment of housing to the surrounding environment, and adequate policy support. Good social capital allows communities to help each other and share information, while stable economic aspects provide space for adaptation in dealing with flood risks. In addition, housing that is designed or modified according to flood conditions can reduce the impact of damage, and responsive government policies are an important foundation in supporting all these efforts.

The implications of this study point to the need to develop more adaptive and holistic policies, which do not only focus on one dimension but also consider all aspects of community resilience. The government and stakeholders need to improve the quality of housing through flood-resistant construction standards and home renovation programs, strengthen the local economy by providing sustainable business support, and build community social capacity through training and improving social networks. This multidimensional approach will increase the effectiveness of disaster mitigation and strengthen community resilience as a whole, so that they are able to not only survive but also recover faster from flood disasters.

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