Social Capital and Community Resilience to Tidal Flooding: A Sociological Study in the Coastal Area of Pontianak City

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Abstract

Keywords:

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This study aims to analyze the influence of social capital on community resilience in facing tidal flooding in Pontianak City, West Kalimantan. A mixed methods approach was used, combining a quantitative survey of 300 respondents and qualitative interviews with community leaders, fishermen, and village officials. Social capital variables were measured through the dimensions of trust, social networks, and mutual aid norms, while community resilience variables included adaptive capacity, collective capacity, access to resources, and post-disaster recovery. Quantitative analysis results indicate that social capital has a highly significant impact on community resilience, with an R² value of 0.974 and significance of 0.000. Dimensions of inter-resident trust, participation in social groups, and mutual aid norms were found to be dominant factors in strengthening coastal community resilience. Qualitative analysis reinforces these findings by describing adaptive and collective community responses, such as building stilt houses, activating mutual aid, and strengthening coordination with external parties such as the government and NGOs. Both quantitative and qualitative results indicate that social capital functions as a key mechanism in strengthening the resilience of Pontianak communities against tidal flooding. This study underscores that disaster risk reduction strategies in the coastal areas of West Kalimantan require not only structural interventions but also the strengthening of social capital as the foundation of community resilience.

INTRODUCTION

Pontianak City, the capital of West Kalimantan Province, Pontianak's unique geographical position on the equator and its location along the Kapuas River significantly contribute to its vulnerability to flooding, a phenomenon exacerbated by climate change. The increasing frequency and intensity of these floods over the past two decades can be attributed to sea level rise and changing rainfall patterns, both of which are direct consequences of global climate change (Adi, 2023). Understanding the hydrology of the Kapuas River is crucial for developing effective flood management strategies, as it plays a crucial role in the dynamics of flash floods (Sitorus, 2019). Furthermore, effective urban planning that takes into account its equatorial location and associated risks is crucial to mitigate the adverse effects of flooding on the city's population.

Tidal flooding significantly disrupts not only physical infrastructure but also the socio-economic structure of affected communities. Economic activities are often severely impacted, leading to reduced livelihoods and hampered access to education, which is crucial for community development (Amin, 2024). Furthermore, the risk of waterborne diseases increases, posing a serious health threat to citizens and further straining public health systems (Mutiani et al., 2024). These socio-economic impacts are linked to social interactions and community networks, highlighting the importance of building community resilience. Strengthening social cohesion and

adaptive capacity enables communities to be more resilient and recover from such disasters (Maulita et al., 2023).

Social capital is a crucial component in understanding how communities respond to disasters, as it encompasses networks, trust, and norms that facilitate cooperation and coordination among citizens (Völker, 2021). In Pontianak, a city characterized by its ethnic and cultural diversity, social capital plays a crucial role in enhancing community resilience—their ability to absorb, adapt, and recover from disasters (Sadeka et al., 2015). The unique socio-cultural dynamics in Pontianak require a contextual examination of these relationships, as they influence how social capital is built and utilized (Nugraha et al., 2024). Furthermore, trust and cooperation among diverse groups are crucial for effective disaster response, as they enable collective action and foster a supportive environment during recovery efforts. By leveraging social capital, communities in Pontianak can navigate their diverse social structures to promote inclusive and sustainable disaster recovery.

The tidal flooding phenomenon in Pontianak City highlights the complex interplay between environmental challenges and social dynamics. Coastal communities demonstrate resilience through various response patterns, significantly influenced by social capital, including trust among residents, social networks, and traditional practices of mutual cooperation (gotong royong). These elements foster cooperation and collective action, enabling community members to effectively respond to flood threats, such as repairing embankments and assisting with evacuations (Jones et al., 2024). Social networks facilitate information dissemination and coordination of efforts, enhancing community resilience by providing support during crises (Sitorus, 2019). Furthermore, the development of local innovations, such as emergency savings, reflects the adaptive capacity of these communities, underscoring the crucial role of social capital in shaping their ability to survive and recover from disasters (Alidrus & Wiyono, 2024).

Social Capital

Social capital encompasses resources derived from social relationships, networks, and norms that enable individuals to coordinate and cooperate toward common goals (Gill & Ritchie, 2007). According to James Coleman's social capital theory, trust, reciprocal obligations, and recognized norms are fundamental to increasing the effectiveness of collective action (Spencer, 2012). Trust acts as a crucial component, fostering cooperation and strengthening social bonds, which are essential for achieving shared goals. Norms also play a crucial role, as they establish shared expectations that can facilitate or hinder cooperation within social groups.

Community Resilience

Community resilience is the ability of a community to anticipate, respond to, recover from, and adapt to threats or disasters (Norris et al., 2008). This concept emphasizes that resilience encompasses not only physical infrastructure but also social, economic, and psychological capacities. Community-based initiatives empower residents to address specific needs, fostering self-reliance and adaptability (Domínguez Vázquez et al., 2024). Furthermore, effective community engagement strengthens relationships between members and organizations, promoting collaboration and a sense of belonging, which are crucial during crises (Haggard et al., 2019). Finally, economic resilience ensures that communities can maintain their economic viability and recover from shocks, thus supporting overall well-being (Vaziri et al., 2023).

Local Context: Tidal Floods in Pontianak

Flooding in Pontianak is significantly influenced by tidal factors from the Kapuas River, sea level rise, and land subsidence, coupled with urban development that reduces natural intake space (Vaziri et al., 2023). Coastal communities have implemented various adaptation strategies, such as raising house floors and forming environmental volunteer groups, to mitigate these challenges. However, the success of these strategies depends heavily on the strength of social

capital within the community. Research shows that areas with high community participation in environmental activities experience higher levels of damage and better recovery times compared to areas with lower participation (Kamal, 2024). Therefore, cultivating social networks and trust is crucial to increasing the resilience of coastal communities in Pontianak to the impacts of flooding. This highlights the need for an integrated approach that combines community engagement with effective flood management strategies (Ilhami et al., 2014)

METHODS

This study uses a Mixed Methods approach with a sequential explanatory design, where data collection and analysis are carried out in stages, starting from the quantitative stage, followed by the qualitative stage, and ending with the integration of results. This approach was chosen because it is able to provide a complete picture of the role of social capital in shaping community resilience to tidal flooding, both in terms of statistical generalization and in-depth contextual understanding. The respondent population is the community living in the coastal area of Pontianak city. The research sample was 300 respondents from 300 households (100 households per sub-district). The selection of respondents was carried out using a stratified random sampling technique to ensure representation in each affected sub-district. The research instrument was a structured questionnaire that measured three dimensions of social capital (trust, social networks, and norms of mutual cooperation) as well as indicators of community resilience.

Research Variables

Independent Variable (X) Social Capital with dimensions of Trust between residents, Strength of bridging and linking networks, Mutual cooperation norms and social compliance, Dependent Variable (Y) Community Resilience with dimensions of Household Adaptive Capacity, Speed of Post-Disaster Recovery, Preparedness and Preventive Actions

RESULTS AND DISCUSSION

1. Respondent Demographics

Table 1. Respondent Demographics

Information		Number (n)	Percentage (%)
Gender	Man	158	52.70%
	Woman	142	47.30%
	Total	**300**	**100%**
Age	18–29 years	54	18.00%
	30–39 years	92	30.70%
	40–49 years	87	29.00%
	≥50 years	67	22.30%
	Total	**300**	**100%**
Education	Elementary School/Equivalent	61	20.30%
	Junior High School/Equivalent	79	26.30%

	High School/Equivalent	118	39.30%
	College	42	14.00%
	Total	**300**	**100%**
Main Job	Fisherman	96	32.00%
	Trader	72	24.00%
	Casual Daily Laborer	58	19.30%
	Private employees	37	12.30%
	Other	37	12.30%
	Total	**300**	**100%**
Length of Stay	<5 years	27	9.00%
	5–10 years	56	18.70%
	>10 years	217	72.30%
	Total	**300**	**100%**

Source: 2025 Data Processing Results

Based on data from 300 respondents, the majority were male (52.70%), while women were 47.30%. In terms of age, most respondents were in the 30–39 year group (30.70%), followed by 40–49 year group (29.00%), which reflects that most respondents were of productive age.

The education level is dominated by high school graduates (39.30%), followed by junior high school graduates (26.30%), and elementary school graduates (20.30%), while only 14.00% have a college education. This indicates that the majority of coastal communities still have a lower secondary education level.

In terms of primary occupation, the majority of respondents worked as fishermen (32.00%), followed by traders (24.00%), and casual laborers (19.30%). These professions demonstrate the dependence of coastal communities on the informal sector and marine resources. Most respondents had lived in coastal areas for more than 10 years (72.30%), thus their experience and involvement in dealing with tidal flooding were relatively high.

2. Validity & Reliability Test

Validity & Reliability Test Table

Variable	**Dimensions**	**Indicator**	Validity Test	Reliability Test
			Pearson Correlation	Cronbach's Alpha
Social Capital	**Trust**	Level of trust between citizens	,763**	0.985
		Trust in community leaders	,753**	
		Trust in local government	,761**	
	Social Network	Intensity of interaction between residents	,741**	
		Participation in community groups (RT/RW, social gatherings, fishermen's groups, etc.)	,773**	

Variable	Dimensions	Indicator	
		Strength of relationships with external parties (NGOs, government, volunteers)	,730**
	Norm/Reciprocity	The norm of mutual assistance (gotong royong)	,779**
		Solidarity in times of disaster	,723**
		Willingness to share resources (clean water, food)	,779**
Variable	Dimensions	Indicator	
Community Resilience	Adaptive Capacity	Ability to adapt to floods	,772**
		Local innovations (stilt houses, water reservoirs)	,761**
	Collective Capacity	Cooperation between citizens	,719**
		Participation in flood management	,755**
		Coordination with external parties	,759**
	Access & Utilization of Resources	Access to aid (clean water, food, shelters)	,751**
		Support from government/NGOs	,727**
		Utilization of local resources	,730**
	Post-Flood Recovery	Speed of economic recovery	,760**
		Public facility improvements	,723**
		Social support to bounce back	,753**

Source: 2025 Data Processing Results

Interpretation

Based on the results of the validity test using Pearson Correlation, all indicators for both the Social Capital and Community Resilience variables showed correlation values >0.70 and were significant (p <0.01). This indicates that all indicators have high validity and are suitable for use in measuring the research constructs.

For the Social Capital variable, indicators covering the dimensions of Trust, Social Network, and Norms/Reciprocity were all valid, with correlations ranging from 0.723 to 0.779. This indicates that the level of trust between residents, the intensity of interaction, community participation, and norms of mutual cooperation and solidarity contribute strongly to explaining social capital in coastal communities.

For the Community Resilience variable, all dimensions—Adaptive Capacity, Collective Capacity, Resource Access & Utilization, and Post-Flood Recovery—were also valid, with correlation values ranging from 0.719 to 0.772. This means that indicators such as local innovation capacity, community collaboration, coordination with external parties, and the speed of economic recovery truly reflect the resilience of coastal communities to tidal flooding.

From the reliability test, a Cronbach's Alpha value of 0.985 indicates that all research instruments have very high internal consistency. In other words, this questionnaire is reliable for use in further research.

3. Simple Linear Regression Analysis

Table 3. Simple Regression Analysis

Variable	**t-test**	**F test**	Sign	RSquare
Social Capital	106,369	11314,454	0,000	0.974

a. Dependent Variable: Community Resilience
b. Predictors: (Constant), Social Capital

Based on the results of a simple regression test between Social Capital as an independent variable and Community Resilience as a dependent variable, the following findings were obtained:
   1. Partial t-test
The t-value of 106.369 with a significance level of 0.000 ($p < 0.05$) indicates that the Social Capital variable has a significant effect on Community Resilience. This means that the higher a community's social capital, the higher the community's level of resilience in facing tidal flooding.
   2. F test (simultaneous)
The calculated F value of 11,314.454 with a significance of 0.000 ($p < 0.05$) indicates that the regression model used is appropriate (fit). This confirms that Social Capital as a whole contributes significantly in explaining variations in Community Resilience.
   3. Coefficient of Determination (R Square)
The R Square value of 0.974 means that 97.4% of the variation in changes in Community Resilience can be explained by the Social Capital variable. The remaining 2.6% is influenced by other factors not examined in this study.

Tidal Flood Events and Community Response
1. Pre-Flood: Vigilance and Anticipation
Residents of Pontianak's coast have become accustomed to the tidal flood cycle that usually occurs in certain months, especially when the high tide of the Kapuas River coincides with heavy rainfall.
   1) Natural signs such as rising river water, waves on the edge of the pier, and information from community leaders are used as informal indicators by residents.
   2) Most residents made structural adaptations by raising their houses (stilt houses) or making small embankments from sandbags.
   3) There are also collective initiatives such as cleaning ditches/drains together to improve water flow.

2. When Floods Occur: Spontaneous Response and Mutual Cooperation
When tidal floods hit, the community's response was seen in the form of:
   1) Mutual cooperation to rescue household goods and important assets, especially for the elderly and poor families.
   2) Informal coordination between residents through RT/RW networks, social gatherings, and fishermen's groups to provide temporary assistance.
   3) The role of community leaders and religious leaders as trusted figures is very important in calming residents, coordinating information, and bridging communication with the government/NGOs.

3. Times of Crisis: Access to External Assistance and Networks
At the peak of the flood:

1) The limited availability of local resources (clean water, food, medicine) gives rise to solidarity among residents who share with each other.
2) Aid from local governments and NGOs comes in the form of basic logistics and emergency posts. However, distribution often depends on residents' social networks—those with close ties to village officials have quicker access to aid.
3) Residents who work as fishermen or traders suffer huge losses because they cannot go to sea/sell.

4. Post-Flood: Recovery and Adaptation
After the water recedes:
1) Economic recovery is carried out independently, for example repairing boats, reopening stalls, or working odd jobs.
2) Infrastructure improvements such as roads, wooden bridges, or prayer rooms are carried out through a mutual cooperation system, often with the support of self-help funds.
3) Collective reflection: the community conducts a joint evaluation, strengthens solidarity, and emphasizes the importance of maintaining environmental cleanliness to prevent further flooding.

Synthesis Analysis
The flow of tidal flood events in Pontianak shows a pattern of resilience based on social capital:
1. Trust in local figures triggers rapid coordination.
2. Social networks (RT/RW, fishermen's groups, social gatherings) speed up aid distribution.
3. The norm of mutual cooperation strengthens adaptive and recovery capacity.

This is in line with the theory of community resilience, which emphasizes the importance of coping capacity, collective efficacy, and reciprocity as a support in facing recurring disasters.

DISCUSSION
The results of this study indicate that social capital has a very significant influence on community resilience in the coastal area of Pontianak. Quantitatively, the linear regression test produced a t-value of 106.369 and an F-value of 11,314.454 with a significance level of 0.000 and an R^2 value of 0.974. This means that 97.4% of the variation in community resilience can be explained by social capital. These findings confirm that trust, social networks, and norms of mutual cooperation are the main determinants in building resilience against tidal flooding.

Qualitative results revealed that communities do not rely solely on external aid but prioritize local solidarity-based mechanisms. When flooding strikes, residents immediately engage in community service, evacuate belongings, and distribute resources (clean water and food) equitably. Community and religious leaders play a crucial role in maintaining trust, reassuring residents, and acting as a bridge of communication with the government and NGOs. This aligns with the quantitative dimensions of "trust" and "network," which show a high correlation with community resilience indicators.

Furthermore, qualitative data revealed that community resilience is not only measured by technical adaptations (e.g., stilt houses or simple embankments), but also by social resilience, including the speed of economic recovery, group coordination, and post-flood social support. This narrative reinforces the quantitative findings on the dimensions of adaptive capacity, collective capacity, and post-flood recovery, which have a strong correlation with social capital.

Thus, quantitative findings confirm the significant contribution of social capital to community resilience, while qualitative findings enhance understanding of how these mechanisms operate in everyday practice. Both approaches yield meta-inferences that:
1. Social capital is the main foundation of community resilience, not just a supplement.

2. Trust, social networks, and norms of mutual cooperation have been shown to play a role in pre-flood, during-flood, and post-flood stages.
3. Community resilience is dynamic: the stronger the internal solidarity, the faster the community recovers from the impact of a disaster.
4. Reliance on external networks (government/NGOs) remains important, but their effectiveness is heavily influenced by the strength of internal social networks.

CONCLUSION

Research on Social Capital and Community Resilience to Tidal Flooding in Pontianak City yielded several important points:

1. Quantitative test results indicate that social capital explains 97.4% of the variation in community resilience. The dimensions of trust, social networks, and norms of mutual cooperation are key pillars that strengthen community resilience in the face of tidal flooding.

2. Qualitative findings show that communities do not only rely on external assistance, but also mobilize internal solidarity, such as building stilt houses, activating mutual cooperation, and organizing fishermen's groups or RT/RW as a basis for coordination.

3. Residents with strong social ties recover more quickly socio-economically, are able to coordinate with external parties (government/NGOs), and maintain the continuity of daily life after the flood recedes.

4. Statistical evidence confirming the influence of social capital is reinforced by empirical narratives depicting real-world solidarity practices. This confirms that social capital is not merely a theoretical concept, but a concrete mechanism supporting the resilience of Pontianak's coastal communities.

Thus, this study confirms that social capital is a crucial foundation for building community resilience in the face of tidal flooding. Disaster management strategies in coastal areas of West Kalimantan should prioritize strengthening community social capital, alongside structural government interventions..

REFERENCE

Adi, AC (2023). Forecasting Flood Vulnerability in Pontianak using Multiple Linear Regression and Geospatial Information Systems (GIS). Innovation in Research of Informatics (Innovatics), 5(1). https://doi.org/10.37058/innovatics.v5i1.6567

Alidrus, S., & Wiyono, A. (2024). Resilience and Vulnerability of Coastal Communities: A Case Study of Tambak Lorok, Semarang-Indonesia in Facing Flood Risks. Journal of Syntax Admiration, 5(9), 3349–3357. https://doi.org/10.46799/jsa.v5i9.1568

Amin, M. (2024). Comparative study of physical, economic, social, and environmental vulnerability mitigation due to tidal flooding in Demak. 1(1). https://doi.org/10.61511/ersud.v1i1.2024.640

Domínguez Vázquez, L., Eshun, E. S., & Houston, J. B. (2024). Community Disaster Resilience and Communication (pp. 146–161). Information. https://doi.org/10.4324/9781003363330-13

Gill, D. A., & Ritchie, L. A. (2007). Enough is enough: social capital in post-Katrina New Orleans - a study of neighborhoods affected by the 2007 tornadoes.

Haggard, R., Cafer, A., & Green, J. J. (2019). Community resilience: A meta-study of international development rhetoric in emerging economies. Community Development, 50(2), 160–180. https://doi.org/10.1080/15575330.2019.1574851

Ilhami, F., Sugianto, DN, & Rochaddi, B. (2014). Mapping the Level of Susceptibility to Tidal Flooding for the Evaluation of Spatial Planning of Coastal Settlement Areas in Pekalongan Regency, Central Java. Journal of Marine Research, 3(4), 508–515. https://doi.org/10.14710/JMR.V3I4.11409

Jones, E.C., Nance, E., & McCurdy, S. (2024). Social capital and social networks in flood recovery (pp. 259–274). Edward Elgar Publishing. https://doi.org/10.4337/9781839102981.00027

Kamal, N. (2024). Analysis of Adaptation and Adaptation Costs of Sriwulan Village Communities to Tidal Flooding. Scientific Journal of Village Development and Agriculture, 9(4), 415–423. https://doi.org/10.37149/jimdp.v9i4.1223

Maulita, R., Parahita, BN, & Trinugraha, YH (2023). Tidal Flood Disaster Mitigation in Mangkang Wetan: Community Social Action and Structural Capabilities. Indonesian Journal of Sociology of Religion, 4(2), 178–200. https://doi.org/10.22373/jsai.v4i2.2782

Mutiani, M., Rusmaniah, R., Triyono, S., Jumriani, J., & Febrian, MI (2024). Impact of Floods on the Socio-Economic Conditions of Communities in Sungai Tabuk. The Kalimantan Social Studies Journal, 6(1), 61. https://doi.org/10.20527/kss.v6i1.13294

Nugraha, AT, Zahara, S., Suhartini, W., Zahid, U., & Hlahla, J. (2024). The Role of Social Capital on Community Resilience in Rural Areas: A Case Study in Ponggok Village, Indonesia. https://doi.org/10.21776/rrs.v2i1.27

Sadeka, S., Mohamad, MS, Reza, MIH, Manap, J., & Sarkar, K. (2015). Social capital and disaster preparedness: conceptual framework and linkage.

Sitorus, SHA (2019). Forecasting flood-prone areas using website-based Tsukamoto fuzzy logic (case study of Pontianak City). Coding: Journal of Computers and Applications, 7(02). https://doi.org/10.26418/coding.v7i02.33828

Sitorus, SHA (2019). Forecasting flood-prone areas using website-based Tsukamoto fuzzy logic (case study of Pontianak City). Coding: Journal of Computers and Applications, 7(02). https://doi.org/10.26418/coding.v7i02.33828

Spencer, D. (2012). 'Social Capital' in Central, Eastern and South East Europe: Methodological, Theoretical and Epistemological Debates (pp. 325–355). Palgrave Macmillan, London. https://doi.org/10.1057/9780230314146_14

Völker, B. (2021). Disaster recovery via social capital. 1–2. https://doi.org/10.1038/S41893-021-00820-5