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The effects of the community-driven development concept on the success implementation of flood management construction in the Ciujung Basin

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ABSTRACT

The flood-prone area in Serang Regency ranges from 22,617.49 hectares (ha). The trigger factor for flooding in Serang Regency is the high rainfall, ranging from 200 mm to 400 mm in the rainy season. The local government of Serang Regency handles floods using non-structural methods. The method applied is flood management with CDD, a community-based development concept with a process of resource development and decision-making directly by community groups. The Serang district government has succeeded in minimizing flooding with CDD in the Ciujung watershed area; it needs to be improved regarding human resources, community participation, socio-culture, quality-quantity, and budget. Analysis of the effect of applying the CDD concept on the success rate of flood control construction using qualitative descriptive research methods by surveying 52 respondents. This study aims to determine the dominant factor in implementing flood control construction with the concept of CDD. The success rate of implementing the CDD concept in flood control construction is influenced by socio-cultural aspects, with a dominance rate of 28,476%. The benefits of this research are to increase the application of non-structural methods with the concept of CDD and become a reference by stakeholders in implementing community-based development; for that, it is necessary to reorganize the planning, implementation, and maintenance stages based on local wisdom and community aspirations.

ABSTRAK

Wilayah rawan banjir di Kabupaten Serang berkisar 22.617,49 hectar (ha), faktor pemicu banjir di kabupaten serang yaitu tingginya curah hujan berkisar 200 mm – 400 mm pada musim penghujan. Pemerintah daerah Kabupaten Serang melakukan penanganan banjir dengan metode non-struktural. Metode yang diterapkan yaitu penanganan banjir dengan konsep CDD, merupakan konsep pembangunan berbasis masyarakat dengan proses pengembangan sumber daya dan pengambilan keputusan secara langsung oleh kelompok masyarakat. Pemerintah kabupaten serang sukses meminimalisir banjir dengan konsep CDD di daerah DAS Ciujung, hal tersebut perlu ditingkatkan dari aspek sumber daya manusia, partisipasi masyrakat, sosial budaya, kualitas-kuantitas dan anggaran. Analisis pengaruh penerapan konsep CDD terhadap tingkat keberhasilan pelaksanaan konstruksi pengendali banjir menggunakan metode penelitian mengunakan deskriftif kualitatif, dengan melakukan survey kepada 52 responden. Tujuan penelitian ini untuk mengetahui pengeruh faktor dominan pada pelaksanaan konstruksi pengendali banjir dengan konsep CDD. Tingkat keberhasilan penerapan konsep CDD terhadap pelaksanaan konstruksi pengendali banjir dipengaruhi oleh aspek sosial budaya dengan tingkat dominasi sebesar 28.476%. Manfaat dari penelitian ini yaitu meningkatkan penerapan metode non-struktural dengan konsep CDD serta menjadi referensi oleh stakeholder dalam pelaksanaan pembangunan berbasis masyarakat, untuk itu perlu menata kembali tahap perencanaan, pelaksanaan dan pemeliharaan berbasis kearifan lokal serta aspirasi masyarakat.

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1. Introduction

One issue with regional growth is flooding; there are two types: natural and social. Natural catastrophes are common in Indonesian territory; these include hydrometeorological disasters or disasters caused by weather phenomena such as floods, landslides, tornadoes, and droughts [1]. Flood disasters in the Serang Regency area are caused by factors driving floods, including land use change, river sedimentation, narrowing of river boundaries, poor drainage systems, and community behavior that does not care about the environment. Then, flood trigger factors, namely high rainfall.

Flood control is necessary to lessen the impact of damage and losses brought on by floods. This can be accomplished quickly using flood control buildings for short-term management [2]. The Cross Province River Area designated the C3 River Basin as a River Area under Presidential Decree Number 12 of 2012 concerning the Determination of River Basins. Since the C3 River is under the central government's jurisdiction, managing the C3 watershed is a joint effort between the two. By encouraging more community and business sector involvement in flood and landslide management initiatives, the Regional Government of Serang Regency employs a social approach to flood management, drawing on Presidential Instruction No. 4 of 2012 concerning Flood and Landslide Management.

The technological process of community participation gives the community more power and opportunity to work together to solve various problems in general, particularly when it comes to flood control in both physical and non-physical flood control development. This division of authority is based on community participation in these activities. Community participation aims to find better solutions to problems by opening more opportunities for the community to contribute to the pre-construction, construction, and post-construction phases of physical flood control development. The community's stakeholders' social security supports the more effective, efficient, and long-lasting implementation of safe running activities [3].

With increased chances for community involvement in pre-construction, construction, and post-construction flood control initiatives, community participation seeks to find solutions to issues. Community-based development is anticipated to promote pro-social conduct [4]. Participatory approaches to CDD allow the community to grow in ways that best suit their skills, particularly by using their sociocultural capital. Sustainable development requires public planning to consider culture [5].

Community involvement in flood control in Serang Regency is regarded as successful in minimizing flooding. The Regional Government of Serang Regency develops a flood management program by putting the concept of CDD into practice. For flood control projects utilizing the CDD idea to be successful, there needs to be more community development and engagement.

There are challenges in implementing the CDD program in Serang Regency, particularly concerning the degree of community participation because of socio-cultural influences. Low levels of education influence the study area's social conditions, and most jobs are manual labor, entrepreneurship, and factory work. These conditions tend to form individualist lives, so most people would rather work than participate in flood control programs. The concept and infrastructure development of flood control programs are also influenced by the socio-cultural dynamics of communities in emerging countries, including the role of leadership in community settings.

Numerous earlier studies have looked at CDD and found that its initiatives increase people's desire to contribute to community public goods, local associations become more significant, and formerly marginalized groups are included in rural areas [4]. Enhancing socio-economic welfare and implementing sustainable projects are tied to community involvement, and these endeavors are anticipated to have full support from the user community, particularly the community [6]. It is advised that relevant authorities identify and map localities at risk of flooding, incorporating community people, as local perspectives and knowledge about those communities can be incorporated into vulnerability analysis. Local communities are more suited to offer expertise and direction in these kinds of endeavors, and their involvement will confirm any results and guarantee vigorous participation [7].

In addition to helping the community understand its role and responsibility in achieving common welfare, community engagement can improve the efficacy and efficiency of government-launched social programs. The public's need for more awareness of the value of community engagement, divergent opinions and interests, a lack of funding and official backing, and other factors pose challenges to its implementation [8]. Globally, cities are experiencing disastrous effects from many flood disasters. The absence of community leaders in flood-prone areas from participating in developing flood risk management plans may cause this issue. Conflict, a lack of technical knowledge, and institutional difficulties can keep players out of flood control. [9]. One of the leading worldwide issues of our day is flooding. The importance of local knowledge in providing practical risk-reduction tactics to prevent flood disasters—which were long disregarded—is now being widely acknowledged. The need for empirical research to determine if indigenous knowledge reduces flood danger is becoming more and more pressing [10]. Community development aims to provide the community with the tools it needs to run programs on its own. Opportunities are also given for the district to train itself to address issues as they arise [11]. There are several intricate issues in managing flood risk in high-density floodplain areas. Despite being informed of the possibility of flooding, almost every community in the area hesitates to relocate [12].

CDD can offer concepts, conceptual frameworks, tools, and models to justify a program that aligns with present institutional rules and concerns. Even though the project's official narrative conceals the apparent contradictions and disconnects in CDD practices, the policy's true impact is in its capacity to provide a focus for the mobilization of resources and political support, as well as for the solidification of development practices that cater to a wide range of interests [13]. Local leaders have crucial responsibilities in managing flood disasters, and their duties are closely tied to one another: the part played by local leaders in facilitating communication between the public and private sectors about disaster management support [14]. The absence of empirically verified measures is a significant gap in understanding community flood resilience. This analysis aims to shed light on the causes of community flood resilience to develop evidence-based strategies for increasing flood resilience capability [15].

1.1. Community Driven Development

CDD is a method of putting development into practice by encouraging more community initiatives to take on active roles as managers or actors [11]. Community-driven product has the concept of social relations and planned development. Community-driven development has four leading principles.

- Involving community groups in every decision-making process
- Comprehensive strategy alignment for government and society
- Open public access to professional and technical facilities and other incentives to increase community participation
- Changing people's behavior is more professional to be more sensitive to community and independence.

By the principle of participatory development, development is carried out by the government and the community, so it is carried out based on a balance between the government and the community. In Community Driven Development, apply the following principles:

- Participatory.

- Utilized by public
- Accountability.
- Sustainable.

Community development from the bottom-up, which places the community as a decision-maker, is a concept carried out on the community's initiative and aspirations, from planning and implementation to development management. The principle of CDD is a development that places communities, individually and in groups, as determinants and principal actors, where all decision-making and plans are based on group agreements. At the same time, the government and private sector are expected to support community processes. They must commit to absorbing and providing opportunities for the community to express their aspirations.

1.2. Participation in Community-Driven Development

Community-driven Driven Development is an approach to implementing development by increasing community initiatives to manage Champ actively [11]. The stages of construction projects are grouped based on the identification stage, design stage, Implementation stage, and Monitoring evaluation stage-community participation in the following steps of the project.

Table 1. Participation in CDD

Implementation CDD	Participation in CDD
Identification	Communities identify the problems and impacts of flooding. 1) Problem identification 2) Identify resources (land, labour and materials) 3) Identification of construction and budgeting
Design	Planning prepared by communities facilitated by Facilitators. 1) Develop a Community Work Plan 2) Shop Drawing 3) Backup Volume 4) Construction Cost Estimate
Implementation	Construction work implemented by the community 1) Socialisation 2) Reimbursement of Budget from stakeholders to Community group accounts. 3) Implementation of community participation-based construction (labour and materials)
Monitoring and Evaluation	Supervision by Stakeholders, facilitators, community groups 1) Volume 2) Quality 3) Time of Implementation 4) Cost 5) Implementation Administration

1.3. Flood Management

Hydrological engineering, hydraulics, morphology, watershed erosion, river engineering, river sedimentation, water, and municipal drainage systems buildings are all involved in flood control engineering. Systems for controlling flooding must be carefully and effectively planned and executed. There are two types of technical flood control: structural methods and non-technical flood control.

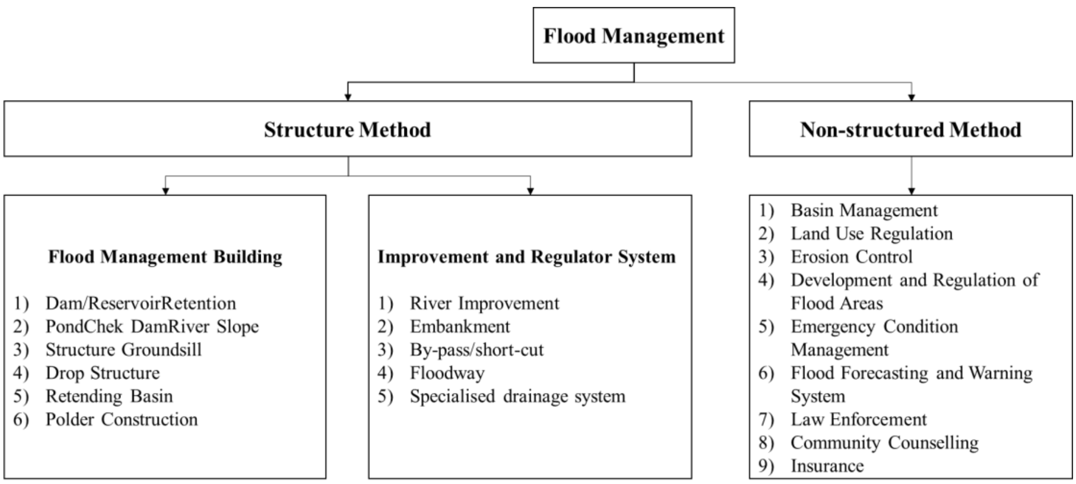

Figure 1. Method Flood Management

Principle flood control methods with structural and non-structural methods:

- Reduce flood discharge upstream so as not to disturb allotment areas along the river.
- Deliver flood discharge to the sea as quickly as possible with sufficient capacity downstream.
- Increase or enlarge the dimensions of the river channel.
- Minimize the roughness of the river channel.

- Straightening or shortening of river channels in turning or winding rivers. This alignment must be meticulous, and the geomorphology of the river must at least be considered.
- Control of sediment transport

Flood control activities according to the location area can be grouped into upstream and downstream.

2. Research Method

Using questionnaires, interviews, and literature reviews, this study design employs qualitative descriptive methodologies. Based on study themes, literature reviews, or prior journals, the steps of this research design are problem identification stages. Additionally, look for and identify study gaps, collect data using state-of-the-art questionnaires, get expert validation, and perform statistical analysis.

The study's independent variables (x) and dependent variables (y) are the successful application of CDD in flood control construction:

- Human Resources Factor (x1)
- Community Participation Factor (x2)
- Social Cultural Factors (x3)
- Quality and Quantity Factors (x4)
- Budget Factors (x5)

This research will use secondary data from the findings of literature reviews in addition to primary data and interviews collected from respondent surveys. This study's questionnaire was split into stage 1 (Expert Validation) and stage 2 (respondents). For the results of the literature study to be validated by experts, the first stage questionnaire assesses the significance of the factors—step 2 questionnaire for more detailed and targeted problem analysis. There were 52 samples in the study's sample distribution.

Table 2. Sample Distribution

No	Population	Quantity
1	Regional Development Planning Agency of Serang Regency	2
2	Serang Regency Disaster Management Agency	1
3	Serang Regency Public Works Department	14
4	Facilitator	10
5	Community Disaster Preparedness Group	19
6	Consultant Ministry of Home Affairs	2
7	Consultant Regional Banten	4
	Total	**52**

3. Data and Analysis

To gather accurate and trustworthy data, respondent information is categorized according to the respondent's agency, job history, most recent educational institution attended, position, age, and gender. The description explains the questionnaire's findings. Statistical analysis was carried out with JASP.

3.1. Reliability Test

A reliability test ascertains the degree of accuracy, stability, or consistency. It is said that the variable is trustworthy. Generally, one can classify anything as good if it falls between 0.60 and 0.80 and extremely good if it falls between 0.80 and 1.00. data analysis with JAPS software. Each variable instrument's Cronbach's value α is shown in the table. The data from the JAPS program's processing is what is indicated in the table. Stages of Reliability Test with JASP software, *Reliability → Unidimensional Reliability → Items Variable → Analysis → Confidence Interval → Cornbach's alpha.* The independent variables x1, x2, x3, x4, and x5 are deemed reliable because the reliability test reveals that all their values are more significant than 0.60.

Table 3. Reliability Statistics

Item	Cronbach's α
x1	0.690
x2	0.690
x3	0.739
x4	0.664
x5	0.691

3.2. Validity Test

The validity test assesses the instrument's validity in revealing data from the carefully examined variables. Decisions are made using the validity test as the foundation by contrasting recalculate and r.

- If Pearson's r > r = valid.
- If Pearson's r < r = invalid

Stages of Validity Test with JASP software, Regression → Classic → Correlation → Var x1.1, x1.n to variable Y → Pearson's R → Validity test.

Table 4. Validity Statistic

Item	p-value	Pearson's r
x1	$3.019x10^{-19}$	0.896
x2	$9.342x10^{-19}$	0.891
x3	$4.386x10^{-20}$	0.904
x4	$7.169x10^{-6}$	0.578
x5	0.016	0.333

P-value for x1, x2, x3, x4, and x 5 is less than 0.05. Therefore, it is said that independent and dependent factors are simultaneously influencing one another. It is deemed legitimate because Pearson's independent variable r has a higher correlation value than r.

3.3. Shapiro – Wilk Test

The Shapiro-Wilk test is a reliable and acceptable normalcy test technique for small samples. To determine if random variables are normally distributed or not, utilize Shapiro-Wilks. Regression analysis frequently uses this test to investigate the unexpected error normality assumption. It is determined that all variables evaluated are normally distributed based on the findings of the JASP analysis, which revealed that the independent variable has a Shapiro-Wilk value of > 0.05.

Table 5. Uji Shapiro – Wilk Test

	x1	x2	x3	x4	x5	Variable
Valid	52	52	52	52	52	52
Missing	0	0	0	0	0	0
Mean	19.981	20.115	19.788	15.788	16.058	117.904
Std. Deviation	1.935	1.745	1.984	1.649	1.873	7.588
Skewness	-0.039	0.162	0.101	0.325	0.081	0.475
Std. Error of Skewness	0.330	0.330	0.330	0.330	0.330	0.330
Kurtosis	-0.358	-0.007	-0.447	-0.225	-0.276	0.181
Std. Error of Kurtosis	0.650	0.650	0.650	0.650	0.650	0.650
Shapiro-Wilk	0.969	0.966	0.964	0.957	0.958	0.974
P-value of Shapiro-Wilk	0.199	0.143	0.121	0.056	0.062	0.313
Minimum	16.000	16.000	16.000	13.000	12.000	103.000
Maximum	24.000	24.000	24.000	20.000	20.000	137.000

3.4. Linear Regression

The degree of influence that exists between the independent and dependent variables is measured using multiple regression analysis. A regression model with multiple independent variables is called a linear regression.

Table 6. Model Summary

										Durbin-Watson		
Model	R	R^2	Adjusted R^2	RMSE	R^2 Change	F Change	df1	df2	p	Autocorrelation	Statistic	p
H_0	0.000	0.000	0.000	7.588	0.000		0	51		0.032	1.879	0.662
H_1	0.984	0.967	0.964	1.444	0.967	272.608	5	46	5.635×10-33	0.113	1.700	0.244

According to the table above, the independent variable influences the dependent variable concurrently when the coefficient of determination (R2) = 0.967 is reached. The influence of additional variables not examined in this study is 3.30% for the truth level to get 96.70%.

Table 7. T Test

							Collinearity Statistics	
Model		Unstandardized	Standard Error	Standardized	t	p	Tolerance	VIF
H_0	(Intercept)	117.904	1.052		112.047	1.061×10^{-62}		
H_1	(Intercept)	18.717	2.972		6.298	1.035×10^{-7}		
	x1	1.045	0.271	0.266	3.860	3.525×10^{-4}	0.149	6.715
	x2	1.210	0.222	0.278	5.447	1.936×10^{-6}	0.272	3.680
	x3	1.204	0.305	0.315	3.944	2.713×10^{-4}	0.111	8.979
	x4	0.934	0.144	0.203	6.505	5.042×10^{-8}	0.729	1.372
	x5	0.958	0.118	0.236	8.085	2.216×10^{-10}	0.830	1.204

Positive and significant effects are seen in the independent variables x1 (Human Resources), x2 (Community Participation), x3 (Social Cultural), x4 (Quality and Quantity), and x5 (Budget Factors). According to the fact that f is greater than F_{test}, there is a relationship between the independent and dependent variables.

Table 8. F test

Model	Description	Sum of Squares	Df	Mean Square	F	P
H_1	Regression	2840.653	5	568.131	272.608	5.635×10^{-33}
	Residual	95.867	46	2.084		
	Total	**2936.519**	**51**			

3.5. Histogram Normal Distribution

The histogram graph illustrates a distribution pattern that does not stray to the right or left but is centered like a bell shape, indicating that the data is normally distributed. This is one technique to test for normalcy.

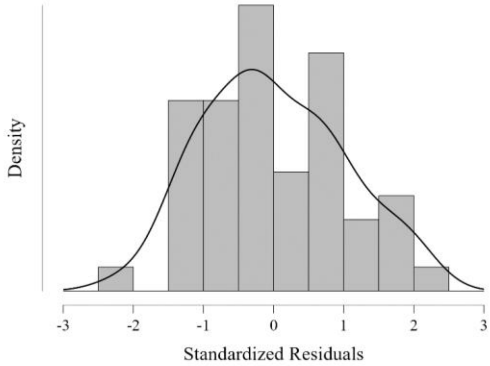

Figure 2. Standardized Residual Histogram

Standard Q-Q Inferred normal distributed residual values can be found by examining the plot graph's data spread or points on the diagonal axis that follow the diagonal line. The residual values' normality assumption is met on the linear regression line. This suggests that the normalcy condition is satisfied and the data are normally distributed. Using the CDD approach, it can be determined that social and cultural elements account for 28.476% of the factors influencing the success rate of flood control construction.

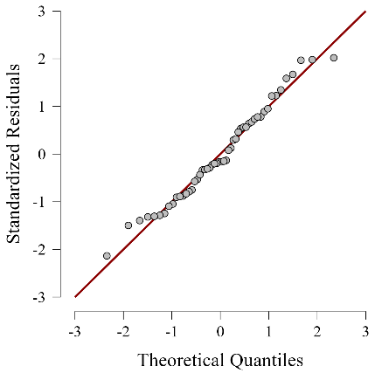

Figure 3. Q-Q Plot Standardized Residuals

Table 9. Dominance

No	Variable	Beta Standardized	Zero-order	Beta * Zero-order	Dominant *(%)*
1	Human Resources Factor (x1)	0.266	0.896	0.238	23.834
2	Community Participation Factor (x2)	0.278	0.891	0.248	24.770
3	Social Cultural Factors (x3)	0.315	0.904	0.285	28.476
4	Quality and Quantity Factors (x4)	0.203	0.578	0.117	11.733
5	Budget Factors (x5)	0.236	0.333	0.079	7.859
			Σ =	0.967	96.67

Σ (Beta Zero-Order) = R^2

4. Conclusion

The dominance of Social Cultural Factors (x3) 28.476%, Community Participation Factor (x2) 24.770%, Human Resources Factor (x1) 23.834%, Quality and Quantity Factors (x4) 11.733% and Budget Factors (x5) 7.859% simultaneously affect the success of flood control construction implementation, thus the better the Social Cultural Factors, the application of the Community Driven Development concept to the success rate of flood control construction implementation in the Ciujung watershed Serang Regency is getting higher and higher. The dominating variable's impact on success is achieved through:

- To prepare for the implementation of construction, approach and include district-level executive conferences and community leaders.
- Encouraging low-income groups in the area to find work should be one of the top focuses.
- Implementing construction that respects local wisdom is crucial for sustainable development and preserving cultural heritage.
- A Memorandum of Understanding (MoU) between the Local Government and Community Groups is essential for maintenance purposes. Neighborhood organizations handle smaller-scale upkeep, whereas larger-scale construction is the responsibility of the regional government. Sign a Memorandum of Understanding (MoU) with community groups while the local government is doing upkeep. Community groups handle small-scale construction upkeep, whereas the Regional Government handles larger-scale construction maintenance.

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