Assessment and Analysis of the Advancement in the Level of San Juan River for Disaster Preparedness

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Abstract: This study was conducted by the researchers to provide an assessment and analysis of the advancement in the level of San Juan River for disaster preparedness. The San Juan River's changing water levels are key to getting ready for disasters. This river has a long story and is crucial for the life around it. But its changing levels are a challenge for keeping people safe from disasters. Descriptive research design was used to analyze and characterize the historical patterns of water level changes in the San Juan River, and identify the key factors contributing to these fluctuations, thereby providing a comprehensive understanding of the river's dynamics for disaster preparedness planning and mitigation strategies. The respondents of this study may include local residents, community leaders, and non-governmental organizations (NGO's) working in the area of San Juan River. Based on the nature of the research, a 5-point Likert scale with an option of Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D) and Strongly Disagree (SD) might be suitable for assessing the factors contributing to the advancement in the San Juan River's level and analyzing their impacts on disaster preparedness. Overall, this study concludes that assessing and analyzing the factors influencing the advancement in the San Juan River's level, sheds light on the complexities of disaster preparedness in riverine environments. The proposed proactive measures and recommendations aim to empower communities to better anticipate and mitigate the risks associated with fluctuating river levels, ultimately enhancing resilience and safeguarding livelihoods along the San Juan River.

Key Words: disaster preparedness; water level changes; non-governmental organizations; mitigation strategies; San Juan River

1. INTRODUCTION

The San Juan River's changing water levels are key to getting ready for disasters. This river has a long story and is crucial for the life around it. But its changing levels are a challenge for keeping people safe from disasters. The San Juan River stands as a lifeline for communities, but its changing water levels pose significant challenges for disaster preparedness. Understanding the dynamics of its level advancement is paramount for effective mitigation strategies and

resilience building. The San Juan River, located in Batangas, is a vital waterway supporting various ecosystems and communities along its course. Over time, the river's water levels have been subject to fluctuations influenced by numerous factors such as climate change, urbanization, and land use practices. These changes have posed significant challenges for disaster preparedness efforts in the region, as communities must contend with the risk of floods and other hydrological events. Therefore, this study seeks to address this gap by conducting a detailed assessment and analysis of the advancement in the San Juan River's level for disaster preparedness. By examining the historical patterns of water level changes, documenting the frequency and magnitude of hydrological events, and identifying key factors driving these fluctuations, this research aims to provide valuable insights for enhancing disaster preparedness strategies along the San Juan River. Through a thorough investigation of these factors, the study endeavors to contribute to the development of effective mitigation measures and resilience-building efforts tailored to the needs of communities residing in the vicinity of the San Juan River. Ultimately, by deepening our understanding of the river's dynamics and its implications for disaster preparedness, this research aims to empower communities to better anticipate, mitigate, and adapt to the challenges posed by fluctuating water levels, thereby enhancing overall resilience and livelihood preservation in the region. Despite its crucial role in sustaining livelihoods and ecosystems, the dynamic nature of the river poses risks of floods and other hydrological events, jeopardizing the safety and resilience of local residents. However, there is a lack of comprehensive understanding regarding the factors driving the advancement in the river's level and their implications for disaster readiness strategies. Therefore, the primary problem addressed by this study is to assess and analyze the advancement in the level of the San Juan River for disaster preparedness, aiming to identify key drivers of water level changes and develop effective mitigation measures tailored to the needs of the affected communities.

2. METHODOLOGY

This section outlines the methodology employed in the study, covering research design, participant selection, and research instrument. A descriptive method was utilized to gather insights, employing Google Forms survey questionnaires to understand disaster preparedness planning related to the San Juan River's level advancement. The study involved 100 individuals from communities along the San Juan River, including local residents, community leaders, and NGOs, to provide diverse perspectives. A self-designed survey questionnaire, utilizing a 5-point Likert scale, was administered via purposive sampling to assess perceptions on disaster preparedness strategies.

This methodology aims to ensure a comprehensive understanding of disaster preparedness planning and mitigation strategies in response to the San Juan River's dynamics.

A visual representation of the research process was depicted in a block diagram to provide a clear overview of the study's workflow.

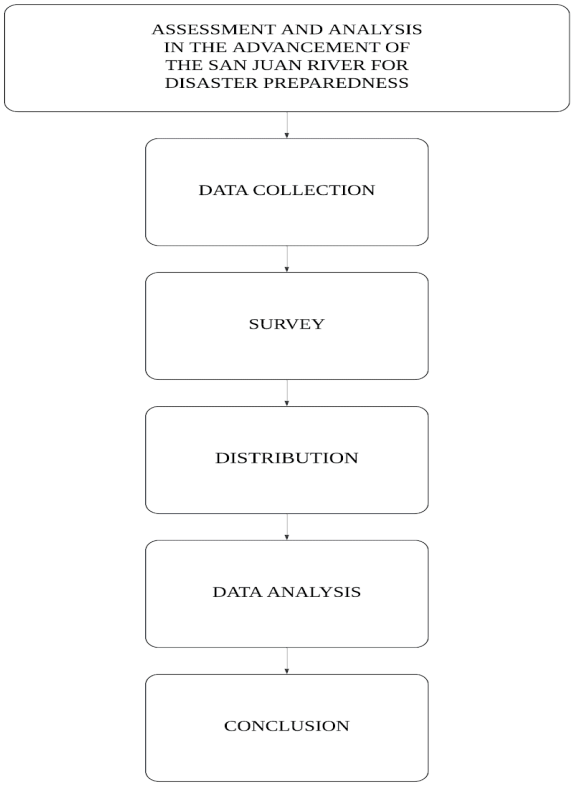


Fig. 1. Block Diagram

A flowchart was created to illustrate the sequential steps involved in conducting the research, ensuring transparency and clarity in the methodology

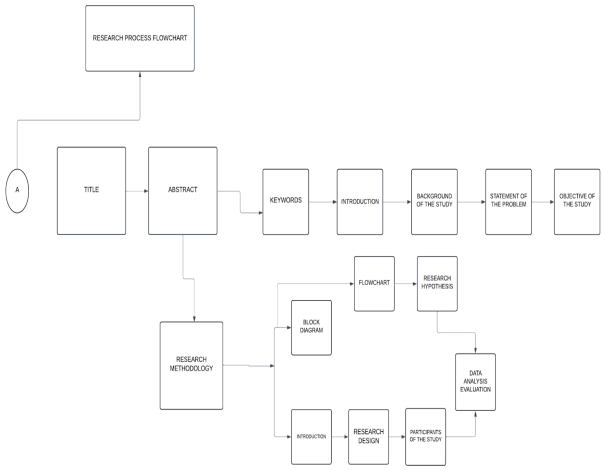


Fig. 2. Flowchart

3. RESULTS AND DISCUSSION

Through the meticulous presentation of tables and graphs, this chapter aims to illuminate the empirical foundation of the study. These visual aids serve as a lens through which the data is examined, allowing for a detailed exploration of patterns, trends, and correlations. The accompanying descriptions provide context and interpretation, enriching the narrative and offering a nuanced understanding of the experimental outcomes. This chapter is integral to the research's credibility, offering a transparent and insightful examination of the acquired data.

Table 1: Demographic Profile According to Age and Gender

This section presents the demographic distribution of participants based on age and gender. The age groups are categorized to understand the distribution across different segments of the population. Gender distribution provides insights into the representation of male and female participants in the study.

	Age	Frequency	Percentage
1	66 and above years old	0	0.000%
2	41 - 65 years old	43	43.000%
3	21 - 40 years old	51	51.000%
4	20 below	6	6.000%
	Grand Total	**100**	

Fig. 3. Table

	Gender	Frequency	Percentage
1	F	79	79.000%
2	M	21	21.000%
	Grand Total	**100**	

Fig.4. Gender

Table 2: The distribution of respondents across different barangays.

This table illustrates the distribution of respondents across different barangays. It provides insight into the geographic representation of participants within the study area.

	Barangay	Frequency	Percentage
1	Santiago	17	17.000%
2	San Fernando	28	28.000%
3	Bagong Pook	43	43.000%
4	San Pioquinto	12	12.000%
	Grand Total	**100**	

Fig. 5. Barangay

	Respondent	Frequency	Percentage
1	Local Resident	71	71.000%
2	NGO	17	17.000%
3	Community Leader	12	12.000%
	Grand Total	**100**	

Fig. 6. Respondent

Table 3: Frequency and Percentage Distribution with Weighted Mean

This table displays the frequency and percentage distribution of responses along with the calculated weighted mean, standard deviation, interpretation and ranking for each category. The weighted mean provides a measure of central tendency that accounts for the frequency of responses, offering a comprehensive understanding of the data distribution.

Frequency Distribution

	SA	A	N	D	SD
1. The infrastructure development along the San Juan River effectively deals with potential risks associated with changing water levels for disaster preparedness.	20	43	24	11	2
2. Climate change adaptation measures implemented along the San Juan River contribute significantly to enhancing disaster preparedness efforts.	9	47	35	6	3
3. The involvement of non-governmental organizations (NGOs) positively impacts disaster preparedness actions along the San Juan River.	17	36	40	7	0
4. Community readiness and awareness about the risks associated with changing water levels in the San Juan River are sufficient for effective disaster preparedness.	12	40	34	13	1
5. The availability of early warning systems helps communities along the San Juan River to prepare effectively for potential disasters.	17	34	39	8	2
6. Local government efforts to mitigate risks associated with changing water levels in the San Juan River are effective.	10	44	35	10	1
7. The level of community engagement and participation in disaster preparedness activities along the San Juan River is high.	12	43	36	7	2
8. Infrastructure maintenance along the San Juan River is a priority for disaster preparedness planning.	10	40	38	11	1
9. The implementation of mitigation strategies effectively reduces the impact of fluctuating water levels on disaster preparedness efforts along the San Juan River.	14	40	38	8	0
10. Overall, the advancement in the level of the San Juan River significantly contributes to improved disaster preparedness in communities along its course.	18	48	23	6	5

Fig. 7. Frequency Distribution

Percentage Distribution

	SA	A	N	D	SD
1. The infrastructure development along the San Juan River effectively deals with potential risks associated with changing water levels for disaster preparedness.	20%	43%	24%	11%	2%
2. Climate change adaptation measures implemented along the San Juan River contribute significantly to enhancing disaster preparedness efforts.	9%	47%	35%	6%	3%
3. The involvement of non-governmental organizations (NGOs) positively impacts disaster preparedness actions along the San Juan River.	17%	36%	40%	7%	0%
4. Community readiness and awareness about the risks associated with changing water levels in the San Juan River are sufficient for effective disaster preparedness.	12%	40%	34%	13%	1%
5. The availability of early warning systems helps communities along the San Juan River to prepare effectively for potential disasters.	17%	34%	39%	8%	2%
6. Local government efforts to mitigate risks associated with changing water levels in the San Juan River are effective.	10%	44%	35%	10%	1%
7. The level of community engagement and participation in disaster preparedness activities along the San Juan River is high.	12%	43%	36%	7%	2%
8. Infrastructure maintenance along the San Juan River is a priority for disaster preparedness planning.	10%	40%	38%	11%	1%
9. The implementation of mitigation strategies effectively reduces the impact of fluctuating water levels on disaster preparedness efforts along the San Juan River.	14%	40%	38%	8%	0%
10. Overall, the advancement in the level of the San Juan River significantly contributes to improved disaster preparedness in communities along its course.	18%	48%	23%	6%	5%

Fig. 8. Percentage Distribution

QUESTIONS	WM	SE Mean	Standard Deviation	Interpretation	Rank
1. The infrastructure development along the San Juan River effectively deals with potential risks associated with changing water levels for disaster preparedness.	3.68	0.329	3.289	Agree	1
2. Climate change adaptation measures implemented along the San Juan River contribute significantly to enhancing disaster preparedness efforts.	3.53	0.311	3.108	Agree	7
3. The involvement of non-governmental organizations (NGOs) positively impacts disaster preparedness actions along the San Juan River.	3.63	0.320	3.203	Agree	2
4. Community readiness and awareness about the risks associated with changing water levels in the San Juan River are sufficient for effective disaster preparedness.	3.49	0.308	3.082	Agree	7
5. The availability of early warning systems helps communities along the San Juan River to prepare effectively for potential disasters.	3.56	0.316	3.159	Agree	4
6. Local government efforts to mitigate risks associated with changing water levels in the San Juan River are effective.	3.52	0.310	3.095	Agree	5
7. The level of community engagement and participation in disaster preparedness activities along the San Juan River is high.	3.56	0.314	3.140	Agree	4
8. Infrastructure maintenance along the San Juan River is a priority for disaster preparedness planning.	3.47	0.305	3.050	Agree	4
9. The implementation of mitigation strategies effectively reduces the impact of fluctuating water levels on disaster preparedness efforts along the San Juan River.	3.6	0.317	3.169	Neutral	2
10. Overall, the advancement in the level of the San Juan River significantly contributes to improved disaster preparedness in communities along its course.	3.68	0.330	3.295	Agree	1

Fig. 9. Weighted Mean, Standard Deviation, Interpretation and Ranking

Formula in getting the Weighted Mean:

Formula:

$$\bar{X} = \frac{\Sigma FX}{N}$$

Where: $\bar{X}$ = Weighed Mean

Σ = Summation Symbol

F = Frequency

X = Weights of each item

N = Number of cases

Formula in getting the Standard Deviation:

$$\sigma = \sqrt{\frac{\Sigma(X-\mu)^2}{N}}$$

Table 4. T-Test and the Significant Test

T-Test for Disaster Preparedness of Local Families				
Demographic Profile	**t-value**	**p-value**	**Decision**	**Conclusion**
Age	12.45	1.01E-19	Reject Null Hypothesis	Significant
Gender	-17.53	1.34E-27	Reject Null Hypothesis	Significant
Barangay	5.09	1.40E-06	Reject Null Hypothesis	Significant
p-value < 0.05, Significant / Reject Ho				

T-Test for Disaster Preparedness of Community Leader				
Demographic Profile	**t-value**	**p-value**	**Decision**	**Conclusion**
Age	12.17	5.03E-08	Reject Null Hypothesis	Significant
Gender	-1.8	4.96E-02	Reject Null Hypothesis	Significant
Barangay	11.05	1.35E-07	Reject Null Hypothesis	Significant
p-value < 0.05, Significant / Reject Ho				

T-Test for Disaster Preparedness of NGO				
Demographic Profile	**t-value**	**p-value**	**Decision**	**Conclusion**
Age	13.71	1.45E-10	Reject Null Hypothesis	Significant
Gender	-1.94	3.51E-02	Reject Null Hypothesis	Significant
Barangay	14.71	5.11E-11	Reject Null Hypothesis	Significant
p-value < 0.05, Significant / Reject Ho				

Fig. 10. T-Test for Disaster Preparedness

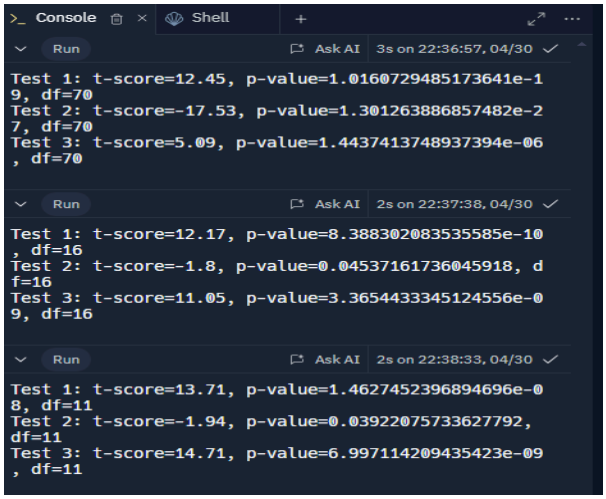


Fig. 11. Simulation for T-test

4. CONCLUSIONS

Based on the results, this study sheds light on the importance of understanding the dynamics of the San Juan River's changing water levels for effective disaster preparedness and mitigation strategies. Through a descriptive research design and the utilization of a survey instrument with purposive sampling, valuable insights were gathered from 100 participants residing in communities along the river. Based on descriptive analytical methods and statistical tests, it provided a comprehensive understanding of the relationship between the river's level advancement and disaster preparedness efforts. The findings of this study contribute to bridging the gap in knowledge regarding the factors driving the advancement in the San Juan River's level and their implications for disaster readiness strategies. The San Juan River's changing water levels and their impact on disaster preparedness in Batangas.

The San Juan River's changing water levels and their impact on disaster preparedness in Batangas. It employs a descriptive research design, surveying 100 residents and stakeholders along the river. The Likert-scale survey assesses perceptions of the river's dynamics and disaster preparedness efforts. Analysis includes hypothesis testing and statistical methods to draw conclusions about the relationship between the river's dynamics and preparedness. Recommendations include community engagement. enhancing early warning systems, and ongoing monitoring and research to improve disaster resilience along the San Juan River.

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6. REFERENCES

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