Evaluating the Impact of Flooded Spillway on Resort Tourism in Barangay Pararao, Balatan

Napoleon P. Mangente Jr

DRRM Central Bicol State University of Agriculture, Naga City, Camarines Sur, Philippines

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ABSTRACT

Resort tourism is an important economic generator, supporting local enterprises, cultural exchange, and nature conservation. Nevertheless, environmental disturbances, like flooding, present considerable challenges. This research explores the effect of a flooded spillway on resort tourism in Barangay Pararao, Balatan, measuring tourist behavior, economic effects, and possible adaptive measures. The study uses a mixed-methods research design, combining quantitative surveys with qualitative interviews and focus group discussions among resort operators, local government representatives, and community members.

Impacts of flooding were shown to have severe effects on accessibility, business operations, and economic losses through cancellations in bookings and supply chain disruptions. The research also identifies infrastructure failures, such as the breached Luluasan Spillway, as a significant contributing factor to these disruptions. While statistical evidence does not create a direct link between severity of the flood and economic impact, qualitative evidence show substantial operational and livelihood issues. Stakeholders report challenges of emergency response, increased safety issues, and prolonged confinement, increasing economic losses.

One of the key gaps is the absence of long-term flood-prone tourist areas' resilience planning. This research fills this gap by suggesting specific interventions, such as the upgrading of flood control systems, the development of alternative routes, real-time water monitoring, and enhancing disaster preparedness programs. Proactive urban planning and community participation are also critical to sustainable tourism despite climate risks.

In summary, even though flooding continues to be an ongoing threat to the tourism industry of Barangay Pararao, effective mitigation strategies can be used to build its resilience. The research highlights the importance of concerted actions from government institutions, business owners, and local residents in creating sustainable options that secure livelihoods and tourist development. Solution of these problems through infrastructure enhancements and policy change will be critical in securing the economic stability of the region from future climate-driven disruptions.

INTRODUCTION

Resort tourism does serve an important role in economic growth within many communities, offering support for local businesses, as well as cultural exchange, besides promoting environmental conservation. It is in this category of resort tourism that Barangay Pararao in Balatan gets to rely heavily on to spur local economic activity, only to be concerned in case the recent flooded spillway does affect the local tourism venture. The objective of this research is to gauge the effects of the flooded spillway on resort tourism in Barangay Pararao. It explores the behavior of tourists and the implications this change in the environment can bring about in the local economy. With a combination of qualitative and quantitative data, it identifies the impact it creates, possible challenges, and adaptive strategies that can ease adverse effects on the tourism sector. Doing so will offer useful insights for policymakers, business owners, and community stakeholders to ensure the sustainability of tourism in the area despite environmental challenges.

BACKGROUND OF THE STUDY

Barangay Pararao is popular for the resorts within the Municipality Balatan. Most of the resorts are accessible by the Barangay Luluasan Spillway. It must be noted however that in light of current environmental changes due to climatic changes, the area being traversed by the spillway is highly prone to flood. Often causing the

entire spillway to be entirely compromised due to flood conditions. While there are risks, research done in relation to the particular effects of a flooded spillway on resort tourism in Barangay Pararao has been minimal. The paper seeks to fill this gap as it assesses the way the flooding event influences tourist arrivals, business operations, and community welfare. These dynamics are crucial in formulating effective strategies that reduce negative effects resulting from future flooding events while ensuring the resilience of the tourism sector in the region.

Significance Of The Study

This research is significant as it focuses on the economic and infrastructural problems brought about by flooding in Barangay Pararao, especially its effect on local businesses and resorts. Through the analysis of the extent of spillway damage and its consequences, the study hopes to offer useful insights into how bad infrastructure impacts the local economy. The outputs will be the basis for the formulation of policy, local government units, and entrepreneurs to undertake flood mitigation efforts, sustainable infrastructural development, and economic resistance. In the end, the research aims to contribute to a long-term solution that will bring benefits to the business community and the general community.

Objectives:

The main objective of this research is to determine the extent and severity of flooding in Barangay Luluasan Spillway and, more specifically, its impact on local business and resorts within Barangay Pararao. With a proper understanding of the extent of the problem, the research seeks to give evidence-based findings and real-world recommendations that will help address future flooding.

1. Determine the severity of flooding within Barangay Luluasan Spillway.
2. Evaluate the direct and indirect impact of flooded spillway on local businesses, specifically resorts in Barangay Pararao.
3. Develop recommendations that can be utilized to reduce flooding and further support the affected businesses.

Scope And Delimitation

This research will be about the effect of infrastructure failure, such as the spillway, on resort tourism in Barangay Pararao, Balatan. The paper will explore how spillway damage impacts the resorts and consequently the local economy of the community.

It focuses on the short-term implications of the spillway overflow, excluding the long-term effects of environmental and infrastructural issues beyond the tourist sector. Also, the study will not encompass other sectors of the local economy or other regions outside of Barangay Pararao.

Problem Statement

The recent flooding caused by the damaged Barangay Luluasan Spillway in Barangay Pararao, Balatan, has triggered concerns over its impact on the local resort tourism. The intensity of the flood and the disruption it caused for the resorts threaten the local business sustainability, which is indispensable to the community's

economy. Nevertheless, little literature exists about the impact of infrastructure failure; that is, the effects of the spillway damage on the resort and other economic sectors in the surrounding areas. This paper presents an effort to find an answer to this research question by establishing the severity of flooding within the spillway, assessing the direct and indirect effects of spillway flooding on local resorts businesses, and providing guidelines towards mitigating these adverse factors to ensure long-term sustainability of the community economy.

LITERATURE REVIEW

The spillway in Barangay Pararao, Balatan, Camarines Sur, which caused flooding in the area, poses risks to resort tourism in the region. The region has become vulnerable to extreme weather events due to climate change. The heavy flooding caused by Tropical Storm Kristine in 2024 is proof of this. The storm brought unprecedented

rainfall, causing massive damage in Naga City and other surrounding areas, including Balatan (GMA News Online, 2024).

Heavy rains of 760.7 mm in 24 hours were the major cause of huge setbacks for local infrastructure, the research says. Resort areas in Barangay Pararao, which rely heavily on stable weather for tourist traffic, were badly affected; the damage would impact those economies dependent on visitor heads, according to Dateline Ibalon (2024). The topography also hampers this as the region has steep hills and mountains, which intensifies rain impact, causing the same to result in speedy runoffs and over-spills of local spillways. The National Economic and Development Authority (NEDA) of the Bicol Region observes that flooding has been an ongoing negative effect on tourism in Camarines Sur. Resort tourism, a critical component to the health of the regional economy, is increasingly being threatened by frequent floods (Naga City Government, 2022). It has become a significant nuisance because people cannot access the resorts easily, and concerns about safety increase (Philippine Daily Inquirer, 2024).

Further, the infrastructure of the regional roads and utilities are always prone to flood damage which also makes it difficult for tourists to access the region and goods flow that again increases the economic vulnerability of the region (Rappler, 2024). A proactive long-term adaptation to climate change including upgrading of flood control infrastructure is the need to protect the resort tourism industry (Inquirer.net, 2024). In addition to the challenge of physical infrastructure, another consideration is the social aspect of flooding on local communities. Studies on the socio-economic impact of flooding in the Bicol Region present evidence that communities, including those situated near resort areas such as Barangay Pararao, suffer long-term loss of livelihoods. Local residents often rely on tourist-related activities for their incomes, and floods force many to find alternative sources of employment that can have a ripple effect on local economies (Gonzales & Gatchalian, 2023). This region needs to establish effective mitigation strategies, for with climate change, it can expect the frequency and intensity of such flooding to rise (Mangente's Beach Resort, n.d.). It is these comprehensive strategies, from infrastructural improvement to adaptive land-use planning, that are going to secure the future of tourism in such flood-prone areas.

The tourism industry is becoming more susceptible to natural disasters, warranting holistic disaster risk management (DRM) practices. A systematic review narrative by Zhang et al. (2023) highlights the increasing attention to utilizing tourism for disaster management, pinpointing major themes as education, infrastructure preparedness, and community resilience. The research identifies the comparative advantage of tourism in helping to strengthen all phases of DRM, and advocating for its incorporation into disaster planning and response measures can make the industry more resilient.

The Philippines, which has its natural beauty, is also highly vulnerable to natural disasters that have a serious impact on both its hospitality and tourism industries. According to Shimizu et al. (2023), natural disasters cause low tourist arrivals, damage to infrastructure, and economic losses to the tourism-based areas. The research emphasizes the need for diversification of tourism products, facilitating sustainable tourism practices, and enhancing public-private collaborations for improving disaster resilience.

Proper risk management is essential in ensuring tourism competitiveness in disaster-risk areas. Liu et al. (2019) carried out a cross-national study showing that both vulnerability and exposure to natural disasters

have a negative impact on the tourism competitiveness of a nation. Nevertheless, intensified risk management can offset these negative impacts, making disaster preparedness and response mechanisms imperative to ensure that the tourism sector's growth and stability are maintained.

METHODOLOGY

This study utilizes the mixed-method approach, whereby both quantitative and qualitative approaches are merged to comprehensively evaluate the impact of the flooded spillway on resort tourism in Barangay Pararao, Balatan. By combining numerical data with specific stakeholder insights, the research offers a holistic analysis of both economic trends and personal experiences.

The study involved four (4) key participants who represented the primary stakeholders of the local tourism industry: resort owners, employees, and community members. Using Purposive Sampling this sampling method ensures that the participants selected are those with the most direct knowledge and experience regarding the

Luluasan Spillway and its impact on resort operations. Structured questionnaires will be administered to estimate the level of flooding, the number of times a disruption has occurred, and the economic losses to businesses. A survey questionnaire using a 4-point Likert Scale (4: To a Great Extent to 1: Not at All) was used to measure the severity of flooding and its impact on businesses.

Semi-structured In-depth interviews will be carried out with key stakeholders; resort owners, local government officials, and community members, in order to explore the personal experiences, challenges, and perceptions regarding the damage to the spillway. Focus group discussions will shed further light on the collective experience of the community and solutions to the impact of failure in infrastructure.

Data Collection

Primary data will be gathered from surveys, interviews, and focus group discussions. For the analysis, government reports, tourism statistics, and infrastructure assessments will be reviewed as secondary data.

Data Analysis

The data gathered from the four participants were analyzed using the following methods:

1. Quantitative Analysis. Descriptive statistics, specifically Mean and Standard Deviation (SD), were calculated to determine the consensus on flooding severity and economic impact. Additionally, the Friedman Test—a non-parametric alternative to the repeated measures ANOVA—was utilized to test the hypothesis regarding the correlation between flood severity and business impact.

2. Qualitative Analysis. The interview transcripts and focus group notes were subjected to Thematic Analysis. This involved coding the responses to identify recurring themes, such as "accessibility challenges," "revenue loss," and "infrastructure needs," providing depth to the statistical findings.

RESULTS

Severity of Flooding within Barangay Luluasan Spillway

The results show that the flooding level in Barangay Luluasan Spillway is severe, especially during typhoons. Major issues identified are that water levels always overflowed above the spillway, which brought flooding to the adjacent roads and residential areas. Its mean score was 4.00 with no variability (SD = 0.00). The quick

overflow of the spillway also traps residents and interrupts emergency responses, which again underscores the severity of such events. Erosion along the spillway further increases the risks by enhancing the possibility of structural collapse and increased flooding, equally rated with a mean of 4.00 and SD of 0.00. It can, therefore, be said that the impact of flooding was consistently severe on the community and that urgent mitigation efforts were required.

These revelations underscore the urgent necessity of expanded flood management infrastructure, especially considering the region's vulnerability to severe weather conditions caused by climate change. By the National Economic and Development Authority (NEDA) of the Bicol Region, recurrent flooding has already directly affected local communities and their capacity for economic recovery. The levels of erosion high in the results further concur with research conducted by Gonzales & Gatchalian (2023), where they highlight that decaying infrastructure amplifies flood risk, creating prolonged displacement and economic uncertainty. As such, investment in measures such as the reinforcement of spillways, drainage systems, and community-based disaster response programs are called for in order to buffer these effects and improve resilience.

Impact of Flooded Spillway on Local Businesses in Barangay Pararao

The results indicate that the flooded spillway in Barangay Pararao has a significant impact on local businesses, especially resorts, during typhoons. Booking cancellations due to road closure and supply chain disruption both scored a mean of 4.00 with no variability (SD = 0.00), which means that these effects are consistent and severe. Flood damage forcing the resorts to close and tourists staying away from the area due to flooding were rated somewhat less severe, with mean ratings of 3.75 and 3.50, respectively, and represented moderate variability

(SD = 0.50 and 0.58). Of course, the impact to the area's reputation as a destination for tourism was rated as severe (Mean = 4.00, SD = 0.00). These findings identify fundamental economic concerns with flooding and establish the urgency of improving methods of managing floods and providing relief aid to the affected business groups to keep local economic life going.

The effect of flooding on tourist-reliant enterprises is amply documented, with research pointing to the potential for long-term economic losses in the face of extreme weather. Shimizu et al. (2023) point to how natural disasters hamper tourism movement, destroy infrastructure, and take a toll on the sustainability of the sector. The economic vulnerability of the resorts in Barangay Pararao reflects the general problem facing flood-risk tourism zones in the Philippines, as discussed by the Philippine Daily Inquirer (2024). In addition, Zhang et al. (2023) highlight the significance of disaster risk management (DRM) measures specifically designed for tourism resilience, such as infrastructure development, emergency response planning, and economic recovery initiatives. By adopting these measures, the financial impacts faced by local enterprises can be minimized, and the tourism industry in the area can be made more resilient.

Hypothesis

The hypothesis tested the correlation of the severity of flooding on its impact on local businesses with the Friedman test. From the results, one could see a chi-square value of 13.2, degrees of freedom at 9, and the pvalue at 0.154. Since the p-value was higher than the standard signification level of 0.05, the test results indicate that there are no statistically significant relationships with the severity of flooding on

Barangay Luluasan Spillway and their impact on the local business in Barangay Pararao. Thus, two critical issues may not be of direct correlation with the data evaluated.

Challenges Experienced (Q11):

The flooding of Luluasan Spillway is problematic during typhoons. The floodwaters cut off the daily lives of people and businesses. Guests frequently cancel their bookings because of the area's inaccessibility, and the condition of the spillway makes emergency responses extremely dangerous. Moreover, the broken spillway isolates communities from access to the facilities and the town proper, which leaves the residents stranded and amplifies the difficulties in critical situations.

Impact On Local Businesses (Q12):

The flooded spillway negatively impacts local businesses, especially resorts, due to reduced operations and income. The Luluasan Bridge is impassable with the flooding, and both businessmen and customers face significant challenges. The few tourists and cancellations of bookings reduce revenue further, and this is where the economic impact of flooding on community livelihood is seen.

Proposed Solutions (Q13):

Emphasized by the respondents, proactive measures to address the spillway flooding and the impacts thereof are necessary. Some of the suggestions presented include repairing and elevating the Luluasan Bridge to prevent overflow and setting up an alternate route whenever budget constraints arise. This should be complemented with more long-term solutions such as infrastructure improvement,

better preparedness for disasters, more community engagement, urban planning, and real-time monitoring of water levels to trigger timely warnings.

CONCLUSION/RECOMMENDATIONS

The effects of flooding in Barangay Luluasan Spillway are dismal is severe to both the community and local businesses in Barangay Pararao. Flooding causes disruption to transportation, isolates residents, and makes them vulnerable to safety risks. At the same time, it causes significant economic problems such as cancellation of bookings and reduced revenues to the local businesses, most especially the resorts. Though statistics do not necessarily support a relation between these challenges, qualitative findings indicate that all these issues relate

to each other. To this end, improving the infrastructure like repairing and elevation of the Luluasan Bridge such that its overflow is mitigated and ensuring another route in emergencies is suggested by the local government. Long-term policies should focus more on better preparation for disasters through accurate forecasting, real-time water level monitoring, and timely warnings when the danger appears. In order to build resilient communities, appropriate community engagement in urban planning plays a crucial role in minimizing effects on residents and local businesses caused by future flooding.

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Annex

Survey Questionnaire

Directions: Put a check mark (✓) on the box that best describes your answer. Use the scale below to indicate your level of agreement or the extent to which you believe the statement applies. 4-Point Likert Scale

4- To a Great Extent

3- To Some Extent

2- To a Limited Extent

1- Not at All

Severity of Flooding within Barangay Luluasan Spillway

	STATEMENTS	4	3	2	1
1.	During typhoons, water levels often rise above the spillway, flooding nearby roads and residential areas.				
2.	During typhoons, the spillway's drainage system fails to contain the surge, leading to widespread inundation.				
3.	During typhoons, floodwaters submerge critical infrastructure, causing long-term damage and recovery challenges.				
4.	During typhoons, the rapid overflow of the spillway traps residents and disrupts emergency response efforts.				
5.	During typhoons, erosion along the spillway worsens, increasing the likelihood of structural collapse and greater flooding.				

Impact of Flooded Spillway on Local Businesses in Barangay Pararao

STATEMENTS	4	3	2	1
During typhoons, resorts face booking cancellations due to road closures.				
During typhoons, flood damage forces resorts to halt operations.				
During typhoons, tourists avoid the area, hurting the local economy.				
During typhoons, disrupted supplies affect resort services.				
). During typhoons, flooding harms the area's reputation for tourism.				

Interview questions:

11. What specific challenges have you experienced during typhoons due to flooding in the Barangay Luluasan Spillway, and how have these impacted daily life?

12. How has the flooded spillway affected the operations and revenue of local businesses, particularly resorts in Barangay Pararao?

13. What measures do you think should be implemented to reduce the impact of spillway flooding on the community and local businesses?